



Methodological Evaluation of Power-Distribution Equipment Systems in South Africa: Quasi-Experimental Design for Yield Improvement Inquiry

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Abstract

Power-distribution equipment systems are critical for ensuring reliable electricity supply in South Africa's infrastructure. However, their performance varies significantly across different regions and settings. A mixed-method approach was employed, including both quantitative data analysis and qualitative field observations to assess system performance across different regions. Statistical models were used to quantify the impact of these systems on power delivery efficiency. In a particular region, an increase in yield by 15% was observed with optimal configuration of power-distribution equipment, indicating significant potential for improvement when tailored appropriately. The quasi-experimental design provided robust insights into the efficacy of power-distribution systems and highlighted the importance of regional adaptation in achieving maximum efficiency. Tailored recommendations were formulated based on findings from this study to guide policymakers and engineers in optimising power distribution systems for better performance and reliability. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \text{var}\epsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Sub-Saharan, African, Ethiopia, Quantitative, Growth

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