African Diplomacy and International Affairs (Political Science focus)

Methodological Evaluation of Off-Grid Communities Systems in South Africa Using Difference-in-Differences Models

Siyabonga Xhakileopatsi[1]

[1] University of the Witwatersrand

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Correspondence: sxhakileopatsi@outlook.com

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Author notes

Siyabonga Xhakileopatsi is affiliated with University of the Witwatersrand and focuses on Computer Science research in Africa.

Abstract

Recent technological advancements have led to an increase in off-grid communities systems in South Africa aimed at providing sustainable energy solutions. The research employs DiD models to analyse data from off-grid communities before and after the implementation of energy solutions. Robust standard errors are used to account for potential confounders. A significant reduction in electricity costs was observed in treated communities, with a decrease of 30% compared to control areas. The DiD models effectively capture the impact of off-grid community systems on cost-effectiveness, providing actionable insights for policymakers and stakeholders. Policymakers should prioritise further research into scalability and sustainability issues associated with these systems. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, African economies, DID, modelling, sustainability, stakeholders, growth*

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