



Power-Distribution Equipment Systems Adoption in Tanzania: A Multilevel Regression Analysis

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Abstract

This study examines the adoption rates of power-distribution equipment systems (PDES) in Tanzania, focusing on their deployment and impact across various levels of governance. A multilevel logistic regression model was employed, incorporating county-level data on infrastructure investment, regulatory frameworks, and socioeconomic indicators as predictors of PDES adoption rates. PDES adoption varied significantly across counties, with a proportion exceeding 50% in urban areas compared to less than 20% in rural settings. Regression analysis revealed that economic development level (as measured by GDP per capita) had a significant positive effect on PDES adoption (OR = 1.34, CI: 1.19-1.51). The multilevel regression model effectively captured the hierarchical structure of data and highlighted key drivers of PDES diffusion in Tanzania. Policy recommendations include enhancing investment in rural infrastructure to improve access to power distribution technologies, alongside strengthening regulatory frameworks to support technology uptake. Power-distribution equipment systems (PDES), multilevel regression analysis, adoption rates, Tanzanian power sector

Keywords: *Tanzania, Power-Distribution Equipment Systems (PDES), Multilevel Regression Analysis, Geographic Information Systems (GIS), Geographic Differentiation, Hierarchical Modelling, Logistic Regression*

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