African Maritime Law Journal
(Law/Engineering/Environmental crossover)

Methodological Evaluation of Power-Distribution Equipment Systems in Tanzania: Quasi-Experimental Design for System Reliability Assessment

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Published: 06 January 2009 | **Received:** 12 October 2008 | **Accepted:** 21 November 2008

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DOI: 10.5281/zenodo.18900113

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Abstract

This study addresses a current research gap in Engineering concerning Methodological evaluation of power-distribution equipment systems in Tanzania: quasi-experimental design for measuring system reliability in Tanzania. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of power-distribution equipment systems in Tanzania: quasi-experimental design for measuring system reliability, Tanzania, Africa, Engineering, intervention study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Geographic Information Systems (GIS), System Dynamics, Data Mining, Modelling Techniques, Simulation Studies, Network Analysis*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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