African History of Science and Technology (Humanities perspective)

Bayesian Hierarchical Model for Measuring Adoption Rates in Nigerian Transport Maintenance Depots Systems: A Methodological Evaluation

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Abstract

This study addresses a current research gap in Engineering concerning Methodological evaluation of transport maintenance depots systems in Nigeria: Bayesian hierarchical model for measuring adoption rates in Nigeria. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. 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 transport maintenance depots systems in Nigeria: Bayesian hierarchical model for measuring adoption rates, Nigeria, Africa, Engineering, case 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: *African geography, Bayesian inference, hierarchical modelling, adoption rates, engineering methodology, transport systems, Nigeria*

ABSTRACT-ONLY PUBLICATION

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