African Structural Geology (Earth Science)

Bayesian Hierarchical Model for Measuring Adoption Rates in Process-Control Systems: A Comparative Study in Uganda

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Abstract

The adoption rates of process-control systems in Uganda have been a subject of interest for researchers and policymakers seeking to optimise industrial processes. A comparative study using data from various industries in Uganda was conducted. A Bayesian hierarchical model was applied to analyse the adoption rates of these systems, incorporating both quantitative and qualitative data for robust inference. The analysis revealed that the rate of adoption varied significantly across sectors, with manufacturing showing a higher adoption rate compared to agriculture (75% vs. 40%). Bayesian hierarchical models provided nuanced insights into the factors affecting system adoption rates in Uganda's industrial landscape. Policymakers should prioritise sector-specific strategies that address unique challenges faced by different industries, such as technological barriers and infrastructure limitations. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, African, Comparative, Methodological, Evaluation, Hierarchical, Bayesian*

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