Bayesian Hierarchical Model for Measuring Cost-Effectiveness in Nigerian Manufacturing Plants Systems,

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Abstract

Manufacturing plants in Nigeria have experienced significant operational inefficiencies over the past decade, leading to high costs and poor productivity. The analysis employs a Bayesian hierarchical regression model to account for variability among different plant types and industries. Uncertainty in parameter estimates is assessed through robust standard errors. Bayesian inference revealed that the average cost-effectiveness ratio varied significantly by sector, with manufacturing plants in the agro-processing industry showing a higher effectiveness rate compared to those in oil refining. The Bayesian hierarchical model successfully captured the heterogeneity among plant types and provided nuanced insights into cost-efficiency improvements across different sectors of Nigerian manufacturing. Adopting targeted interventions based on sector-specific findings can lead to more effective resource allocation, thereby enhancing overall productivity in Nigerian manufacturing plants. Bayesian hierarchical model, cost-effectiveness, manufacturing systems, Nigeria The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

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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