African Ruminant Veterinary Science

Bayesian Hierarchical Model for Measuring Cost-Effectiveness in Manufacturing Plants of Uganda: A Comparative Study

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Abstract

Manufacturing plants in Uganda face challenges in cost-effectiveness due to varying operational efficiencies. A comparative study employing a Bayesian hierarchical model to assess the cost-effectiveness of different manufacturing systems. The model accounts for variability in plant performance across different scales and sectors. The analysis revealed significant differences in cost-efficiency ratios among various manufacturing units, with some showing substantial improvements through process optimization. Bayesian hierarchical modelling effectively highlights disparities in cost-effectiveness within Ugandan manufacturing plants, providing actionable insights for improvement. Manufacturers should prioritise continuous monitoring and adaptive strategies to enhance their operational efficiencies based on the findings of this study. manufacturing systems, cost-effectiveness, Bayesian hierarchical model, Uganda, agricultural production The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, Agricultural productivity, Econometrics, Factor analysis, Hierarchical modelling, Precision farming, Sustainability studies*

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