African Chemical Engineering Studies

Methodological Evaluation of Manufacturing Plants Systems in Nigeria Using Multilevel Regression Analysis for Cost-Effectiveness Assessment

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Abstract

Manufacturing plants in Nigeria face challenges related to inefficiencies that impact both operational costs and environmental sustainability. A multilevel regression model was employed to analyse data from multiple Nigerian manufacturing plants. The study aimed to incorporate both individual and organisational-level factors into the analysis. The multilevel model revealed significant differences in cost-effectiveness across different plant types, with a coefficient of determination (R^2) of approximately 0.75 indicating substantial explanatory power. This study provides evidence that multilevel regression analysis can effectively measure and compare manufacturing systems' cost-effectiveness in Nigeria. Managers should consider implementing the identified best practices to enhance their plants' efficiency, thus reducing costs and improving sustainability. manufacturing plants, cost-effectiveness, multilevel regression, Nigerian context The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Nigerian, Multilevel, Regression, Cost-Effectiveness, Modelling, Analysis, Supply Chains*

ABSTRACT-ONLY PUBLICATION

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