



# Methodological Evaluation of Manufacturing Plants Systems in Ghana Using Multilevel Regression Analysis for Cost-Effectiveness Measures

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### Abstract

Manufacturing plants in Ghana face challenges related to operational efficiency and cost-effectiveness. A comprehensive study employing multilevel regression analysis was conducted. Data from 50 randomly selected plants across the country were analysed to assess system performance and costs. The analysis revealed that plant size has a significant influence on operational efficiency, with larger plants showing higher cost-effectiveness ratios (CERs). This study provides insights into optimising manufacturing systems in Ghana by identifying key factors for improvement. Implementing process improvements and training programmes tailored to specific plant sizes could enhance overall performance and reduce costs. Manufacturing systems, multilevel regression analysis, cost-effectiveness, Ghana The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Sub-Saharan, regression, multilevel, econometric, productivity, stochastic, performance

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