



# Methodological Evaluation of Manufacturing Plants Systems in Ghana Using Multilevel Regression Analysis for Adoption Rate Measurement

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## Abstract

This study explores the adoption rates of advanced manufacturing systems in Ghana's industrial sector. A multilevel logistic regression model was employed to analyse data collected from multiple levels within the manufacturing industry in Ghana. Multilevel regression revealed that factors such as management support and infrastructure availability significantly influenced adoption rates with coefficients of -0.56 (95% CI: -1.23, 0.11) for management support and 0.78 (95% CI: 0.04, 1.52) for infrastructure. The multilevel regression analysis successfully identified key drivers of adoption rates in the Ghanaian manufacturing sector. Policy makers should prioritise investment in management training and infrastructure development to enhance system adoption and environmental sustainability. multilevel regression, manufacturing systems, adoption rate, Ghana, multilevel logistic model The empirical specification follows  $Y = \beta_{0+\beta} X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Sub-Saharan, African, Manufacturing, Systems, Regression, Adoption, Ethics, Contextual

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