



Methodological Evaluation of Manufacturing Systems Adoption in Ethiopian Plants Using Multilevel Regression Analysis

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Abstract

This study examines the adoption of manufacturing systems in Ethiopian plants by evaluating their effectiveness. A multilevel regression model will be employed to analyse adoption rates at both plant-level and national levels. The study will utilise survey data collected from a sample of Ethiopian plants. The findings suggest that the adoption rate of advanced manufacturing systems in Ethiopian plants is significantly higher among those with higher investment, indicating a strong correlation between financial resources and technological advancement. This research contributes to the understanding of how Ethiopian manufacturers can leverage technology for economic growth by identifying key factors influencing system adoption. Manufacturers should consider increasing their investments in technology as it correlates positively with the adoption of advanced manufacturing systems, potentially leading to better productivity and competitiveness. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \sum_{i=1}^n \ell(y_i, f(\theta(\xi))) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: Ethiopia, Multilevel Regression, Adoption Rates, Manufacturing Systems, Hierarchical Analysis, Geographic Information Systems, Methodology, Quantitative Research

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