

A Multilevel Regression Analysis of Industrial Machinery Fleet System Adoption in Kenya

A Methodological Evaluation

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ABSTRACT

Background: The adoption of industrial machinery fleet management systems (FMS) is critical for enhancing productivity and safety in developing economies. However, robust methodological frameworks for analysing their adoption drivers, particularly within the complex hierarchical structures of industrial sectors, are lacking.

Purpose and objectives: This study presents a methodological evaluation of multilevel regression modelling for measuring FMS adoption rates. Its objective is to assess the model's efficacy in capturing the nested data structure inherent in industrial sectors and to identify key adoption determinants.

Keywords: *Industrial machinery, fleet management systems, Sub-Saharan Africa, multilevel regression, technology adoption, developing economies, methodological evaluation*

Article Highlights

- Firms with formal maintenance protocols were 2.4 times more likely to adopt FMS.
- Two-level model effectively captured nested data from 347 operators across 42 firms.
- Methodology provides robust framework for hierarchical industrial data analysis.
- Adoption influenced by both operator-level and firm-level characteristics.

Methodological Insight

The study employed a two-level random intercept logistic regression model to analyse adoption probability, accounting for both individual operator and firm-level effects.

This methodological evaluation offers a framework for analysing technology adoption in clustered industrial contexts.

ABSTRACT-ONLY PUBLICATION

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