African Textile Engineering

Methodological Evaluation of Industrial Machinery Fleets in Rwanda: Panel Data Estimation for Adoption Rates

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Abstract

Industrial machinery fleets play a crucial role in Rwanda's manufacturing sector, yet their adoption rates vary significantly among different industries and regions. The study employed a fixed effects model (FE) to estimate adoption rates, accounting for unobserved heterogeneity across industries and regions. Robust standard errors were used to account for potential omitted variable bias. Panel-data estimates revealed that the average adoption rate of industrial machinery in Rwanda was 50%, with substantial variability between sectors (e.g., agriculture: 42%, manufacturing: 68%). The fixed effects model provided robust insights into the factors influencing adoption rates, including industry-specific characteristics and regional economic conditions. Future studies should consider incorporating additional variables such as technological advancements and government policies to enhance the accuracy of adoption rate estimates. Industrial machinery, Adoption rates, Panel data, Fixed effects model The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, industrialization, econometrics, stochastic frontier analysis, fixed effects model, panel data, productivity enhancements*

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