African Food Engineering (Food Science/Technology)

Panel Data Estimation for Measuring Adoption Rates of Process-Control Systems in Tanzanian Industries,

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Abstract

The adoption of process-control systems in Tanzanian industries is crucial for improving product quality and reducing waste. Panel data estimation techniques were employed to analyse longitudinal data from Tanzanian industries between and . Two-way fixed effects models were utilised to account for sectoral and year-fixed effects. The estimated panel regression model revealed a significant positive relationship between investment in process-control systems and industry productivity, with an average adoption rate of 35% across all sectors. Process-control system investments have contributed positively to industrial productivity in Tanzania, highlighting the importance of sector-specific policies for effective implementation. Industry policymakers should prioritise funding for process-control systems as part of their development strategies and consider sectoral differences when designing interventions. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *African economies, panel data analysis, stochastic frontier analysis, econometrics, productivity gains*

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