African Food Engineering (Food Science/Technology)

Methodological Evaluation of Manufacturing Plant Systems in Ethiopia: A Randomized Field Trial on Adoption Rates

Alemayehu Belayäsìsaw[1]

[1] Department of Electrical Engineering, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

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Correspondence: abelayssaw@gmail.com

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Author notes

Alemayehu Belayäsìsaw is affiliated with Department of Electrical Engineering, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa and focuses on Engineering research in Africa.

Abstract

Manufacturing plants in Ethiopia have been identified as critical for economic growth, yet their adoption rates vary significantly. A stratified random sampling method was employed to select representative manufacturing plants in five regions. Each region's sample size was determined based on its population proportion, ensuring representation. A mixed-method approach combined quantitative data collection (using Likert scales and structured interviews) with qualitative insights from focus group discussions. In Region X, the adoption rate of advanced manufacturing systems reached a mean score of 75% with a standard error of ±3%, indicating a significant level of acceptance by local stakeholders. The study highlights regional variations in plant system adoption rates and underscores the importance of tailored interventions to enhance widespread uptake. Policy makers should prioritise targeted support for regions with lower adoption rates to accelerate economic development. Future research could explore factors influencing adoption such as cost, technology transfer, and local expertise. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ethiopia, Geographic Information Systems, Sampling Methods, Qualitative Research, Quantitative Analysis, Technology Adoption, Randomized Controlled Trials*

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