African Glacial Studies (where applicable - Earth Science)

Methodological Evaluation of Manufacturing Systems Cost-Effectiveness in Ethiopian Plants: A Randomized Field Trial,Contextual Analysis

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Abstract

This study aims to evaluate the cost-effectiveness of manufacturing systems in Ethiopian plants through a randomized field trial. A mixed-method approach combining quantitative data analysis from cost-effectiveness ratios and qualitative interviews with plant managers was employed. Randomized field trials were conducted in three regions to ensure a diverse sample set representative of Ethiopia's manufacturing sector. Manufacturing systems that incorporated lean management principles showed an average cost reduction of 15% compared to traditional methods, indicating their effectiveness in enhancing efficiency and productivity. The findings suggest that adopting lean management practices can significantly improve the economic performance of Ethiopian industrial plants. Further implementation of these systems should be encouraged with targeted training for managers and continuous monitoring to sustain cost savings. manufacturing systems, manufacturing costs, cost-effectiveness analysis, Ethiopia, randomized field trials The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Lean Manufacturing, Sustainability Assessment, Supply Chain Management, Case Study Methodology, Environmental Impact Analysis*

ABSTRACT-ONLY PUBLICATION

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