



# Methodological Assessment of Quasi-Experimental Designs for Yield Improvement in Ethiopian Manufacturing Plants Systems

Mengistu Gizaw<sup>1</sup>

<sup>1</sup> Addis Ababa Science and Technology University (AASTU)

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**Correspondence:** [mgizaw@gmail.com](mailto:mgizaw@gmail.com)

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## Author notes

*Mengistu Gizaw is affiliated with Addis Ababa Science and Technology University (AASTU) and focuses on Engineering research in Africa.*

## Abstract

Manufacturing plants in Ethiopia have been identified as critical sectors for economic growth. However, yield improvements often face challenges due to varying operational conditions and environmental factors. The study employs a mixed-method approach combining quantitative data from multiple plants with qualitative insights from interviews. Statistical models are used to analyse yield data while accounting for potential confounders. A significant proportion (72%) of the variance in yield improvement was explained by plant-specific operational parameters, highlighting the importance of tailored interventions rather than generic solutions. The quasi-experimental design proved robust in detecting meaningful yield improvements across different Ethiopian manufacturing environments. Future research should validate these findings with larger datasets. Manufacturing managers and policymakers are encouraged to adopt a data-driven approach informed by the insights from this study, particularly for targeting yield enhancement strategies effectively. Quasi-Experimental Design, Yield Improvement, Manufacturing Plants, Ethiopia The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Ethiopia, Manufacturing Systems, Quasi-Experimental Design, Methodology, Evaluation, Performance Metrics, Regression Discontinuity Analysis

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