



Methodological Evaluation of Process-Control Systems in Ethiopian Industries: A Randomized Field Trial on Efficiency Gains

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Abstract

The industrial sector in Ethiopia is expanding, necessitating a robust evaluation of process-control systems to enhance efficiency and productivity. A randomized controlled trial design was employed, with the intervention being the implementation of advanced control systems. Process data from ten randomly selected industrial units were collected over six months to evaluate performance metrics including yield and cost-efficiency. In some sectors, there was a notable increase in production efficiency by approximately 15%, as measured by improved output yields while maintaining similar costs. The randomized field trial demonstrated the effectiveness of process-control systems in enhancing industrial productivity in Ethiopia. Sustainable implementation strategies should be developed and promoted to ensure widespread adoption of these control systems across Ethiopian industries. process-control, efficiency gains, randomized controlled trial, Ethiopian industries The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Ethiopia, Geographic Information Systems (GIS), Process Control, Statistical Quality Control, Lean Manufacturing, Six Sigma, Randomized Controlled Trials (RCT)

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