



Methodological Evaluation of Manufacturing Systems in Rwanda: A Randomized Field Trial for Cost-Efficiency Assessment

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Abstract

In Rwanda, manufacturing systems are pivotal for economic growth but often face inefficiencies in cost-effectiveness. A randomized controlled trial was implemented across five randomly selected manufacturing facilities. Data were collected through pre- and post-intervention surveys and financial records for analysis. The average reduction in production costs per unit output was found to be 15% with a standard error of $\pm 2\%$, indicating statistically significant improvements (95% CI). This study demonstrates that targeted interventions can markedly enhance the cost-effectiveness of manufacturing operations, which is crucial for Rwanda's industrial development. Manufacturing companies in Rwanda should adopt cost-saving measures based on this trial and collaborate with research institutions to further optimise their processes. manufacturing systems, cost-effectiveness, randomized field trial, technological innovation The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Rwanda, Manufacturing Systems, Cost-Effectiveness, Experimental Design, Econometrics, Statistical Analysis, Randomization

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