



Methodological Evaluation of Manufacturing Plant Systems in Uganda Using Difference-in-Differences Model for System Reliability Assessment

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Abstract

Manufacturing systems in Uganda face challenges related to system reliability due to varying operational conditions and technological advancements. A Difference-in-Differences model was employed to analyse data from multiple manufacturing plants across Uganda. The DiD approach compared changes over time within and between treatment groups to isolate the impact of interventions on system reliability. The findings indicate a significant improvement in system reliability post-intervention, with an estimated increase of 25% in mean system uptime per month among treated facilities compared to control group. This study demonstrates the utility of the DiD method for evaluating manufacturing plant systems and highlights the potential for enhancing system reliability through targeted interventions. Manufacturing managers should consider implementing similar intervention strategies based on this model's results, alongside ongoing monitoring and maintenance practices to further improve system performance. Difference-in-Differences, Manufacturing Systems, System Reliability, Uganda 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: Manufacturing, Uganda, Reliability, Methodology, Econometrics, Systems, Analysis

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