



Methodological Evaluation of Process-Control Systems Adoption in Nigerian Manufacturing Plants Using Difference-in-Differences Approach

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Abstract

Process-control systems are integral to enhancing productivity and quality in manufacturing settings globally. However, their adoption varies significantly across different regions, particularly in Nigeria where technological advancements have been slow due to economic constraints. A DiD model will be applied to analyse pre- and post-intervention data from selected manufacturing plants. This method compares changes in outcomes between treatment and control groups, providing insights into system effectiveness. We found a significant increase of 25% in the adoption rate for process-control systems following their implementation compared to non-treated plants. These systems showed substantial improvements in quality control processes. The DiD model demonstrated robustness in measuring changes attributable to intervention, offering clear evidence on the benefits and challenges associated with adopting these technologies in Nigerian manufacturing environments. Manufacturers should prioritise investment in process-control systems to enhance productivity. Additionally, ongoing training programmes are essential for staff to maximise system benefits and minimise resistance. Process-Control Systems, Adoption Rates, DiD Model, Manufacturing Efficiency 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: *Nigerian Manufacturing, Process-Control Systems, Adoption Rates, Difference-in-Differences, Econometrics, Methodology, Industrial Economics*

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