



Methodological Evaluation of Process-Control Systems Adoption Rates in Nigeria Using Difference-in-Differences Analysis

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Abstract

Process-control systems (PCS) are essential in engineering projects to ensure quality and safety standards. In Nigeria, their adoption rates have been observed but not systematically analysed. A DiD approach will be employed to assess the impact of PCS implementation across different sectors and regions. This method compares changes in PCS use before and after their introduction, controlling for potential confounding factors such as technological advancements and economic conditions. The analysis reveals a significant increase in PCS adoption rates from to , particularly in the oil and gas sector where they are crucial for safety monitoring. However, there is a notable regional disparity with higher adoption in urban areas compared to rural regions. The DiD model effectively highlights variations in PCS use over time and across geographical locations, providing insights into factors influencing their adoption. Policy makers should consider incentivizing the adoption of PCS in underserved regions to enhance safety standards and technological integration. 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, DiD, econometrics, quality control, diffusion model, panel analysis, empirical methodology

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