



# Methodological Assessment of Process-Control Systems in Nigerian Industries Using Quasi-Experimental Design

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## Abstract

Process-control systems (PCSs) are essential for improving efficiency in industrial settings across Nigeria. However, their effectiveness varies widely and is often influenced by contextual factors such as industry type, technological infrastructure, and management practices. A mixed-method approach was employed, combining quantitative analysis (using a difference-in-differences regression model) with qualitative insights from interviews and surveys. Data were collected from a sample of 50 industrial plants randomly selected to represent various industries in Nigeria. The difference-in-differences regression revealed an average increase of 18% in process efficiency post-PCS implementation, though these gains varied significantly across sectors (e.g., manufacturing vs. services). This study provides empirical evidence that PCSs can lead to substantial improvements in industrial processes in Nigeria, although sector-specific adaptations are required. Industrial policymakers and managers should prioritise the adoption of PCSs alongside targeted interventions tailored to specific industry needs for optimal efficiency gains. Process-Control Systems, Quasi-Experimental Design, Industrial Efficiency, Nigeria 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:** *Sub-Saharan Africa, Methodology, Process-Control Systems, Quasi-Experimental Design, Efficiency Measurement, Industrial Engineering, Evaluation Techniques*

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