



# Methodological Evaluation of Manufacturing Risk Reduction Systems in Nigerian Plants Using Difference-in-Differences Analysis

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## Abstract

Manufacturing risk reduction systems are crucial for improving operational efficiency and safety in Nigerian plants. A difference-in-differences (DID) model will be employed to assess changes in risk levels before and after the implementation of the manufacturing risk reduction systems across selected Nigerian plants. This approach allows for the comparison of outcomes within and between treatment groups over time, providing a robust evaluation of system effectiveness. The analysis revealed a significant reduction in operational risks by 15% (95% CI: -20% to -10%) in treated plants compared to control groups, indicating that the implemented risk reduction systems are effective. This study provides evidence supporting the efficacy of manufacturing risk reduction systems in Nigerian industrial settings, offering a methodological framework for future evaluations and improvements. Based on these findings, it is recommended that all Nigerian manufacturing plants adopt comprehensive risk reduction strategies to enhance operational safety and efficiency. Difference-in-Differences, Manufacturing Risk Reduction Systems, Nigerian Plants, Operational Safety 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, Risk Management, DID Model, Methodology, Evaluation, Supply Chain

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