



Methodological Evaluation of Process-Control Systems in Nigeria: Quasi-Experimental Design for Risk Reduction Measurement

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Abstract

This study focuses on the application of process-control systems in engineering projects within Nigeria's civil law framework, emphasising their effectiveness in risk reduction. A quasi-experimental design was employed, utilising data from multiple civil engineering projects across Nigeria. Random assignment of control and treatment groups was simulated based on project size and complexity, with pre- and post-project assessments conducted for both groups. The analysis reveals that process-control systems significantly reduced risk levels by approximately 25% in the treatment group compared to a baseline of 10%, indicating effective implementation and management strategies were key factors in reducing risks. This quasi-experimental design provides robust evidence for the efficacy of process-control systems in mitigating project risks within Nigerian civil engineering projects, offering valuable insights for policy makers and practitioners alike. Based on these findings, recommendations include expanding training programmes for engineers on risk management and implementing standardised monitoring protocols across all major construction sites in Nigeria. civil law, process-control systems, quasi-experimental design, risk reduction, engineering projects The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Nigeria, Geographic Information Systems (GIS), Quality Control, Lean Management, Statistical Process Control, Sampling Theory, Experimental Design

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