

A Quasi-Experimental Evaluation of Operational Risk Reduction in Ghanaian Manufacturing Systems

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ABSTRACT

Background: Operational risk in manufacturing systems within developing economies is a critical yet under-researched area, with a paucity of robust methodological frameworks for evaluating engineering interventions in real-world settings.

Purpose and objectives: This study aimed to develop and apply a quasi-experimental design to quantitatively evaluate the efficacy of a structured engineering risk control programme in reducing operational incidents within manufacturing plants.

Keywords: *Operational risk management, Quasi-experimental design, Manufacturing systems, Sub-Saharan Africa, Risk reduction, Ghanaian industry, Process safety*

Article Highlights

- A quasi-experimental design with a difference-in-differences model quantified causal treatment effects.
- The integrated risk control programme yielded a statistically significant 34% reduction in risk events.
- Study provides a methodological framework for evaluating engineering interventions in real-world settings.
- Findings support the adoption of evidence-based risk protocols in manufacturing systems.

Methodological Note

The pre-test/post-test control group design with cluster-robust inference offers a rigorous approach to causal evaluation in field-based engineering research.

This study presents a field-tested framework for evaluating operational risk interventions.



ABSTRACT-ONLY PUBLICATION

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