

# A Methodological Evaluation of Process-Control Systems in Senegal

*A Difference-in-Differences Model for Risk Reduction*

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## ABSTRACT

**Background:** Process-control systems are critical for industrial safety and efficiency, yet rigorous methodological frameworks for evaluating their impact on operational risk in developing economies are scarce. This gap is particularly evident in the African context, where infrastructure and regulatory environments present unique challenges.

**Purpose and objectives:** This working paper develops and applies a quasi-experimental econometric model to quantify the risk-reduction efficacy of modernised process-control systems implemented in an industrial sector. The primary objective is to provide a robust methodological template for causal inference in engineering safety evaluations.

**Keywords:** *Process-control systems, Risk reduction, Difference-in-differences, Industrial safety, Francophone Africa*

### Article Highlights

- Difference-in-differences model isolates causal effects of process-control systems.
- Preliminary estimates show 18% risk reduction with modernized systems.
- Methodological template for causal inference in engineering safety evaluations.
- Validates quasi-experimental designs for industrial risk assessment.

### Core Methodology

Difference-in-differences model comparing incident frequency between treatment and control facilities before/after system implementation.

*This working paper presents a methodological framework for causal inference in engineering safety.*



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This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.



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