

REPLICATION STUDY

Replication of a Quasi-Experimental Design for Measuring Adoption Rates in Nigerian Industrial Machinery Fleet Diagnostics

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ABSTRACT

Background: The original quasi-experimental study proposed a novel method for measuring the adoption rates of predictive diagnostics in industrial machinery fleets. Its findings, suggesting high potential uptake, have influenced maintenance policy discussions, yet its methodological robustness in a real-world operational setting required verification.

Purpose and objectives: This study aimed to replicate the original quasi-experimental design to evaluate its methodological rigour and empirical validity for measuring technology adoption in an industrial engineering context. The objective was to test the stability of the original effect estimates and the feasibility of the field implementation protocol.

Keywords: *Replication study, Quasi-experimental design, Adoption rates, Industrial machinery fleets, Sub-Saharan Africa, Predictive diagnostics*

Article Highlights

- Direct replication found non-significant effect (OR=1.12), contrasting original positive finding.
- Intermittent power supply emerged as critical, unmeasured factor influencing system engagement.
- Study demonstrates sensitivity of quasi-experimental designs to operational context in industrial settings.
- Recommends hybrid methods integrating sensor data with structured operational audits.

Contextual Insight

Implementation logs revealed intermittent electrical power as a decisive factor for diagnostic system engagement—a variable not fully accounted for in the original design protocol.

This replication underscores the importance of contextual rigor in technology adoption studies.

ABSTRACT-ONLY PUBLICATION

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