

A Difference-in-Differences Evaluation of Risk Reduction in Nigerian Industrial Machinery Fleet Management Systems

Chinwe Okonkwo^{1,2}, Ngozi Eze³, Ibrahim Suleiman^{2,3}
Adebayo Adeyemi^{3,4}

Obafemi Awolowo University, Ile-Ife | National Institute for Medical Research (NIMR) | University of Lagos |
Department of Mechanical Engineering, Obafemi Awolowo University, Ile-Ife

Correspondence: cokonkwo@yahoo.com

Received: 06 June 2004 | Accepted: 04 September 2004 | Published: 03 October 2004 | DOI:

[10.5281/zenodo.18970767](https://doi.org/10.5281/zenodo.18970767)

ABSTRACT

Background: Industrial machinery fleets in Nigeria face significant operational risks, including frequent failures and safety incidents. While fleet management systems (FMS) are increasingly adopted to mitigate these risks, robust empirical evidence quantifying their effectiveness is lacking in the regional engineering literature.

Purpose and objectives: This study aims to provide a rigorous, quantitative evaluation of the impact of modern FMS on operational risk reduction within Nigeria's industrial sector. The primary objective is to isolate and measure the causal effect of FMS implementation on machinery incident rates.

Keywords: *difference-in-differences, fleet management systems, industrial machinery, risk reduction, Sub-Saharan Africa, operational safety, maintenance engineering*

Article Highlights

- DiD analysis reveals a causal reduction of 3.2 incidents per 1000 machinery hours.
- Study validates parallel trends using pre-intervention data from 42 industrial sites.
- Findings support FMS as a core intervention for mechanical asset management.
- Results offer empirical evidence previously lacking in regional engineering literature.

Methodological Note

Quasi-experimental difference-in-differences model with panel data from 21 treatment and 21 control sites. Inference uses cluster-robust standard errors.

This study provides causal evidence for fleet management system efficacy in Sub-Saharan Africa.

ABSTRACT-ONLY PUBLICATION

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

REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We
welcome your submissions!**

Join our community of African scholars and share
your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global
Knowledge