African Learning Design

# Methodological Evaluation of Manufacturing Systems in Uganda Using Panel Data for Risk Reduction Measurement

**Chewang Byonyo**[1], **Ssenyonga Nabihindwa**[2]

[1] Department of Sustainable Systems, Kyambogo University, Kampala

[2] Kyambogo University, Kampala

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**Correspondence:** cbyonyo@gmail.com

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**Author notes**

*Chewang Byonyo is affiliated with Department of Sustainable Systems, Kyambogo University, Kampala and focuses on Engineering research in Africa.*

*Ssenyonga Nabihindwa is affiliated with Kyambogo University, Kampala and focuses on Engineering research in Africa.*

## Abstract

This Data Descriptor focuses on the methodological evaluation of manufacturing systems in Uganda, utilising panel data to assess risk reduction mechanisms. Panel-data estimation techniques were employed to analyse the impact of various factors on risk reduction within Ugandan manufacturing plants. The study utilised mixed-effects models with robust standard errors to account for potential heteroscedasticity. The data revealed that implementing preventive maintenance schedules significantly reduced equipment failure rates by 20% compared to reactive maintenance methods, highlighting the importance of proactive strategies in risk management. The findings underscore the need for continuous improvement and adoption of best practices in manufacturing systems to enhance productivity and reduce operational risks. Manufacturers are advised to integrate predictive analytics into their operations to forecast potential issues before they occur, thereby improving overall system reliability. manufacturing systems, risk reduction, panel data analysis, mixed-effects models, Ugandan industry The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *African Geography, Manufacturing Systems, Panel Data, Econometrics, Risk Analysis, Methodology, Time Series Analysis*

# ABSTRACT-ONLY PUBLICATION

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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