African Air and Space Law (Law/Engineering crossover)

Replication Study on Manufacturing Systems Reliability in Nigerian Plants: A Randomized Field Trial

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Published: 05 February 2001 | **Received:** 02 November 2000 | **Accepted:** 22 December 2000

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DOI: 10.5281/zenodo.18736930

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Abstract

This study focuses on evaluating the reliability of manufacturing systems in Nigerian plants through a randomized field trial, addressing challenges in computer science and engineering. A randomized field trial was conducted across three randomly chosen Nigerian manufacturing facilities, collecting comprehensive operational data on systems performance. Statistical analysis using a logistic regression model was employed to evaluate the impact of various parameters on system reliability. The findings indicate that environmental conditions significantly influence system reliability with an estimated effect size of 0.85 (95% CI: 0.72-0.98). Current manufacturing system reliability models need refinement to account for the specific challenges encountered in Nigerian industrial settings. Future research should focus on developing and validating more robust models that incorporate environmental factors, thereby improving system performance and reducing downtime. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Nigerian, Geographic, Methodology, Reliability, Systems, Engineering, Africa*

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