Methodological Evaluation of Manufacturing Plant Systems Reliability in Kenya Through Randomized Field Trials

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Abstract

Manufacturing plants in Kenya play a crucial role in the country's economic development, yet their reliability remains an underexplored area of research. A randomized field trial was conducted across various manufacturing sites in Kenya to assess system reliability. Statistical models were used to analyse data, including logistic regression for predicting system failures and confidence intervals for estimating uncertainties. In the trial, a significant proportion (35%) of systems experienced downtime due to maintenance issues, which varied by sector and plant size. The study provides insights into enhancing reliability through targeted improvements in maintenance protocols and system design. Manufacturing companies should prioritise regular maintenance schedules and invest in robust system designs to improve overall reliability. manufacturing systems, field trials, reliability analysis, logistic regression, confidence intervals The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\,X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Kenyan, reliability, methodology, randomized trials, manufacturing, systems, assessment*

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