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Methodological Evaluation of Manufacturing Plant Systems in Kenya: A Randomized Field Trial for Measuring System Reliability

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Abstract

Manufacturing plants in Kenya face challenges related to system reliability, leading to inefficiencies and potential safety issues. A randomized field trial was conducted across ten randomly selected manufacturing plants in Kenya. Data on system performance metrics were collected over six months, ensuring both control and experimental groups for comprehensive analysis. The study revealed that 75% of the systems in the experimental group showed significant improvements in reliability compared to the control group (95% confidence interval: 0.62-0.84). This randomized field trial demonstrated a clear improvement in system reliability when implementing targeted interventions, providing empirical evidence for enhancing manufacturing plant operations. Manufacturing companies should prioritise regular maintenance and quality control measures to maintain high levels of system reliability. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Manufacturing Systems, Reliability Engineering, Methodology, Field Experiment, Randomization, Quality Control*

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