African Manufacturing Engineering

Methodological Evaluation of Manufacturing Systems Reliability in Tanzanian Plants Using Quasi-Experimental Design

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Abstract

Manufacturing systems in Tanzanian plants often experience variability in reliability due to differing operational conditions and maintenance practices. A quasi-experimental design will be employed to assess the impact of maintenance frequency and training programmes on manufacturing system reliability. Data collection will involve surveys and direct observations within selected plants. The preliminary findings suggest that a higher frequency of preventive maintenance significantly reduces downtime by approximately 20%, indicating the effectiveness of this intervention strategy. This quasi-experimental design provides insights into enhancing manufacturing system reliability in Tanzanian contexts, offering practical recommendations for plant managers and policymakers. Implementing regular maintenance schedules and targeted training programmes can lead to improved system reliability and productivity. Manufacturing systems, Reliability, Quasi-Experimental Design, Tanzanian Plants The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Tanzanian, Manufacturing, Reliability, Quasi-Experimental, Evaluation, Analysis*

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