African Volcanology and Geochemistry (Earth Science)

Methodological Evaluation of Manufacturing Systems Reliability in Ugandan Plants: Quasi-Experimental Insights

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Abstract

Manufacturing systems in Ugandan plants are critical for economic growth but often lack robust reliability metrics. A systematic review of literature employing rigorous methodologies to identify and analyse studies that have assessed the reliability of manufacturing systems in Uganda. The analysis revealed a significant variation ($p < 0.05$) in system reliability measures across different industries, with electronics plants demonstrating higher mean reliability scores than food processing units. Quasi-experimental designs provide valuable insights into the factors influencing manufacturing system reliability but require further validation and standardisation for broader application. Standardised guidelines should be developed to enhance the comparability of reliability assessments across Ugandan industries, facilitating more robust policy recommendations. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, reliability engineering, manufacturing systems, quality control, stochastic models, benchmarking, simulation studies*

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