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Methodological Evaluation of Manufacturing Systems Reliability in Ghana: A Quasi-Experimental Study

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Abstract

Manufacturing systems in Ghana face challenges related to reliability and efficiency. A quasi-experimental study was conducted using data from 10 randomly selected manufacturing plants. Statistical models were employed to assess system reliability over two years. The mean system availability rate was found to be 92%, with a confidence interval of (85%, 96%), indicating that the systems are generally reliable but require improvement in certain areas. System reliability can be improved by implementing maintenance protocols and upgrading equipment, which will enhance productivity and reduce downtime. Manufacturing companies should prioritise investment in preventive maintenance to ensure sustainable operations. Continuous monitoring of system performance is also recommended for ongoing improvements. manufacturing systems, reliability, quasi-experimental design, Ghana The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Manufacturing, Ghana, Reliability, Systems Engineering, Quasi-experimental, Methodology, Africa*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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