



Methodological Evaluation of Industrial Machinery Fleets Systems in Ghana Using Quasi-Experimental Design for Efficiency Gains

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Abstract

Industrial machinery fleets in Ghana are characterized by a high level of operational inefficiencies due to outdated maintenance practices and lack of standardization. A quasi-experimental design was employed to assess the impact of standardised maintenance protocols and fleet management systems on operational efficiency. Data were collected over a period of one year using structured surveys and performance metrics. Significant improvements in machinery uptime (average increase of 15% across fleets) and reduced maintenance costs (20,000 annually per fleet) were observed after the implementation of standardised protocols. The quasi-experimental design was used to estimate the effect of the intervention on the outcome variable $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Quasi-experimental, Maintenance, Efficiency, Technological, Industrial, Practices*

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