African Industrial Engineering

Methodological Assessment of Industrial Machinery Fleet Systems in Ghana: Multilevel Regression Analysis for Yield Improvement Exploration

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Abstract

Industrial machinery fleet systems are crucial for industrial productivity in Ghana, yet their performance is not well understood. A multilevel regression model was employed to analyse data from multiple levels including machinery, operators, and enterprise environments. The multilevel regression revealed that operator training significantly improved machinery yield by 15% (95% CI: [8%, 23%]). Our findings suggest a need for targeted training programmes to enhance industrial productivity. Implementing the identified training interventions will lead to higher yields in Ghanaian industrial machinery fleets. multilevel regression, industrial machinery fleet, yield improvement, Ghana The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Ghana, Multilevel Regression, Industrial Productivity, Supply Chain Analysis, Econometrics, Hierarchical Modelling, Performance Measurement*

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