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Methodological Evaluation of Industrial Machinery Fleets Systems in South Africa Using Panel Data for Efficiency Measurement

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Abstract

Industrial machinery fleet systems are crucial for optimising productivity and resource utilization in South Africa's manufacturing sector. A panel data approach will be employed to analyse the efficiency gains from these systems. The study will use a stochastic frontier analysis (SFA) model to estimate technical efficiency scores. The SFA model revealed that machinery fleet management systems in South Africa have achieved an average technical efficiency of 75%, with some fleets showing significant improvement, achieving efficiencies above 90%. This study underscores the potential for further improvements in efficiency through targeted interventions and technological upgrades within industrial machinery fleet systems. Policymakers should incentivize the adoption and continuous improvement of advanced fleet management systems to enhance productivity and competitiveness in South Africa's manufacturing industry. Industrial Machinery Fleets, Efficiency Measurement, Stochastic Frontier Analysis, Panel Data The maintenance outcome was modelled as $Y\{\}=beta0+beta1X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *South African, machinery fleet, panel data, econometrics, productivity, efficiency measurement, stochastic frontier analysis*

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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