African Agricultural Systems Engineering

Methodological Evaluation of Manufacturing Systems Efficiency Gains in Tanzanian Plants Using Time-Series Forecasting Models

Tumba Hamisi[1,2], **Kamwili Mwalimu**[2,3]

[1] Department of Sustainable Systems, Tanzania Wildlife Research Institute (TAWIRI)

[2] Ardhi University, Dar es Salaam

[3] Tanzania Wildlife Research Institute (TAWIRI)

Published: 18 December 2009 | **Received:** 01 October 2009 | **Accepted:** 04 November 2009

Correspondence: thamisi@outlook.com

DOI: 10.5281/zenodo.18894004

Author notes

Tumba Hamisi is affiliated with Department of Sustainable Systems, Tanzania Wildlife Research Institute (TAWIRI) and focuses on Engineering research in Africa.

Kamwili Mwalimu is affiliated with Tanzania Wildlife Research Institute (TAWIRI) and focuses on Engineering research in Africa.

Abstract

This study addresses a current research gap in Engineering concerning Methodological evaluation of manufacturing plants systems in Tanzania: time-series forecasting model for measuring efficiency gains in Tanzania. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A mixed-methods design was used, combining survey and interview data collected over the study period. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Methodological evaluation of manufacturing plants systems in Tanzania: time-series forecasting model for measuring efficiency gains, Tanzania, Africa, Engineering, intervention study This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Manufacturing Systems, Time-Series Analysis, Methodology, Forecasting, Efficiency, Engineering*

ABSTRACT-ONLY PUBLICATION

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

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge