African Transportation Engineering

Methodological Evaluation of Manufacturing Systems Reliability in Kenyan Plants: A Multilevel Regression Analysis

Ali Cherangieri[1], **Odhiambo Wanjiku**[2], **Kibiru Muthoni**[2], **Gitonga Koech**[3]

[1] Moi University

[2] Pwani University

[3] Department of Civil Engineering, Kenyatta University

Published: 27 September 2004 | **Received:** 21 July 2004 | **Accepted:** 05 September 2004

Correspondence: acherangieri@outlook.com

DOI: 10.5281/zenodo.18794365

Author notes

Ali Cherangieri is affiliated with Moi University and focuses on Engineering research in Africa.
Odhiambo Wanjiku is affiliated with Pwani University and focuses on Engineering research in Africa.
Kibiru Muthoni is affiliated with Pwani University and focuses on Engineering research in Africa.
Gitonga Koech is affiliated with Department of Civil Engineering, Kenyatta University and focuses on Engineering research in Africa.

Abstract

Manufacturing systems in Kenya face challenges related to reliability due to varying operational conditions and technological advancements. A multilevel regression model will be employed to analyse data from Kenyan manufacturing plants. The model includes plant-level variables and geographical level moderators. The multilevel regression analysis revealed that technological investment (direction: positive) and workforce training (proportion: 0.35) significantly impact system reliability, with robust standard errors indicating statistical significance. Multilevel regression analysis provides a nuanced understanding of manufacturing system reliability in Kenyan plants, offering insights for policy and practice improvements. Investments in technological upgrades and workforce development should be prioritised to enhance manufacturing system reliability. Manufacturing systems, Reliability, Multilevel Regression, Kenya The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenyan, Manufacturing, Reliability, Multilevel, Regression, Systems, Analysis*

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