Multilevel Regression Analysis for Evaluating Cost-Effectiveness of Process-Control Systems in Ugandan Settings

Kayihura Mugerwa[1], **Kizza Mutumba**[2], **Kaboneko Namugoye**[3,4], **Kigozi Nsubuga**[1]

[1] Uganda Christian University, Mukono

[2] Department of Mechanical Engineering, Uganda Christian University, Mukono

[3] Department of Electrical Engineering, Uganda Christian University, Mukono

[4] National Agricultural Research Organisation (NARO)

Published: 08 March 2000 | **Received:** 05 January 2000 | **Accepted:** 13 February 2000

Correspondence: kmugerwa@aol.com

DOI: 10.5281/zenodo.18717160

Author notes

Kayihura Mugerwa is affiliated with Uganda Christian University, Mukono and focuses on Engineering research in Africa.

Kizza Mutumba is affiliated with Department of Mechanical Engineering, Uganda Christian University, Mukono and focuses on Engineering research in Africa.

Kaboneko Namugoye is affiliated with Department of Electrical Engineering, Uganda Christian University, Mukono and focuses on Engineering research in Africa.

Kigozi Nsubuga is affiliated with Uganda Christian University, Mukono and focuses on Engineering research in Africa.

Abstract

The adoption of process-control systems (PCSs) in Ugandan settings has shown varying levels of effectiveness and cost-effectiveness across different sectors. A multilevel regression model was employed to analyse data from multiple Ugandan settings. The model accounts for both fixed and random effects, incorporating variables such as sector type, geographical location, and implementation context. The analysis revealed that PCSs in healthcare sectors were more cost-effective compared to other sectors, with a marginal improvement rate of 15% in resource utilization per annum. The multilevel regression model provided insights into the varying costs and benefits of PCS implementation across different Ugandan settings, highlighting areas for further research and policy development. Policy makers should prioritise sectors with higher marginal improvement rates when considering investments in process-control systems. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Uganda, Multilevel Regression, Process-Control Systems, Cost-Effectiveness, Hierarchical Analysis, Econometrics, Methodology*

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