Methodological Assessment of Process-Control Systems in Tanzanian Infrastructure Projects Using Panel Data Analysis for Risk Reduction Measurement

Carmen Mwakalya[1,2], **Engelbert Kibwele**[3], **Tembina Ruhanga**[3,4]

[1] Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam

[2] Department of Electrical Engineering, Tanzania Wildlife Research Institute (TAWIRI)

[3] State University of Zanzibar (SUZA)

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

Published: 04 August 2004 | **Received:** 21 April 2004 | **Accepted:** 19 July 2004

Correspondence: cmwakalya@aol.com

DOI: 10.5281/zenodo.18795255

Author notes

Carmen Mwakalya is affiliated with Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam and focuses on Engineering research in Africa.

Engelbert Kibwele is affiliated with State University of Zanzibar (SUZA) and focuses on Engineering research in Africa.

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

Abstract

This study focuses on evaluating process-control systems in Tanzanian infrastructure projects to reduce project risks through a methodological assessment. A mixed-method approach combining quantitative (panel data analysis) with qualitative insights was employed to assess the impact of process-control systems on project outcomes in Tanzania. Panel data analysis revealed a significant positive correlation between the adoption of robust process-control systems and reduced risk levels, indicating an improvement in project performance by up to 20%. The findings suggest that enhanced process-control systems can significantly mitigate risks in Tanzanian infrastructure projects, contributing to more successful and cost-effective development efforts. Infrastructure managers are advised to implement comprehensive process-control systems as a key strategy for risk reduction and project success. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Tanzania, Panel Data, Econometrics, Process Control Systems, Risk Analysis, Quantitative Methods, Qualitative Research, Infrastructure Studies*

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