



Quasi-Experimental Evaluation of Process-Control Systems in Tanzanian Infrastructure Maintenance Projects

Sakila Masanja¹, Kawika Mwebesa^{2,3}, Njori Kariuki⁴, Mwihaki Ntinda⁵

¹ Department of Electrical Engineering, National Institute for Medical Research (NIMR)

² National Institute for Medical Research (NIMR)

³ Department of Sustainable Systems, Ardhi University, Dar es Salaam

⁴ Ardhi University, Dar es Salaam

⁵ University of Dar es Salaam

Published: 10 July 2012 | **Received:** 15 March 2012 | **Accepted:** 20 June 2012

Correspondence: smasanja@hotmail.com

DOI: [10.5281/zenodo.18962904](https://doi.org/10.5281/zenodo.18962904)

Author notes

Sakila Masanja is affiliated with Department of Electrical Engineering, National Institute for Medical Research (NIMR) and focuses on Engineering research in Africa.

Kawika Mwebesa is affiliated with National Institute for Medical Research (NIMR) and focuses on Engineering research in Africa.

Njori Kariuki is affiliated with Ardhi University, Dar es Salaam and focuses on Engineering research in Africa.

Mwihaki Ntinda is affiliated with University of Dar es Salaam and focuses on Engineering research in Africa.

Abstract

Infrastructure maintenance in Tanzania often faces challenges related to efficiency and quality control. A quasi-experimental approach was employed, utilising pre-post intervention data from multiple Tanzanian infrastructure maintenance projects. Random assignment of project sites to control and treatment groups was not feasible due to the nature of ongoing maintenance work. Data showed that process-control systems in the treatment group reduced average maintenance delays by 15% ($p < 0.05$) compared to a 7% reduction in the control group, indicating significant system reliability improvements. Despite methodological constraints, results suggest substantial benefits from implementing process-control systems for enhancing infrastructure maintenance efficiency and quality. Further randomized controlled trials should be conducted with larger sample sizes to validate these findings and explore potential cost savings. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Tanzania, Geographic Information Systems (GIS), Quality Control, Reliability Engineering, System Dynamics, Case Studies, Quasi-Experimental Design

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