



# Methodological Evaluation of Process-Control Systems in Senegal: A Randomized Field Trial

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## Abstract

In Senegal, process-control systems are employed to enhance engineering quality control in manufacturing processes. A randomized field trial was conducted over six months with 150 participants. Participants were randomly assigned to either the treatment group (using process-control systems) or control group (no system). The proportion of defects in treated groups was found to be significantly lower than that in control groups ( $p < 0.05$ ). The randomized field trial demonstrated significant reliability improvements with the use of process-control systems. Recommendation for implementation of process-control systems based on findings and to further enhance quality control measures. Process-Control Systems, Engineering Quality Control, Randomized Field Trial, Reliability The maintenance outcome was modelled as  $Y \{\} = \beta_0 + \beta_1 X \{\} + u_i + \text{varepsilon} \{\}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *African development, quality control, randomized trials, process reliability, engineering metrics, econometrics, experimental design*

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