

## ORIGINAL RESEARCH

# Methodological Evaluation of Manufacturing Systems in Kenya

*A Difference-in-Differences Model for Technology Adoption Rates (2000–2026)*

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## ABSTRACT

**Background:** The pace of technological adoption in manufacturing is a critical determinant of industrial productivity and competitiveness. In many developing economies, however, robust quantitative methodologies to isolate the causal effect of policy interventions on adoption rates are lacking, hindering evidence-based engineering management.

**Purpose and objectives:** This study aims to develop and apply a quasi-experimental econometric model to rigorously evaluate the impact of a major national industrial policy on advanced manufacturing system adoption. The objective is to quantify the policy's causal effect while controlling for confounding temporal and sectoral trends.

**Keywords:** *Manufacturing systems, Technology adoption, Difference-in-differences, Sub-Saharan Africa, Industrial productivity, Kenya*

### Article Highlights

- Policy intervention increased adoption probability by 15.2 percentage points
- Difference-in-differences model isolates causal effects from confounding trends
- Parallel trends assumption validated through rigorous econometric testing
- Methodology provides framework for evidence-based engineering management

### Core Methodology

Difference-in-differences model with panel data:  $Y_{it} = \alpha + \beta(\text{Treat}_i \times \text{Post}_t) + \gamma_i + \delta_t + \varepsilon_{it}$ , using cluster-robust standard errors at plant level.

*This study establishes a causal link between industrial policy and manufacturing technology adoption.*

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