African Learning Design

Methodological Evaluation of Manufacturing Systems in Ghana Using Quasi-Experimental Design

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Abstract

Recent studies have highlighted the importance of cost-effectiveness in manufacturing systems to ensure sustainable growth in developing countries like Ghana. The research employs a mixed-method approach combining quantitative data analysis with qualitative interviews. A total of 100 manufacturing units were randomly selected for detailed cost-benefit analyses and case studies. A notable finding is the significant reduction in operational costs attributed to advanced automation technologies implemented by some plants, demonstrating an average decrease of 25% in production expenses compared to traditional methods. The quasi-experimental design effectively isolates the impact of different system configurations on cost-effectiveness. The findings suggest that integrating modern manufacturing technologies can significantly enhance efficiency and reduce costs. Manufacturing firms are advised to adopt automation and digitalization strategies to achieve greater economies of scale and improve their competitive position in the global market. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Manufacturing, Quasi-Experimental, Cost-Benefit, Evaluation, Performance, Theory*

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