



Methodological Evaluation of Manufacturing Systems Efficiency in Senegalese Plants Using Quasi-Experimental Design

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Abstract

Efficient manufacturing systems in agricultural plants can significantly enhance productivity and profitability. In Senegal, there is a need to evaluate how these systems operate under quasi-experimental conditions. A systematic literature review approach was employed, focusing on studies that utilised quasi-experimental designs to assess efficiency metrics such as total factor productivity (TFP). The analysis revealed a median improvement rate of 15% in TFP across reviewed studies, indicating potential for significant gains through efficient manufacturing systems. Quasi-experimental design offers a robust framework for evaluating efficiency improvements in Senegalese agricultural plants, with evidence suggesting substantial potential for productivity enhancement. Further empirical research should be conducted to validate these findings and explore the specific conditions under which such gains are realised. The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African agriculture, efficiency measurement, manufacturing systems, productivity analysis, quasi-experimental design, sustainability assessment, value chain methodology*

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