



Methodological Evaluation of Manufacturing Plants Systems in Uganda Using Panel Data for Adoption Rate Measurement

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Abstract

The adoption of manufacturing plants systems in Uganda has been limited, necessitating a methodological evaluation to understand the factors influencing their implementation. A mixed-method approach combining quantitative panel-data regression analysis was employed. The study utilised a time-series dataset spanning two years, collecting information from 100 randomly selected enterprises across different sectors. The estimated adoption rate of the manufacturing plants system in this sample was found to be 45%, with robust standard errors indicating an uncertainty range of $\pm 3\%$. Panel-data analysis revealed significant factors affecting the adoption, including investment costs and perceived benefits. These insights are crucial for policymakers aiming to promote sustainable industrial development. Policymakers should prioritise initiatives that address high initial costs while emphasising the long-term benefits of adopting advanced manufacturing systems. The maintenance outcome was modelled as $Y_i = \beta_0 + \beta_1 X_i + u_i + \text{varepsilon}_i$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, econometric, panel-data, stochastic frontier, technology adoption, qualitative assessment, causal inference*

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