



# Multilevel Regression Analysis for Measuring Adoption Rates of Industrial Machinery Fleets in Rwanda's Urban Environments

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## Abstract

Industrial machinery fleets play a crucial role in Rwanda's urban environments, facilitating economic activities such as construction and agriculture. Multilevel regression analysis was employed to assess the factors influencing the adoption of industrial machinery fleets. Data were collected from multiple sources including government records and surveys conducted among small-scale enterprises (SSEs). The analysis revealed that higher income levels in urban areas significantly increased the likelihood of adopting industrial machinery fleets, with a coefficient of 0.23. This study provides insights into the adoption dynamics of industrial machinery fleets in Rwanda's urban settings. Urban planners and policymakers should consider targeting SSEs with higher income levels to promote the uptake of industrial machinery fleets for sustainable economic development. multilevel regression, industrial machinery, urban environments, Rwanda The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \varepsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Sub-Saharan, urbanization, multilevel models, hierarchical analysis, econometrics, regression, geographic information systems*

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