



Bayesian Hierarchical Model for Yield Improvement in South African Manufacturing Plants Systems,

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Abstract

This study evaluates a Bayesian hierarchical model to enhance yield in manufacturing systems within South African plants. A Bayesian hierarchical model was implemented to analyse yield data from various manufacturing plants in South Africa. The model accounts for site-specific variability while estimating overall yield improvements. The analysis revealed significant site-specific differences in yield improvement, with some sites showing a 15% increase over the period of study. The Bayesian hierarchical model effectively captured site-specific variations and provided robust estimates of yield improvements across different manufacturing environments. Manufacturing plants should consider implementing this method for continuous monitoring and improving their yield performance. Bayesian Hierarchical Model, Manufacturing Yield Improvement, South Africa, Engineering The maintenance outcome was modelled as $Y \{ \} = \beta_0 + \beta_1 X \{ \} + u_i + \text{varepsilon} \{ \}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: South Africa, Manufacturing Systems, Bayesian Hierarchical Models, Yield Analysis, Methodology, Statistics, Quality Control, Optimization Techniques

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