African Astronomy and Astrophysics (Pure Science)

Reliability Assessment Framework for Manufacturing Systems in South Africa: Quasi-Experimental Design Approach

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Abstract

Manufacturing systems in South Africa face challenges related to reliability, leading to inefficiencies and potential safety risks. A theoretical framework will be developed without empirical data or statistical testing. A robust quasi-experimental design approach is proposed for evaluating manufacturing systems' reliability in South Africa, with a focus on enhancing productivity and safety. Manufacturing companies should consider implementing real-time monitoring and predictive maintenance strategies to improve system reliability. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, reliability engineering, system dynamics, simulation modelling, stochastic processes, fault-tree analysis, grey systems theory*

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