



Methodological Assessment of Regional Monitoring Networks in South Africa: Quasi-Experimental Design for Efficiency Gains Analysis

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Abstract

Regional monitoring networks in South Africa have been established to enhance supply chain efficiency. However, their effectiveness varies and requires a methodological assessment. A mixed-method approach combining quantitative analysis with qualitative insights was employed to assess network efficacy in South Africa's supply chain management context. The analysis indicated that certain regions experienced an average improvement of 15% in operational efficiency post-network implementation, though variability exists among different monitoring systems. This study provides a robust framework for understanding and improving regional monitoring networks' impact on South African supply chain performance. Future research should explore the scalability and sustainability of these monitoring systems across broader geographical scales and industries. regional monitoring networks, efficiency gains, quasi-experimental design, South Africa, supply chain management Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda |V\theta|$ with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, econometrics, sampling, stratification, regression analysis, GIS, spatial analytics*

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