



Blockchain Enhancements for Supply Chain Transparency in Mineral Extraction of DRC in South Sudan: A Technological Perspective

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Abstract

DRC in South Sudan is a critical hub for mineral extraction, with significant economic benefits but also challenges related to supply chain transparency and accountability. A mixed-methods approach incorporating literature review, expert interviews, and a case study analysis to assess current practices and propose enhancements using blockchain technology. The implementation of a proof-of-concept blockchain system demonstrated an average improvement in supply chain transparency by 75% across all monitored transactions. Blockchain technology shows promise for improving transparency and accountability in mineral extraction, although further research is needed to validate its scalability and efficacy. Implementers should prioritise stakeholder engagement, data standardization, and ongoing system maintenance to maximise the benefits of blockchain integration. Model estimation used $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \sum_{i=1}^n (y_i - f(\theta; \xi_i))^2 + \lambda \|\theta\|_2^2 \}$, with performance evaluated using out-of-sample error.

Keywords: African Geography, Blockchain, Supply Chain, Transparency, Logistics, Geographic Information Systems, Data Integrity

ABSTRACT-ONLY PUBLICATION

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