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Blockchain Innovations in Supply Chain Transparency for Mineral Extraction in DRC: A Methodological Exploration

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Abstract

DRC is a significant producer of minerals globally, but its supply chain transparency remains low due to corruption and inefficiencies. The study utilizes a mixed-method approach combining quantitative data analysis with qualitative interviews. Blockchain transaction records from mining companies are analysed using an event detection model to identify anomalies indicative of fraudulent activities. Anomalies detected represent approximately 5% of total transactions, suggesting potential fraud rates in the DRC mineral extraction supply chain. Blockchain technology offers a promising method for improving transparency and accountability in DRC's mineral extraction sector by detecting suspicious patterns in transaction records. Mineral extraction companies should adopt blockchain solutions to enhance their internal controls and improve stakeholder trust. Regulatory bodies could mandate the use of blockchain for increased oversight and compliance. Blockchain, Supply Chain Transparency, Mineral Extraction, DRC Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *African geography, Blockchain, Supply chain, Transparency, Methodology, Data mining, Cryptography*

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