



Blockchain Technology for Supply Chain Transparency in DRC Mineral Extraction: A Methodological Exploration in an African Context

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Abstract

The Democratic Republic of Congo (DRC), a critical mineral resource hub, faces significant challenges in ensuring transparency and accountability in its mineral extraction sector. A mixed-methods approach was employed, integrating qualitative interviews with blockchain experts and quantitative analysis of data from the DRC's mining sector. A Bayesian hierarchical model was used to predict the adoption rate of blockchain technology by stakeholders. The preliminary findings suggest that there is a moderate interest in adopting blockchain for supply chain transparency, particularly among large corporations and government bodies. Blockchain technology holds promise for improving transparency in DRC's mineral extraction sector, though challenges related to cost, technical capacity, and regulatory frameworks need further investigation. Developed countries should support the DRC with technological infrastructure and training programmes. Policymakers must create a conducive legal environment that encourages blockchain adoption. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta r \operatorname{Vert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African Geography, Blockchain, Supply Chain, Transparency, Smart Contracts, Data Analytics, Ethical Computing*

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