



# Blockchain Technology in Enhancing Transparency within DRC Mineral Extraction Supply Chains in Senegal

Toure Ndiaye<sup>1,2</sup>, Diallo Sene<sup>3,4</sup>, Fouley Diop<sup>5,6</sup>, Sow Faye<sup>2,7</sup>

<sup>1</sup> Department of Software Engineering, Institut Sénégalais de Recherches Agricoles (ISRA)

<sup>2</sup> Université Alioune Diop de Bambey (UADB)

<sup>3</sup> Institut Sénégalais de Recherches Agricoles (ISRA)

<sup>4</sup> Department of Cybersecurity, Institut Pasteur de Dakar

<sup>5</sup> Department of Data Science, African Institute for Mathematical Sciences (AIMS) Senegal

<sup>6</sup> Department of Data Science, Université Alioune Diop de Bambey (UADB)

<sup>7</sup> African Institute for Mathematical Sciences (AIMS) Senegal

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**Correspondence:** [tndiaye@aol.com](mailto:tndiaye@aol.com)

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## Author notes

*Toure Ndiaye is affiliated with Department of Software Engineering, Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Computer Science research in Africa.*

*Diallo Sene is affiliated with Institut Sénégalais de Recherches Agricoles (ISRA) and focuses on Computer Science research in Africa.*

*Fouley Diop is affiliated with Department of Data Science, African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Computer Science research in Africa.*

*Sow Faye is affiliated with African Institute for Mathematical Sciences (AIMS) Senegal and focuses on Computer Science research in Africa.*

## Abstract

The Democratic Republic of Congo (DRC) is a significant producer of minerals worldwide, including gold, diamonds, and cobalt. However, corruption and lack of transparency have led to widespread exploitation and environmental degradation in its mineral extraction supply chains. A mixed-methods approach was employed, including interviews with stakeholders from government bodies, mining companies, and civil society organizations. Quantitative data were collected through surveys to assess perceptions of transparency before and after blockchain technology implementation. Blockchain technology showed a significant improvement in trust levels among participants, with over 80% reporting increased confidence in supply chain integrity post-intervention. While initial results are promising, further empirical research is needed to validate the long-term efficacy of blockchain in enhancing transparency and governance within DRC's mineral extraction sector. Governments should provide incentives for mining companies to adopt blockchain technology, while civil society organizations can facilitate community engagement and ensure equitable benefits from such systems. Model estimation used  $\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \{ \theta \} \operatorname{sumiell} (y_i, f\theta(\xi)) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *Democratic Republic of Congo, Geographic Information Systems, Supply Chain Management, Blockchain Protocol, Transparency Metrics, Data Integrity Verification, Smart Contracts*

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