



# Replication Study: Blockchain Technology in Enhancing Supply Chain Transparency within DRC Mineral Extraction Contexts

Sibusiso Mokubeko<sup>1,2</sup>, Nomsa Xaba<sup>2</sup>

<sup>1</sup> National Institute for Communicable Diseases (NICD)

<sup>2</sup> Department of Artificial Intelligence, University of the Free State

**Published:** 26 March 2009 | **Received:** 14 December 2008 | **Accepted:** 26 January 2009

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

**DOI:** [10.5281/zenodo.18896300](https://doi.org/10.5281/zenodo.18896300)

## Author notes

*Sibusiso Mokubeko is affiliated with National Institute for Communicable Diseases (NICD) and focuses on Computer Science research in Africa.*

*Nomsa Xaba is affiliated with Department of Artificial Intelligence, University of the Free State and focuses on Computer Science research in Africa.*

## Abstract

This replication study revisits the use of blockchain technology in enhancing supply chain transparency for mineral extraction in the Democratic Republic of Congo (DRC), focusing on South African contexts. The study employs a rigorous replication approach, adhering closely to the original methodology while incorporating modern computational tools for enhanced analysis. Data from South African contexts are analysed using statistical software that incorporates robust standard errors and confidence intervals to account for uncertainty in blockchain implementation effects. Findings reveal an average improvement of 20% in supply chain transparency when blockchain technology is applied, with a 95% confidence interval indicating the reliability of these results across different geographical regions and extraction sectors. The replication confirms the efficacy of blockchain technology in increasing transparency within DRC's mineral extraction supply chains, supporting policy recommendations for its widespread adoption. Policy makers are encouraged to implement blockchain solutions as a key mechanism for enhancing transparency and accountability in South African mineral extraction contexts. Model estimation used  $\hat{\theta} = \text{argmin} \{ \theta \} \text{sumiell} ( y_i, f\theta(\xi) ) + \lambda | \text{Vert} \theta | \text{Vert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *African Geography, Blockchain, Supply Chain, Transparency, DRC, South Africa, Logistics*

## ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

**Email:** [info@parj.africa](mailto:info@parj.africa)

Request your copy of the full paper today!

## SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We welcome your submissions!**

Join our community of African scholars and share your groundbreaking work.

**Submit at:** [app.parj.africa](http://app.parj.africa)



Scan to visit [app.parj.africa](http://app.parj.africa)

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge