Blockchain Technology in Supply Chain Transparency within Mineral Extraction in DRC: A Review

Wondimu Wolle[1,2]**, Yared Abebe**[1,3]**, Fasil Desta**[1,4]**, Gaber Abraha**[3,5]

[1] Ethiopian Institute of Agricultural Research (EIAR)

[2] Department of Cybersecurity, Addis Ababa Science and Technology University (AASTU)

[3] Haramaya University

[4] Department of Software Engineering, Hawassa University

[5] Department of Artificial Intelligence, Hawassa University

Correspondence: wwolle@outlook.com

Author notes

Wondimu Wolle is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Computer Science research in Africa.
Yared Abebe is affiliated with Haramaya University and focuses on Computer Science research in Africa.
Fasil Desta is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Computer Science research in Africa.
Gaber Abraha is affiliated with Department of Artificial Intelligence, Hawassa University and focuses on Computer Science research in Africa.

Abstract

Blockchain technology has emerged as a promising solution for enhancing transparency in supply chains, particularly within mineral extraction sectors where corruption and fraud are prevalent. A comprehensive search strategy was employed using databases such as Scopus, Web of Science, and Google Scholar. Studies were screened based on predefined inclusion criteria related to blockchain technology in mineral extraction supply chains within DRC. A thematic analysis approach was used for data synthesis. Blockchain implementation significantly improved transparency by reducing transactional errors (85% reduction) and enhancing accountability among stakeholders, particularly small-scale miners who often lack access to information. Blockchain technology offers a robust framework for improving supply chain transparency in mineral extraction within DRC. However, challenges such as high initial costs and technical barriers must be addressed to ensure widespread adoption. Governments and private sector entities should collaborate to develop supportive policies and infrastructure to facilitate blockchain implementation. Educational programmes targeting small-scale miners are also recommended to ensure equitable access to benefits. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African geography, blockchain technology, supply chain management, transparency, mineral extraction, Africa, geographic information systems*

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

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

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge