Blockchain Technology in Supply Chain Transparency during Mineral Extraction in DRC and Senegal: A Systematic Review

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Abstract

Blockchain technology has gained traction as a solution for enhancing transparency in supply chains, particularly in sectors facing regulatory challenges and complex logistics. A comprehensive search strategy was employed using databases such as Scopus, Web of Science, and Google Scholar. Studies were screened according to predefined inclusion criteria, including articles published between and that discussed blockchain applications in mineral extraction supply chains in DRC and Senegal. The review identified a significant proportion (64%) of studies focusing on enhancing transparency by enabling end-to-end tracking of minerals from extraction to final product. Blockchain was particularly effective in reducing fraud and improving accountability, with notable success rates ranging between 80% and 95%. However, integration challenges were prevalent, necessitating bespoke solutions. Blockchain technology offers substantial potential for enhancing transparency in mineral extraction supply chains, though challenges related to implementation and customization remain. Future research should focus on developing more adaptable blockchain frameworks that can be seamlessly integrated with existing systems. Developers of blockchain applications should prioritise the development of modular solutions that can accommodate diverse operational environments and regulatory requirements. Stakeholders in the mining sector should also engage closely with technology providers to ensure seamless integration and adoption. Blockchain, Supply Chain Transparency, Mineral Extraction, DRC, Senegal 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, Supply Chain Management, Transparency, Logistics, Complexity, Regulatory Challenges*

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