

ABSTRACT

Indonesia's palm oil export sector plays a critical role in the global economy but faces challenges in sustainability, traceability, and compliance with regulations like the EU Deforestation-Free Regulation (EUDR). Existing certification schemes such as RSPO and ISPO often fall short due to fragmented data systems, high compliance costs, and limited transparency across the supply chain. These constraints limit visibility, hinder regulatory coordination, and reduce trust among stakeholders. This study proposes a blockchain-based traceability model that integrates internal and external traceability mechanisms to support end-to-end certification, transparency, and cross-border compliance. Smart contracts are employed to automate data recording and role-based access control, while a QR code interface enables real-time consumer access to verified supply chain information. Data were collected through literature review and stakeholder interviews, and the model was validated using a Likert-scale questionnaire. Results indicate that the system improves traceability integrity, reduces manual verification, and enhances certification credibility. By providing tamper-resistant, verifiable records and aligning with RSPO, ISPO, and EUDR standards, the model strengthens export readiness and contributes to SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production).

Keywords: blockchain, palm oil supply chain, smart contract, sustainability, traceability