

Abstract

In recent years, approximately 3.825 tons of waste are generated every minute, with substantial volumes ending up in landfills or open dump sites. In Indonesia, only around 10% of garbage is sorted for recovery and recycling, and the majority of this work is performed by the unorganized sector. Although high-value items are primarily targeted during the collection of recycled materials, their attractiveness diminishes significantly when contaminated. This situation creates considerable pressure on waste management systems, driven largely by increasing production and consumption activities. Beyond the waste collection issue, a critical obstacle lies in the management of the recycled materials supply chain in Indonesia. The current system faces persistent challenges related to transparency and accountability, fostering mistrust and operational inefficiencies. Implementing blockchain-based traceability systems offers a promising pathway to strengthen the recycled materials supply chain. This study employs the Technology-Organization-Environment (TOE) Framework and analyzes the data using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4 software. A total of 194 respondents from the Greater Jakarta area—comprising Jakarta, Bogor, Depok, Tangerang, and Bekasi—participated in the study. The findings conclude that technological and environmental factors positively influence blockchain-based traceability adoption for recycled materials supply chains in Greater Jakarta.

Keywords: blockchain-based traceability adoption, recycled materials supply chains, Partial Least Squares Structural Equation Modeling (PLS-SEM), Technology-Organization-Environment (TOE) Framework