Chapter 7
The Role of Blockchain Technology With IoT for Revolutionizing Waste Management

S. Vidhya
https://orcid.org/0000-0003-3130-0455
Department of Computing Technologies, SRM Institute of Science and Technology, India

Balaji Mahadevan
Department of Electrical and Electronics Engineering, Sri Sivasubramaniya Nadar College of Engineering, India

V. Kamaraj
Department of Electrical and Electronics Engineering, Sri Sivasubramaniya Nadar College of Engineering, India

ABSTRACT

Modern approaches for waste management assure effectiveness, openness, and sustainability and hence can be adopted with the aim of handling increasing waste problem globally. The use of blockchain, which is well known for its decentralization and immutability, may help to revolutionalize this area. The chapter focuses on the uses of blockchain in waste management. Better traceability is one of the primary benefits of blockchain's application in waste management. Thus, it is possible to monitor the movement of waste garbage from the time it leaves the source to the time it gets to the waste garages. The integration of the internet of things (IoT) with blockchain technology is useful in the following ways in enhancing the functional-

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ity of the system. In this chapter, the blockchain-enabled smart waste management system is proposed to change the traditional waste management system in the urban areas by using the IoT devices, smart contracts, and data analytics.

INTRODUCTION

The topic of waste management is one of the main global challenges and relates directly to environmental sustainability, public health, the resource conservation. Inefficient recycling practices, poor track, lack of transparency, illegal dumping and other such experience of the conventional waste management system have created profound demand for new and innovative solutions. As the world becomes more and more urbanized and industrialized, the volume of waste generated is growing exponentially. Existing waste management methods, that are based on manual record keeping and centralized control, cannot satisfy contemporary requirements of environment and operation. It calls for the integration of advanced digital technologies in order to develop a more efficient and sustainable waste management scheme.

Waste management has become a disruptive problem which is to be resolved and hence Blockchain technology has come as the solution in the form of a decentralized and unmodifiable ledger system. Blockchain records waste related transactions on a secure as well as tamper proof ledger and ensures traceability of waste movement, prevents fraudulent activities and ensures regulatory compliance. With Internet of Things (IoT), blockchain enables real time data collection from smart sensors present in waste bins, recycling units as well as transportation vehicles. This synergy allows the waste management companies to maximize collection schedules, minimize operating costs, minimize environmental impact and enhance their efficiency in general.

At the end of this chapter, the paper analyzes the transformative apps of blockchain in waste management, exploring its benefits, real life case studies and its obstacles to adoption. This analyzes the way blockchain can function with Integrating the IoT, smart contracts and token developed incentive models for sustainable waste disposal and recycling. Additionally, as a proposed framework to revolutionize urban waste management practices, it further presents a Blockchain Enabled Smart Waste Management System (BSWMS). With the intention of creating more transparent, less expensive, and more sustainable waste management ecosystem, this approach leverages blockchain decentralization, security, and automation power.