

# **DIGITAL ENVIRONMENTAL SOLUTIONS: AN ANALYSIS OF SMART WASTE MANAGEMENT IN THE EUROPEAN UNION**

**Chaima Arribi<sup>1\*</sup>, Soraya Boutarfa<sup>2</sup>**

*<sup>1)2)</sup> University of Shahid Sheikh Larbi Tebessi, Tebessa, Algeria*

## **Abstract**

This paper investigates the role of digital transformation in accelerating the European Union's transition toward a circular economy, specifically focusing on municipal waste management. The research design employs a descriptive and comparative analytical approach using EU-27 data from 2000–2023. While recycling rates have doubled, current trajectories remain below the 2030–2035 targets. The original contribution of this study lies in providing a structured roadmap for digital integration, identifying how technologies like IoT and AI can bridge the performance gap. The findings highlight that digital solutions are essential drivers for environmental efficiency and governance transparency.

## **Keywords**

digital transformation; waste management; circular economy; European Union; recycling; environmental governance; Internet of Things; E-waste traceability

## **JEL Classification**

Q53, Q58, O33, M15

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\* Corresponding author, **Chaima Arribi** - [chaima.arribi@univ-tebessa.dz](mailto:chaima.arribi@univ-tebessa.dz)