

SUSTAINABLE E-WASTE MANAGEMENT

PRINCIPLES AND PRACTICES



Editors

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CHAPTER 5

Can AI and IOT Rescue India from its Own E-Waste Crisis or Will We Just Have Smarter Trash?

Dr. Tulika Singh*

ABSTRACT

India's e-waste crisis is escalating at an alarming rate, with the country generating approximately 1.75 million metric tonnes of e-waste in 2023-24, marking a 73% increase over the past five years. As digital consumption surges, Artificial Intelligence (AI) and the Internet of Things (IoT) are being explored as potential solutions to tackle this mounting challenge. AI-powered waste sorting and deep-learning-based recognition systems promise higher efficiency in segregating electronic waste, while IoT-enabled smart bins and tracking systems facilitate real-time monitoring of disposal patterns. However, despite these technological advancements, the integration of AI and IoT remains limited due to high costs, lack of infrastructure, and the dominance of the informal sector, which processes over 95% of India's e-waste manually. Additionally, Extended Producer Responsibility (EPR) policies, which legally bind manufacturers to manage post-consumer electronic waste, are often poorly enforced, leading to greenwashing practices where companies overstate their recycling efforts without meaningful action. Blockchain technology is being explored to enhance transparency in e-waste disposal by creating tamper-proof records of recycling processes, but its adoption remains in its infancy. Meanwhile, modular and self-repairing electronic devices are emerging as a long-term solution to reduce e-waste generation, but the widespread adoption of such technology is hindered by corporate reluctance and consumer habits. While AI and IoT present promising interventions, the reality remains that without regulatory reinforcement, economic incentives, and socio-technological integration, India risks merely creating 'smarter trash' rather than resolving the core issue. Addressing this crisis requires a multi-faceted approach, balancing innovation with policy reforms and

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