Chapter 12
Fostering Sustainability: A Review on E-Waste

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ABSTRACT

The unpredictable chemical components of e-waste pave the way to have severe impacts on ecosystems and human health. Electronic waste (e-waste) has been becoming a potential threat to live in a conducive environment for mankind. The basic cause for concern for this incessant e-waste seems to be the rapidly changing advanced technologies and low production cost. This chapter analyses to what extent e-waste is creating panic for sustainable societies and addressing sustainable development goals. To fulfil it, the researchers conducted an extensive literature review to muster frame of mind from relevant disciplines and did content analysis of the reports pertaining to e-waste and sustainability published at multiple digital platforms. To reduce the exorbitant amount of e-waste, e-waste management methods (recycling, etc.) are of utmost importance. Technically speaking, the developed countries are the main source of e-product production and e-waste generation.

INTRODUCTION

This book chapter delves into the field of excessive redundance of e-waste and its management, with a particular emphasis on sustainability. It explores e-waste recycling technologies and disposal practices within the IT industry, addressing the health and environmental impacts associated with e-waste recycling processes. Moreover, it analyses the challenges, issues, and potential solutions pertaining to e-waste management, while also emphasizing the financial prospects concerned with e-waste management.

The book chapter has tried to dissect the following aspects:

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Evolution in E-Waste Management in India

This section examines the latest trends and progress in e-waste management practices in India. It explores the regulatory frameworks, policy initiatives, and institutional mechanisms exercised to address the rapidly increasing e-waste challenge.

E-waste management in India has undergone significant transformation over the past few years. With the rapid proliferation of electronic devices and gadgets, the issue of electronic waste has become a pressing concern due to its environmental and health implications.

Initially, e-waste in India was largely dealt with through informal recycling practices, leading to improper disposal, pollution, and health hazards for those involved in these activities. However, recognizing the urgency of the situation, India introduced the E-Waste (Management) Rules in 2016. These rules established a structured framework for e-waste management, outlining responsibilities for producers, consumers, and recyclers.

The evolution in e-waste management in India has witnessed the emergence of authorized e-waste collection centers, designated collection points, and registered recyclers. These developments aim to ensure the safe assemblage, transportation, and recycling of e-waste, reducing its environmental impact and promoting sustainable practices (Borthakur, 2023).

Technological Advancements in E-Waste Recycling and Processing in India

This section gives an in-depth input related to electronic component recycling practices and waste processing methodologies espoused in India. It explores the various stages of e-waste treatment, including disassembling, quarantining, and material recovery, while emphasizing the importance of proper waste management to mitigate adverse effects.

The technological advancements and innovations in e-waste recycling processes seems to have given tremendous opportunities to tackle the exorbitant amount of e-waste in India's parlance. It examines new techniques employed to extract valuable resources from e-waste, while minimizing collateral damage and ensuring sustainable practices.

One significant advancement is the development of advanced recycling technologies that enable the efficient extraction of valuable materials from electronic devices. Automated processes, such as shredding, sorting, and material recovery, have minimized the manual handling of hazardous substances and improved overall recycling efficiency.

Additionally, India has witnessed the rise of innovative e-waste management systems that utilize digital platforms and data analytics. These platforms provide consumers with convenient channels to dispose of their electronic products responsibly while allowing recyclers to optimize collection routes and resource allocation.

Furthermore, the implementation of blockchain technology has brought transparency and traceability to e-waste management. This ensures that e-waste is tracked throughout the recycling process, reducing the risk of illegal disposal, and encouraging compliance with environmental regulations.

Moreover, the integration of robotics and artificial intelligence has enhanced the dismantling process of complex electronic devices. This not only improves worker safety but also facilitates the recovery of valuable components and substances from devices that would otherwise be challenging to disassemble manually.