

# Sustainable Solutions for E-Waste and Development

Rajesh Kumar K. V.  
*Woxsen University, India*

Hemachandran Kannan  
*Woxsen University, India*

Dmitry Spodarets  
*Data Phoenix, USA*

Parvez Alam Khan  
*Universiti Teknologi PETRONAS, Malaysia*

Bikash Kumar Pradhan  
*Woxsen University, India*



A volume in the Practice, Progress, and  
Proficiency in Sustainability (PPPS) Book Series

Published in the United States of America by  
IGI Global  
Engineering Science Reference (an imprint of IGI Global)  
701 E. Chocolate Avenue  
Hershey PA, USA 17033  
Tel: 717-533-8845  
Fax: 717-533-8661  
E-mail: [cust@igi-global.com](mailto:cust@igi-global.com)  
Web site: <http://www.igi-global.com>

Copyright © 2024 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

CIP Data in progress

Title: Sustainable Solutions for E-Waste and Development

**ISBN: 9798369310182**

This book is published in the IGI Global book series Practice, Progress, and Proficiency in Sustainability (PPPS) (ISSN: 2330-3271; eISSN: 2330-328X)

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: [eresources@igi-global.com](mailto:eresources@igi-global.com).

## **Chapter 18**

Technological Advancements in E-Waste Management and Resource Recovery ..... 275

*Jayaditya Reddy Yeruva, Woxsen University, India*

*Adip Krishna Guduru, Woxsen University, India*

*Bhanu Prakash Saripalli, Woxsen University, India*

## **Chapter 19**

Technological Advancements in E-Waste Management Methods and Models ..... 289

*M. Rudra Kumar, G. Pullaiah College of Engineering and Technology, India*

*U. Sivaji, Institute of Aeronautical Engineering, Dundigal, India*

*N. Badrinath, Vellore Institute of Technology, India*

*B. Rupa Devi, Annamacharya Institute of Technology and Sciences, India*

*K. Dinesh Kumar, Amrita Vishwa Vidyapeetham University, India*

*V. Rajesh Kumar Korupalli, Woxsen University, India*

## **Chapter 20**

Transitioning Toward a Circular Economy Through E-Waste Management ..... 311

*G. Raghunandan, Department of Commerce, Christ University (deemed), Bengaluru, India*

*Dhanabalan Thangam, Presidency Business School, Presidency College, Bengaluru, India*

*Shashikala Patil, International School of Management Excellence, Bengaluru, India*

*B. M. Rama Murthy, Acharya Institute of Management and Sciences, Bengaluru, India*

*Mohammad Juned, Presidency Business School, Presidency College, Bengaluru, India*

*Durairaj Duraisamy, School of Management, CMR University, Bangalore, India*

*Ramakrishna Narasimhaiah, Department of Economics, Jain University, Bengaluru, India*

*Nandeeswara Rao Ponnada, Department of Economics, Jain University, Bengaluru, India*

*Ravi V., Department of Professional Studies, Christ University (deemed), Bengaluru, India*

**Compilation of References** ..... 341

**About the Contributors** ..... 385

**Index** ..... 393

## Chapter 19

# Technological Advancements in E-Waste Management Methods and Models


**M. Rudra Kumar**

*G. Pullaiah College of Engineering and  
Technology, India*


**U. Sivaji**

*Institute of Aeronautical Engineering, Dundigal,  
India*


**N. Badrinath**

 <https://orcid.org/0000-0003-4058-7136>  
*Vellore Institute of Technology, India*

**B. Rupa Devi**

 <https://orcid.org/0009-0005-1298-737X>  
*Annamacharya Institute of Technology and  
Sciences, India*

**K. Dinesh Kumar**

 <https://orcid.org/0000-0003-0843-1561>  
*Amrita Vishwa Vidyapeetham University, India*

**V. Rajesh Kumar Korupalli**

*Woxsen University, India*

## ABSTRACT

*In response to the rise of electronic trash on a worldwide scale, numerous new solutions have emerged. To recover valuable elements from electronic trash, many recycling processes have been developed, including mechanical, chemical, and biological methods. The use of artificial intelligence and machine learning algorithms in automated sorting systems has increased the operational efficacy of e-waste recycling dramatically. Urban mining has gained popularity as a potential method of obtaining precious metals from technological trash. Furthermore, the implementation of extended producer obligation (EPR) rules imposes obligation on producers for the correct management and disposal of their products. These technology advances collectively lead to more sustainable and effective electronic waste management, decreasing environmental impact and aiding the recovery of valuable materials.*

DOI: 10.4018/979-8-3693-1018-2.ch019