Chapter 5
Sustainable Smart Economies:
Green Technologies and Circular Business Models

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ABSTRACT

The chapter investigates the convergence of sustainable smart economies, green technologies, and circular business models, underscoring their vital contributions to promoting environmental sustainability and economic resilience. As global issues such as climate change and resource scarcity become more pressing, incorporating innovative green technologies spanning renewable energy initiatives to sophisticated waste management solutions becomes essential. These technologies not only improve resource efficiency but also play a significant role in diminishing ecological footprints. Concurrently, implementing circular business models is crucial for reimagining value creation in ways that reduce waste and encourage sustainable practices. Enterprises can shift from conventional linear models to more regenerative frameworks that harmonies with ecological objectives by emphasising systems that focus on recycling, reuse, and sustainable sourcing. This chapter synthesises existing literature and case studies to understand how sustainable smart economies can harness these innovations thoroughly.

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1- INTRODUCTION

Sustainable smart economies have become crucial for reconciling economic advancement with environmental and social health in an era of rapid urban development, climate change, and diminishing resources (Kumar et al., 2024). Integrating green technologies and circular business models is at the heart of this framework, presenting innovative solutions to some of society's most pressing issues. We can minimise ecological impacts and enhance resource utilisation through green technologies such as renewable energy systems, energy-efficient infrastructures, and sophisticated waste management practices. By advocating for resource efficiency, waste minimisation, and continuous material reuse, circular business models displace the traditional 'take-make-dispose' paradigm.

The development of resilient, inclusive, and future-oriented economies can be facilitated by integrating advanced technology with sustainable economic practices. These principles can be adopted by enterprises, government bodies, and communities to create new avenues for growth and protect the environment for future generations. This analysis explores how green technologies and circular business models can aid in the transition to sustainable smart economies, creating a framework for a more equitably and environmentally conscious world.

Closed-loop systems emphasise the importance of resource efficiency and sustainability through the circular economy, a revolutionary paradigm in economic frameworks. In contrast to conventional linear models characterised by a “take-make-waste” approach, it aims to prolong the lifespan of products through strategies such as reuse, repair, refurbishment, and recycling, thereby mitigating waste and depletion of resources. To achieve the objectives, we must decrease our reliance on virgin materials, reduce greenhouse gas emissions, and promote industrial symbiosis, in which another uses waste produced by one industry as a resource. To illustrate, implementing circular economy principles in agriculture can decrease synthetic fertilisers by as much as 80%, improving soil health and ecosystem resilience (Cordeiro & Sindhøj, 2024).

Circular models have significant environmental advantages, with projections suggesting that industrial emissions within the European Union could be reduced by 56% by 2050 (Hailemariam & Erdiaw-Kwasie, 2023). Furthermore, these models help preserve natural ecosystems by reducing pollution and guarding against excessive resource extraction. Job creation is facilitated by circular systems from an economic standpoint, particularly in recycling, renewable energy, and sustainable manufacturing sectors. The implementation of circular strategies has increased net employment in industries, as demonstrated by research. Creating 18 million jobs worldwide while also achieving a 41% reduction in emissions can be achieved by switching to renewable energy sources (Milhem et al., 2024). Green technologies