

Chapter 4

Future of AI in Global Sustainability

Satya Subrahmanyam

 <https://orcid.org/0000-0003-0441-2742>

Holy Spirit University of Kaslik, Lebanon

ABSTRACT

The integration of artificial intelligence (AI) into global sustainability presents a transformative opportunity to address critical challenges such as climate change, resource depletion, and social inequities. This chapter explores AI's role in achieving the United Nations Sustainable Development Goals (SDGs) through innovative applications in environmental conservation, resource efficiency, and social impact. It examines AI-driven advancements in climate modeling, renewable energy optimization, and equitable economic development. Additionally, the chapter highlights challenges including ethical concerns, technological limitations, and policy gaps. Future trends, such as AI-IoT convergence and international collaborations, are discussed as key drivers of sustainable innovation. Through case studies and policy recommendations, this chapter provides a roadmap for leveraging AI to build a more sustainable and equitable world.

DOI: 10.4018/979-8-3373-1077-0.ch004

Copyright © 2026, IGI Global Scientific Publishing. Copying or distributing in print or electronic forms without written permission of IGI Global Scientific Publishing is prohibited. Use of this chapter to train generative artificial intelligence (AI) technologies is expressly prohibited. The publisher reserves all rights to license its use for generative AI training and machine learning model development.

1. INTRODUCTION

1.1 Contextualizing AI within the Global Sustainability Agenda

The twenty-first century has never presented more opportunities or threats to sustainability than at any time in the past. Increasing socio-economic inequalities, resource scarcity, biodiversity loss, and climate change are all issues that indicate the dire necessity of response on a global scale and urgently (United Nations, 2023). In the meantime, new technology, namely AI, can transform how we deal with sustainability in a global context. AI is no longer an innovation but a solution mechanism to problems at the systemic level that influence economics, society, and the environment (Vinueza et al., 2020). Governments, corporations, and communities can make decisions, which can be more informed and aligned to the SDGs when using artificial intelligence (AI) to analyse huge data, identify patterns, and streamline processes.

1.2 Defining Sustainability: Environmental, Economic, and Social Dimensions

Environmental preservation, economic growth, and social equality are the three interconnected pillars upon which sustainability rests. In order to keep the earth habitable for generations to come, the environmental component stresses conserving natural resources and minimising human impact on the ecosystem (Rockström et al., 2009). From an economic perspective, we want to lessen global economic inequities and systemic vulnerabilities while simultaneously encouraging inclusive development, productivity, and innovation. Economic and technical progress should lead to better living conditions and protection of human rights; this is where the social dimension comes in (Geissdoerfer et al., 2018). In all three areas, AI has the potential to be a catalyst when used wisely. Globally, renewable energy integration into power grids can be optimised with machine learning, financial inclusion can be enhanced with predictive analytics, and healthcare and education can be made more accessible with natural language processing.

40 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/future-of-ai-in-global-sustainability/400593

Related Content

Current Technological Advances in the Real Estate

Shamanth Adiga Shamanth Adiga and K. G. Hemalatha (2026). *Applied AI and Blockchain in Global Real Estate* (pp. 75-96).

www.irma-international.org/chapter/current-technological-advances-in-the-real-estate/397243

A Fuzzy Clustering Model for Fuzzy Data with Outliers

M. H. Fazel Zarandi and Zahra S. Razaee (2013). *Contemporary Theory and Pragmatic Approaches in Fuzzy Computing Utilization* (pp. 29-40).

www.irma-international.org/chapter/fuzzy-clustering-model-fuzzy-data/67480

An Intelligent Ecosystem to Support the Development of Communication Skills in Children with Autism: An Experience Based on Ontologies, Multi-Sensory Stimulation Rooms, and Robotic Assistants

Vladimir Robles-Bykbaev, Martín López-Nores, Jorge Andrés Galán-Mena, Verónica Cevallos León Wong, Diego Quisi-Peralta, Diego Lima-Juma, Carlos Andrés Arévalo Fernández and José Juan Pazos-Arias (2017). *Smart Technology Applications in Business Environments* (pp. 109-133).

www.irma-international.org/chapter/an-intelligent-ecosystem-to-support-the-development-of-communication-skills-in-children-with-autism/179035

An Ontology Based Model for Document Clustering

U. K. Sridevi and N. Nagaveni (2011). *International Journal of Intelligent Information Technologies* (pp. 54-69).

www.irma-international.org/article/ontology-based-model-document-clustering/58056

A Fuzzy-Based Approach to Support Decision Making in Complex Military Environments

Timothy P. Hanratty, E. Allison Newcomb, Robert J. Hammell II, John T. Richardson and Mark R. Mittrick (2016). *International Journal of Intelligent Information Technologies* (pp. 1-30).

www.irma-international.org/article/a-fuzzy-based-approach-to-support-decision-making-in-complex-military-environments/145775