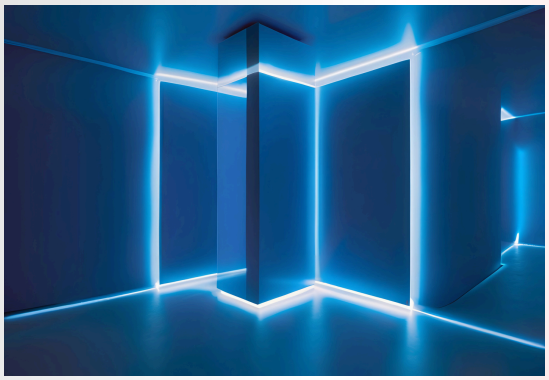
# Future Technologies and Sustainable Development: Shaping the New World

## Summit 2025



**AUGUST 03, 2025**

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**Venue**- 106 Sampaguita St, Purok, Laguna, Philippines, 4030

Hybrid Mode- Auguste 3, 2025

Time- 9 am to 6 pm

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# FOREWORD

**Dear Colleagues,**

It is a great honor for me to host you all in "***Future Technologies and Sustainable Development: Shaping the New World***" was taken place in Laguna, Philippines 03 august 2025.

We are also happy to publish the proceeding of the conferences. All papers have been reviewed by reviewers.

Prof. Dr. Herman, S.Pd., M.Pd., C.TESOL/TEFL., C.TEYL

Chair for "Future Technologies and Sustainable Development: Shaping the New World-2025"

## Preface

In an era marked by rapid technological transformation and global sustainability challenges, the intersection between innovation and responsibility has never been more crucial. The international conference on "***Future Technologies and Sustainable Development: Shaping the New World***" brings together researchers, practitioners, policymakers, and academicians to engage in critical dialogue about the technologies shaping our collective future. This conference proceedings volume captures a diverse range of scholarly contributions that explore the dynamic relationship between technology, environment, culture, and human progress.

The primary objective of this conference is to foster interdisciplinary understanding of how emerging technologies such as artificial intelligence, quantum computing, cloud systems, and sustainable industrial frameworks can contribute to a balanced, inclusive, and environmentally responsible world. The selected papers span six core themes: *Technologies and Industrial Development; Artificial Intelligence and Emergent Technologies; Economics and Business Management; Software Engineering and Cloud Computing; Culture as a Catalyst for Sustainable Development; and Life on Earth*. Together, these themes reflect a shared vision of innovation that is not only technologically advanced but also ethically guided and ecologically sustainable.

We extend our deepest gratitude to all contributing authors, reviewers, and organizing committee members whose dedication made this event possible. Their collective insights and scholarly rigor have shaped this compilation into a valuable resource for academics, industry leaders, and policymakers striving to align technological advancement with sustainable development goals. It is our hope that this volume will inspire continued collaboration, critical reflection, and actionable innovation toward building a resilient and sustainable future.

Editors

Conference Proceedings Committee

*Future Technologies and Sustainable Development: Shaping the New World*

Year of Publication: 03 august 2025

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## Theme 1: Technologies and Industrial Development

# Smart Manufacturing and Industry 5.0: Human-Centric Automation for a Sustainable Future

Sumedh Sing, Punjab Engineering College (Deemed to be University), Chandigarh

## Abstract

The evolution from Industry 4.0 to Industry 5.0 represents a transformative movement that blends advanced automation with human intelligence, creativity, and sustainability. This paper examines how technologies such as the Internet of Things (IoT), artificial intelligence (AI), and robotics are redefining modern manufacturing. It emphasizes the concept of human-machine collaboration through cobots (collaborative robots), predictive maintenance, and data-driven production systems. Empirical evidence from advanced economies indicates that Industry 5.0 fosters innovation, reduces energy consumption, and enhances worker well-being by integrating social and environmental considerations into industrial strategy. The paper discusses the potential of human-centered automation to drive inclusive growth and industrial resilience. It further outlines the challenges of upskilling, cybersecurity, and ethical governance that accompany this transformation. The findings underscore that the next phase of industrialization must focus not only on productivity but also on purpose and sustainability, aligning technological progress with human values.

Keywords: Industry 5.0, smart manufacturing, human-centric automation, sustainability, cobots, IoT, industrial resilience.

# Green Industrial Transformation: Circular Economy Models for Emerging Markets

Krishna Ramaswamy, Acharya Nagarjuna University, Guntur, Andhra Pradesh

## Abstract

Industrial development in emerging markets faces the dual challenge of achieving economic growth while ensuring environmental sustainability. This paper explores how circular economy models focused on resource efficiency, waste minimization, and recycling can drive green industrial transformation. It evaluates digital tracking systems, renewable energy integration, and material recovery technologies as catalysts for sustainable industrial ecosystems. Drawing on case studies from India, Brazil, and South Africa, the research identifies key barriers such as inadequate infrastructure, regulatory gaps, and limited access to green finance. It proposes a multi-level policy framework emphasizing industrial symbiosis, extended producer responsibility, and digital supply chain transparency. The analysis reveals that circular industrial systems can create new business opportunities, generate green jobs, and enhance long-term competitiveness. Ultimately, the study advocates for a shift from linear to regenerative industrial growth models that align with global climate commitments and Sustainable Development Goals (SDGs).

**Keywords**: Circular economy, green industrialization, sustainable development, industrial symbiosis, renewable energy, emerging markets.

## Theme 2: Artificial Intelligence and Emergent Technologies

### Artificial Intelligence for Climate Adaptation: Predictive Analytics in Environmental Management

Richard Philip, National Institute of Technology, Itanagar, Arunachal Pradesh

### Abstract

Artificial Intelligence (AI) offers revolutionary opportunities for addressing the escalating challenges of climate change and environmental degradation. This paper explores how machine learning, deep learning, and remote sensing are leveraged to predict, manage, and mitigate environmental risks. It focuses on AI-driven applications for drought prediction, flood forecasting, and deforestation monitoring, utilizing big data analytics and satellite imagery. The study presents predictive models that enable real-time decision-making, early warning systems, and evidence-based environmental policies. Results demonstrate that integrating AI into climate governance frameworks enhances the precision, efficiency, and timeliness of interventions. However, the paper also discusses data privacy concerns, algorithmic transparency, and the ethical implications of AI deployment in ecological systems. The research concludes that sustainable AI implementation when governed responsibly can significantly advance climate adaptation, resilience planning, and biodiversity conservation across vulnerable regions.

**Keywords**: Artificial intelligence, climate adaptation, predictive analytics, environmental monitoring, sustainability, machine learning.

# Quantum Computing and the Next Technological Frontier: Implications for Sustainable Innovation

Tuhin Pradhani, Vellore Institute of Technology, Vellore, Tamil Nadu

## Abstract

Quantum computing represents a paradigm shift that could redefine computational efficiency across multiple domains, including energy, materials science, and logistics. This paper investigates how quantum algorithms can optimize complex systems to promote sustainability and innovation. By leveraging quantum annealing and entanglement-based computing, researchers are developing tools that accelerate chemical simulations, enabling the discovery of renewable materials and efficient catalysts. The study also evaluates the environmental footprint of quantum data centers, proposing a "Green Quantum Framework" to ensure energy-efficient infrastructure. Furthermore, the paper highlights cross-sectoral applications—ranging from climate modeling to carbon capture optimization—that demonstrate the transformative potential of quantum technologies. Despite challenges in cost, scalability, and qubit stability, the research concludes that quantum computing will become a cornerstone of future sustainable innovation ecosystems if guided by responsible development and international collaboration.

**Keywords**: Quantum computing, sustainable innovation, green technology, computational optimization, renewable energy, quantum algorithms.

## Theme 3: Economics and Business Management

### Sustainable Finance and Green Investment: Pathways to a Low-Carbon Economy

Kuldeep Sangwan, Central University of Haryana, Haryana

### Abstract

This paper investigates the evolving dynamics of sustainable finance as a key enabler of a low-carbon, inclusive global economy. It evaluates financial mechanisms such as green bonds, sustainability-linked loans, carbon pricing, and ESG (Environmental, Social, and Governance) investing. Through econometric analysis across OECD and emerging economies, the study measures the impact of green financial instruments on GDP growth and emission reductions. Findings reveal that nations with robust institutional frameworks, transparent governance, and digital financial inclusion demonstrate stronger environmental and economic outcomes. The paper also discusses the integration of fintech solutions—such as blockchain for transparency and AI for risk assessment—to enhance the efficiency of green capital allocation. Challenges include inconsistent ESG standards and limited awareness among investors. The research concludes that sustainable finance can serve as a powerful vehicle for decarbonization and long-term economic stability when coupled with supportive policy interventions and technological innovations.

**Keywords**: Sustainable finance, green bonds, ESG investing, carbon economy, fintech, climate investment, low-carbon transition.

# Digital Entrepreneurship and Innovation Ecosystems in the Post-Pandemic Economy

Mohitosh Manas, New Arts, Commerce and Science College, Ahmednagar

## Abstract

The global pandemic accelerated the digital transformation of businesses, redefining entrepreneurship, innovation, and market ecosystems. This paper explores the rise of digital entrepreneurship as a driver of economic resilience and inclusive growth in the post-pandemic era. It examines how emerging technologies such as AI, blockchain, and digital platforms enable small and medium enterprises (SMEs) to scale efficiently. Based on survey data from 500 start-ups across Asia, the study identifies enablers including government policy, digital literacy, and innovation clusters. The results demonstrate that digital ecosystems foster agility, reduce entry barriers, and create sustainable employment opportunities. However, challenges such as digital inequality, cybersecurity threats, and capital accessibility persist. The paper concludes that fostering a sustainable digital economy requires a multi-stakeholder approach that combines technological innovation, human capital development, and regulatory support for inclusive entrepreneurship.

**Keywords**: Digital entrepreneurship, innovation ecosystems, post-pandemic economy, SMEs, blockchain, inclusive growth, sustainability.

## Theme 4: Software Engineering and Cloud Computing

### Cloud-Native Applications for Sustainable IT Infrastructure

Animekh Goala, St. Joseph's College, Devagiri

### Abstract

Cloud-native architecture is redefining the sustainability paradigm within digital infrastructure. This paper examines how containerization, microservices, and serverless computing collectively contribute to energy-efficient and resource-optimized IT operations. Through empirical analysis of major technology firms, the research quantifies carbon footprint reductions achieved through virtualization and workload distribution. The study also introduces a "Sustainable Cloud Framework" integrating renewable-powered data centers and AI-based energy management systems. Findings suggest that the widespread adoption of cloud-native technologies not only enhances scalability and agility but also promotes green computing practices. Moreover, the paper explores the economic implications of sustainable cloud migration for small enterprises and developing nations. It concludes that environmentally conscious cloud strategies can play a crucial role in balancing technological advancement with ecological responsibility.

**Keywords**: Cloud computing, sustainability, green IT, serverless architecture, microservices, data centers, energy efficiency.

# Software Engineering for Sustainability: Building Energy-Efficient Digital Systems

Rahul Deshpande, B.M.S. College of Engineering

## Abstract

As global dependence on software intensifies, sustainable software engineering has emerged as a critical discipline for minimizing digital environmental impact. This paper explores the principles and methodologies for developing energy-efficient software systems. It examines algorithmic optimization, code efficiency, and lifecycle assessment frameworks that reduce carbon emissions associated with software execution. Using case studies from the financial and healthcare sectors, the study compares programming paradigms and identifies the measurable benefits of adopting green coding practices. Additionally, it emphasizes the need for incorporating sustainability criteria into software engineering curricula and professional standards. The findings suggest that fostering a culture of eco-conscious development can significantly lower the ICT industry's energy footprint. Ultimately, sustainable software design is presented not merely as a technical necessity but as a moral imperative for responsible digital transformation.

**Keywords**: Sustainable software, green coding, energy efficiency, software lifecycle, eco-design, ICT sustainability.

## Theme 5: Culture as a Catalyst for Sustainable Development

### Cultural Heritage and Smart Technologies: Reviving Traditions for Sustainable Tourism

Tulsi Sikarwar, St. Ann's College of Education, Mangaluru

**Abstract**

The intersection of culture and technology offers transformative potential for sustainable tourism and heritage preservation. This paper examines how digital technologies such as virtual reality (VR), augmented reality (AR), and 3D modeling are revitalizing historical sites and promoting cultural continuity. Case studies from India, Italy, and Japan demonstrate how immersive technologies enhance tourist experiences while reducing physical strain on heritage sites. The research highlights digital storytelling as a tool for engaging younger audiences and fostering cross-cultural understanding. Additionally, it discusses how community-based tourism initiatives can generate livelihoods while preserving intangible cultural heritage. Policy recommendations focus on integrating smart technologies within UNESCO's sustainable tourism frameworks. The study concludes that when applied ethically, technology can serve as a bridge between tradition and modernity, reinforcing cultural identity while supporting sustainable development.

**Keywords**: Cultural heritage, smart tourism, augmented reality, digital preservation, community-based tourism, sustainability.

# The Role of Indigenous Knowledge Systems in Achieving the Sustainable Development Goals

Anup Sinha, Savitribai Phule Pune University

## Abstract

Indigenous knowledge (IK) systems play an indispensable role in advancing sustainability, resilience, and cultural continuity. This paper investigates how traditional ecological knowledge contributes to biodiversity conservation, sustainable agriculture, and community-based resource management. Drawing on qualitative field studies from tribal regions of India, the Philippines, and Kenya, the study explores the integration of indigenous practices into national sustainable development policies. Results reveal that indigenous farming systems promote soil fertility, climate adaptation, and water conservation far more efficiently than many industrialized models. However, the erosion of indigenous wisdom due to modernization and loss of traditional livelihoods poses serious challenges. The paper proposes a "Hybrid Knowledge Integration Framework" combining digital documentation, community participation, and AI-assisted data mapping to preserve and disseminate traditional knowledge. It concludes that the recognition and protection of IK systems are essential to achieving the Sustainable Development Goals (SDGs), particularly those addressing poverty alleviation, environmental restoration, and gender equity.

**Keywords**: Indigenous knowledge, sustainability, biodiversity conservation, traditional ecology, SDGs, cultural resilience, hybrid knowledge framework.

## Theme 6: Life on Earth

### Biodiversity Conservation through Technology: AI-Driven Ecological Monitoring

Anu Agarwal, Government Mohindra College

**Abstract**

Biodiversity is the foundation of planetary sustainability, yet it faces unprecedented threats from habitat destruction, pollution, and climate change. This paper presents an integrated approach to ecological monitoring that harnesses artificial intelligence (AI), remote sensing, and Internet of Things (IoT) technologies. It details how automated species recognition, drone-based imaging, and AI-driven analytics can track population dynamics and ecosystem health in real time. Case studies from conservation projects in Africa and Southeast Asia demonstrate that technology-based monitoring significantly enhances early detection of biodiversity loss. Moreover, the paper proposes the establishment of a "Global Biodiversity Data Network" to enable cross-border collaboration and open-access data sharing. The study concludes that while technology cannot replace traditional conservation practices, it can amplify their effectiveness by improving accuracy, coverage, and policy responsiveness. Ethical considerations, such as data privacy and indigenous land rights, are also critically discussed.

**Keywords**: Biodiversity, AI monitoring, ecological conservation, IoT, remote sensing, data-driven sustainability, ecosystem management.

# Sustainable Agriculture and Food Security in the Age of Technology

Atul Ansari, Amrita Vishwa Vidyapeetham

## Abstract

Feeding a growing global population while preserving environmental integrity is one of humanity's greatest challenges. This paper examines how technology-driven innovations—such as precision agriculture, IoT-enabled irrigation, and AI-based pest control—are transforming the agricultural landscape. Through case analyses in India, Kenya, and Brazil, the study demonstrates how digital farming enhances productivity, optimizes resource use, and reduces greenhouse gas emissions. It emphasizes the potential of drones and satellite mapping in precision nutrient management and climate adaptation. The research also identifies socio-economic barriers, including digital illiteracy and unequal technology access, that limit the widespread adoption of smart agriculture. The paper concludes with a policy framework promoting capacity building, farmer cooperatives, and data-sharing platforms to ensure inclusivity. Sustainable agriculture, the study argues, is not only about technological efficiency but also about empowering smallholder farmers and ensuring long-term food security.

**Keywords**: Sustainable agriculture, food security, precision farming, smart irrigation, IoT, AI in agriculture, climate resilience.

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# Ocean Health and Blue Economy: Technological Pathways for Marine Sustainability

Shilpi Sahani, KTHM College, Nashik

## Abstract

The ocean, covering over 70% of the Earth's surface, sustains life and regulates climate, yet it faces degradation due to pollution, overfishing, and global warming. This paper explores the role of technology in advancing the Blue Economy and ensuring marine sustainability. It highlights innovations such as autonomous underwater vehicles (AUVs), satellite-based oceanographic monitoring, and AI algorithms for marine biodiversity mapping. Using case studies from the Indian Ocean and the Mediterranean, the research reveals how technology enables sustainable fisheries management and marine pollution control. The study also introduces a "Blue Technology Integration Model" linking science, governance, and community participation. Challenges such as high operational costs, data fragmentation, and limited policy coordination are discussed in depth. The findings underscore the need for global cooperation and investment in ocean technologies to achieve SDG 14, Life Below Water and ensure equitable resource distribution for coastal communities.

**Keywords**: Blue economy, ocean sustainability, marine technology, AUVs, marine conservation, SDG 14, ocean governance.

# Renewable Energy and Ecological Balance: Integrating Technology with Nature

Kunal Natwal, G. B. Pant University of Agriculture and Technology, Uttarakhand

## Abstract

The rapid expansion of renewable energy sources offers a critical pathway to mitigate climate change, yet it must be harmonized with ecological preservation. This paper investigates the interplay between renewable energy development; solar, wind, and bioenergy and environmental sustainability. It analyzes environmental impact assessments from major renewable energy projects in India, Germany, and the United States to identify ecological trade-offs. Findings reveal that while renewable installations reduce carbon emissions, they can disrupt local ecosystems if poorly managed. To address this, the study proposes an "Eco-Tech Balance Model" emphasizing site-specific planning, biodiversity offsets, and community participation. It also examines technological solutions such as floating solar farms and wildlife-safe wind turbines that integrate conservation principles into energy systems. The paper concludes that responsible innovation and nature-based engineering are essential to achieving a sustainable energy transition without compromising ecological integrity.

**Keywords**: Renewable energy, sustainability, ecological balance, solar and wind power, biodiversity, eco-tech integration, green transition.

# Human Health, Technology, and the Planet: Building a One-Health Future

Isha Hooda, Pandit Ravishankar Shukla University

## Abstract

The One Health concept recognizes the interconnectedness of human, animal, and environmental health, a relationship increasingly vital in the face of pandemics and ecological disruption. This paper explores the role of technology in implementing the One Health approach, emphasizing biosensors, digital surveillance systems, and AI analytics for integrated disease management. Case studies from WHO-UNEP collaborative initiatives illustrate how cross-sectoral data sharing and predictive modeling have enhanced early detection of zoonotic diseases. The study highlights the potential of telemedicine and remote diagnostics to strengthen health systems in resource-limited regions. It also examines ethical and privacy challenges in handling health-environmental data. The paper concludes that the digitalization of One Health practices can revolutionize global health governance by bridging gaps between medical science, ecology, and technology. Building a technology-enabled One Health framework is thus crucial for safeguarding both planetary and public health in the 21st century.

**Keywords**: One Health, digital health, zoonotic diseases, AI in healthcare, biosensors, environmental health, sustainable health systems.