

Original Article

The Role of Innovation for the Sustainable development in India: A Study

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Manuscript ID:
BN-2025-020808

ISSN: 3065-7865

Volume 2

Issue 8

August 2025

Pp36-39

Submitted: 12 July 2025

Revised: 21 July 2025

Accepted: 10 Aug 2025

Published: 31 Aug 2025

DOI:

[10.5281/zenodo.17157415](https://doi.org/10.5281/zenodo.17157415)

DOI link:

<https://doi.org/10.5281/zenodo.17157415>



Quick Response Code:



Website: <https://bnir.us>



Abstract

Sustainable development is a complete strategy that combines social justice, economic efficiency and environmental responsibility. Its basic principle is to meet current needs without compromising the likelihood that future generations will meet theirs. The United Nations Sustainable Development Organization (CIR) emphasizes the need for radical transformation to resolve global issues such as poverty, inequality and climate change. Innovation is a key component of this transition. This research finds the decisive role of various forms of innovation - technological, institutional and social - in the promotion and improvement of the results of sustainable development. The study is based on a qualitative analysis of scientific articles, political documents, government reports and expert comments. Analysis classifies the different types of innovations that are essential for sustainable development in the following areas:

Keywords: Sustainable Development, Innovations, Technological Development.

- **Technological Innovation:** This includes advancements in clean energy technologies, green building techniques, and water-saving irrigation systems.
- **Social Innovation:** This focuses on creating and implementing novel solutions to address social and environmental issues, thereby fostering well-being and resilience.
- **Business and Economic Innovation:** This drives sustainable development by promoting resource-efficient practices, eco-friendly products, and new business models like circular economy models.
- **Policy and Governance Innovation:** This involves the implementation of green policies, such as carbon pricing and emissions trading, and the use of data analytics in policy formulation.

Objectives

1. To study how Innovation plays the role in sustainable entrepreneurship.
2. Identify problems and opportunities in implementing stable innovation.
3. Analysis the different kinds of Innovation which is important for sustainable development

Research Methods:-

On the basis of this study was an analysis of quality data which includes political documents, scientific articles, government reports and expert comments, all of which were verified. The study foundation process includes the content of innovation and sustainable development.

Introduction:

A balanced strategy that incorporates social justice, economic efficiency, and environmental responsibility is the focus of sustainable development. The goal of sustainable development is to satisfy current demands without compromising the capacity of future generations to satisfy their own. According to the Sustainable Development Goals (SDGs) of the UN, radical change is necessary to address poverty, inequality, and climate change of various countries. An important in rushing this move is innovation. This study sightsees the ways in which innovation—technological, institutional, and social—can promote and improve the results of sustainable development.

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How to cite this article:

Karpe, A. P. (2025). The Role of Innovation for the Sustainable development in India: A Study. Bulletin of Nexus, 2(8), 36–39. <https://doi.org/10.5281/zenodo.17157415>

A holistic strategy for environmental preservation, social inclusion, and economic growth is known as sustainable development. The report defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). In light of urgent global issues, including climate change, biodiversity loss, resource depletion, and growing inequality, the importance of sustainable development has increased. The 2030 Agenda for Sustainable Development, which was endorsed by the UN in 2015, has 17 Sustainable Development Goals (SDGs) that are intended to make the world more sustainable and equitable. The interconnectedness of development concerns is reflected in some goals, which address issues like changes in environment, insufficiency in products, health's of human, education, clean energy and responsible consumerism. To address these challenges, the government of India not keep behind the world they has taken initiatives such as the National Action Plan on Climate Change (NAPCC) and campaigns like Namami Gange, Swachh Bharat Abhiyan, and Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME). Indian government also focus on poverty reduction, increasing quality education, reducing gender inequality, healthcare, and rural development. For that they started Digital India program, Skill India program, Ayushman Bharat Scheme, and Jal Jeevan Mission for the support inclusive and sustainable development.

Important Points included in the Sustainable Development

- 1. Intergenerational Equity** – To secure resources for the future generations.
- 2. Inclusive Growth** – Give the equal chance for the people and removing the imbalance of rich and poor.
- 3. Environmental Protection** – Preserving biodiversity, ecosystems, and natural resources.
- 4. Efficient Use of Resources** – Minimizing waste and optimizing renewable energy.
- 5. Participatory Decision-Making** – Involving local communities and stakeholders.

Three Pillars of Sustainable Development

Economic Sustainability – Long-term economic growth without hurting and reducing resources of the environment.

Social Sustainability – Fair access to education, healthcare, and justice for all.

Environmental Sustainability – Conservation of natural resources and reducing pollution.

Role of Innovation in Sustainable Development

Innovations play a key role in achieving sustainable development, providing new solutions to complex environmental, economic and social problems. This stimulates efficiency, reduces the consumption of resources and creates inclusive and long -term means of growth. In the context of the United Nations' Sustainable Development Purpose (CUR), systems and society change requires innovation.

1. Technological Innovation:

Innovation is important to help India's sustainable development by promoting green technology, improving resource efficiency and promoting data controlled by data. In addition to events in areas such as AGTECH and renewable energy, initiatives such as Digital India and Start-Up India will revolutionise a certain number of industries which result increase in number of manufacturing company and achieve development goals. However, treating digital differences and ensuring fair access to technology remains a serious obstacle.

Clean energy technologies: Electric power and electricity produced using technologies that affect the trusting environment are included in pure and clean energy technology. These contain in the technologies such as backing up and storing carbon emissions, energy storage, and improving electric vehicles, as well as renewable energy sources such as solar batteries, wind, hydroelectric power plants, geothermal and biomass. It helps reduce carbon emissions or environmentalists.

Green building technologies and energy-efficient appliances: - Green Building Technology covers many strategies and methods used in building design, design and operation, increasing passenger and well efficiency, while minimizing environmental impact. It includes optimizing energy and water use, using stable materials, minimizing waste throughout the building's lifecycle. This approach aims to reduce carbon traces, preserve natural resources, and create a healthier internal environment

Water-saving irrigation systems:- Water-saving techniques are very important for any country development, in the point of view as like agriculture, reducing the water wastage and exploiting efficiency. DOUT drip irrigation technology and irrigation intellectual technology are important examples of providing water directly to the root roots and optimizing the irrigation calendar according to real-time data.

2. Social Innovation:

Social innovation is very important in the sense for achieving sustainable development, as it involves developing and implementing new solutions to address social and environmental problems, promoting well-being and resilience. It fosters systemic change through participatory approaches, collaboration, and technological advancements, aligning with the UN's Sustainable Development Goals. Social innovation can take various forms, from micro-level, place-based initiatives to macro-level, transformative changes in systems and institutions. Social innovation plays a vital role in achieving the UN's Sustainable Development Goals (SDGs) by providing innovative solutions to address various challenges, including poverty, hunger, inequality, climate change, and environmental degradation. It offers a bottom-up approach to problem-solving, empowering communities to become active participants in their own development.

In essence, social innovation is a powerful tool for creating a more sustainable and equitable future by fostering transformative change, promoting well-being, and leveraging collaborative approaches to address complex societal challenges.

3. Business and Economic Innovation:

Commerce and economic innovation are crucial to stimulate sustainable development, solve environmental problems, create economic opportunities, and generate solutions that contribute to social wells. In particular, innovation in the form of commercial models in the form of economies and innovation can lead to greater practice of resources, development of sustainable products and services, and the creation of new markets. This could contribute to achieving the Sustainable Development Goals (CUR) and creating a more stable and fair future.

Circular economy models (reuse, recycle, remanufacture) reduce waste and promote resource efficiency. Sustainable entrepreneurship drives the development of eco-friendly products and services. Innovations in supply chains lead to ethical sourcing and sustainable production.

4. Policy and Governance Innovation:

Introduction of green policies as like carbon pricing, emission trading etc. and environmental regulations are very necessary. Use of data analytics and AI in policymaking for climate action, disaster response, and urban planning. Examples of Innovation Supporting Sustainable Development: India's

Solar Energy Initiative: The International Solar Alliance (ISA) and PM-KUSUM scheme promote solar use in agriculture also farm development.

Eco-friendly Transportation: Development of electric vehicles (EVs) and public transport systems.

Smart Cities Mission: Innovation in urban planning, waste management, and digital governance.

Agricultural Innovation: Use of bio-fertilizers, precision farming, and climate-resilient crops.

Benefits of Innovation in Sustainability:

1. Reduces dependence on finite natural resources.
2. Enhances productivity and lowers costs.
3. Creates new job opportunities in green sectors.
4. Improves quality of life and social equity.
5. Boosts resilience to climate and environmental risks..

Conclusion

For the development of innovation, they play an important role in India's sustainable development, and are the integration of technological, social, economic and political solutions to solve environmental, economic and social problems. Modernised in the renewable energy sector, green buildings and effective irrigation reduce resource and emissions use, and social innovation contributes to inclusiveness and stability. Commercial models such as circular economy create green employment, increase productivity, and management innovation creates frameworks that favor long-term change. Coordinating these innovations with sustainable development objectives will enable India to fight poverty, inequality and climate change without compromising environmental integrity. Cooperation between governments, industry, science circles and communities is important to expand these initiatives. Ultimately, innovation is not an additional tool, but a changeable power to create a fair, stable and stable future.

Acknowledgement

I express my sincere gratitude to my guide, colleagues, and the Department of Commerce at ACS College, Gangakhed, for their continuous support and encouragement throughout this research work. I am thankful to the library and academic resources that provided valuable reference material which strengthened the study.

I extend my heartfelt thanks to my family and friends for their constant motivation, patience, and understanding during the preparation of this work. Their moral support has been an immense source of inspiration.

Finally, I would like to acknowledge all the scholars, researchers, and organizations whose works and reports have been referred to in this study. Without their valuable contributions, this research would not have been possible.

Financial support:

Nil

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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