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VIKSIT BHARAT @2047
Role of Science in Building a Developed India

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ABSTRACT
Viksit Bharat @2047 envisions an India that is economically prosperous, socially inclusive, technologically advanced, environmentally sustainable and capable of delivering a high quality of life to its citizens. Science and technology are central to this transformation because they create knowledge, improve productivity, strengthen public services, support innovation and help address complex national challenges. This paper examines the role of science in realizing the Viksit Bharat vision, with particular attention to space science, digital technologies, artificial intelligence, biotechnology, healthcare, agriculture, clean energy and climate resilience. It also highlights the importance of scientific temper, research and development, industry–academia collaboration, entrepreneurship and skill development. The paper argues that scientific progress should be inclusive, ethical, sustainable and focused on translating research into solutions that benefit society. A coordinated ecosystem involving government, educational institutions, researchers, industry and citizens can accelerate India's journey towards a developed nation by 2047.

Keywords
Viksit Bharat @2047; Science; Technology; Innovation; Research and Development; Artificial Intelligence; Biotechnology; Sustainable Development; Scientific Temper

1. Introduction
India's aspiration to become a developed nation by 2047 requires sustained progress across economic, social, technological and

environmental dimensions. Science provides the knowledge base for such progress, while technology converts scientific knowledge into products, services and systems. From space exploration and digital public infrastructure to modern agriculture, healthcare and renewable energy, scientific capabilities increasingly influence everyday life and national development.

The Viksit Bharat vision therefore cannot be separated from the development of a strong scientific and innovation ecosystem. The objective is not merely to increase the number of discoveries, but to ensure that research creates measurable public value, improves productivity, generates employment and contributes to a resilient and sustainable society.

2. Objectives of the Paper

To examine the contribution of science and technology to India's development.
To identify major scientific areas that can support the Viksit Bharat @2047 vision.
To discuss the role of research, innovation and entrepreneurship in economic growth.
To highlight the importance of scientific temper, skills and inclusive access to technology.
To suggest measures for strengthening India's science and innovation ecosystem.

3. Role of Science in Viksit Bharat

3.1 Science and Economic Growth

Scientific research improves productivity, enables new industries and supports value addition. Advances in manufacturing, materials science, electronics, biotechnology and digital technologies can strengthen domestic capabilities, create skilled employment and increase competitiveness. Strong links between research institutions and industry can help move innovations from laboratories to markets.

3.2 Space Science and National Development

India's space programme contributes to communication, weather forecasting, navigation, disaster management, agriculture and earth observation. Satellite-based data can support resource mapping, infrastructure planning and environmental monitoring. Continued investment in space science can also stimulate high-technology manufacturing and scientific skills.

3.3 Digital Technology and Artificial Intelligence

Artificial intelligence, cloud computing, data analytics and digital platforms can improve public administration, education, finance, transport and healthcare. Responsible adoption of AI requires attention to privacy, cybersecurity, transparency, accessibility and human oversight. Digital literacy is equally important so that technological benefits reach rural and underserved communities.

3.4 Biotechnology and Healthcare

Biotechnology can support vaccines, diagnostics, medicines, genomics, precision healthcare and agricultural applications. Scientific research can improve disease prevention and strengthen health systems. The benefits of biotechnology should be pursued with appropriate biosafety, ethical safeguards and affordable access.

3.5 Science in Agriculture

Agricultural science can improve crop productivity, soil health, water efficiency and resilience to climate variability. Remote sensing, precision agriculture, improved seeds, biotechnology, weather information and scientific storage practices can reduce losses and increase farmers' incomes when implemented appropriately.

3.6 Clean Energy and Sustainability

India's development pathway requires reliable and cleaner energy. Research in solar power, energy storage, green hydrogen, bioenergy, smart grids and energy efficiency can help reduce environmental pressures while supporting industrial growth. Science is also essential for climate monitoring, adaptation and disaster resilience.

3.7 Education, Skills and Scientific Temper

A developed India needs citizens who can understand evidence, solve problems and adapt to technological change. School and higher education should strengthen scientific inquiry, laboratory learning, interdisciplinary education, coding and data literacy. Scientific temper—questioning claims, evaluating evidence and remaining open to revision—is important for informed decision-making.

4. Challenges

Need for sustained and outcome-oriented investment in research and development.

Uneven access to advanced technology, laboratories and high-quality scientific education.

Limited research–industry linkages in some sectors and difficulties in commercializing research.

Shortage of advanced skills in emerging fields and the need for continuous reskilling.

Cybersecurity, data privacy, AI ethics and responsible technology governance.

Need to balance rapid development with environmental sustainability and social inclusion.

5. Suggestions for Strengthening the Science Ecosystem

Increase support for fundamental as well as applied research with clear long-term priorities.

Strengthen university–industry–government partnerships and technology transfer mechanisms.

Promote interdisciplinary research in AI, climate, health, agriculture, energy and materials.

Expand research opportunities and innovation facilities in colleges and universities.

Encourage student innovation, incubation, entrepreneurship and intellectual-property awareness.

Improve access to laboratories, digital resources and scientific learning in rural and underserved areas.

Build strong frameworks for ethical, safe and responsible use of emerging technologies.

Promote science communication in Indian languages to broaden public participation in scientific development.

6. Conclusion

Science is a foundational driver of India's journey towards Viksit Bharat @2047. Its contribution extends beyond laboratories: it influences productivity, healthcare, agriculture, education, energy, environmental protection, digital services and national resilience. The next phase of development requires an ecosystem in which discovery, innovation, entrepreneurship and public policy reinforce one another. By investing in people, research institutions and responsible technologies—and by ensuring that scientific progress is inclusive and sustainable—India can strengthen its capacity to create opportunities and improve quality of life. The vision of a developed India will therefore depend substantially on how effectively scientific knowledge is transformed into solutions for society.

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