



# IAS PARLIAMENT

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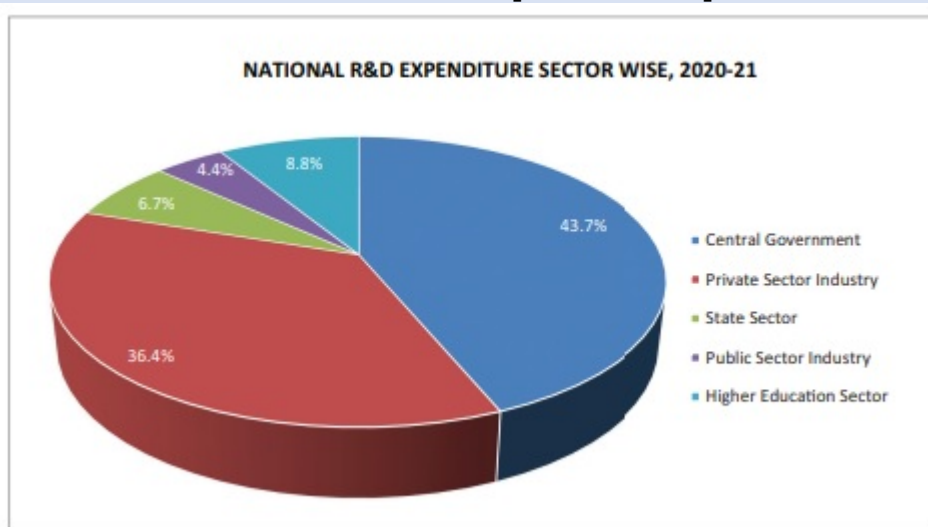
## Status of India's R&D

### Why in news?

Sustainable funding for science and research is crucial for India's journey towards becoming a science power by 2047.

### Status of India's R&D

- The UNESCO defines R&D as - 'R&D is any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications'.
- National Science Day- The theme for 2024 is "Science for Sustainable Development", the country aims to become a developed nation by 2047 through science and technology.
- In India, the government undertakes 60% of expenditure on Research and development (R&D), unlike other nations where private enterprise takes the lead.



- The [India Innovation Index 2021](#) has found that the overall spending on R&D by India has been relatively low across the country.
- India's R&D expense has dropped to the current 0.64% of GDP from 0.8% in 2008-2009 and 0.7% in 2017-2018, whereas the world average stands at around 1.8%.
- STIP, 2013- Science, Technology, and Innovation Policy noted that increasing Gross Expenditure on R&D (GERD) to 2% GDP has been a national goal for some time.
- Most developed countries allocate between 2% and 4% of their GDP for R&D, US and UK have consistently exceeded 2% mark over the past decade
- In 2021, OECD member countries on average invested 2.7% of their GDP in R&D.

### What are the issues with India's R&D?

- **Low R&D spending**- India's R&D spending is among the lowest globally, inadequate

funding hinders the country's ambitious science and technology goals.

- **Low private participation**- The overreliance on public fund signals an immature financing system and a weak domestic market, it is due to low private sector contribution due to concerns about regulation, intellectual property rights etc.,
- **Fund deficit**- [Anusandhan National Research Foundation](#) (ANRF) has faced delays in implementation as the strategies for raising private sector fund remain unclear.

*ANRF has been established under ANRF Act 2023 Act which aims to seed, grow and promote research and development (R&D) and foster a culture of research and innovation throughout India's universities, colleges, research institutions, and R&D laboratories.*

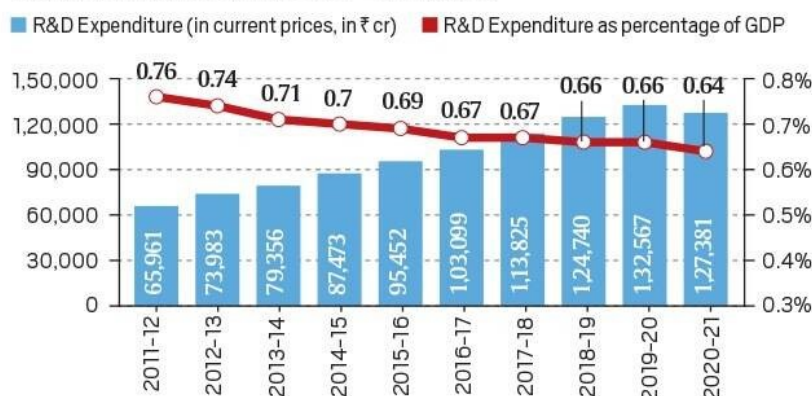
- **Underutilization of budget**- Ministries, such as the Department of Biotechnology and Department of Science and Technology, consistently under-utilize their allocated budgets.
- **Patent ownership**- Majority of the patents filed by India are owned by MNCs with less than 10% owned by Indian companies, it indicates a potential gap in indigenous innovation and technology development.



# Key indicators: How India compares with others

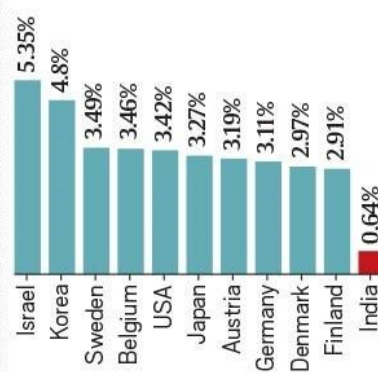
India compares unfavourably with the world's best on R&D expenditure as percentage of GDP – and the number has trended downward over the past decade. India has far fewer researchers per million population compared with China, Brazil, or the US

## EXPENDITURE ON R&D (ALL PUBLIC PLUS PRIVATE)



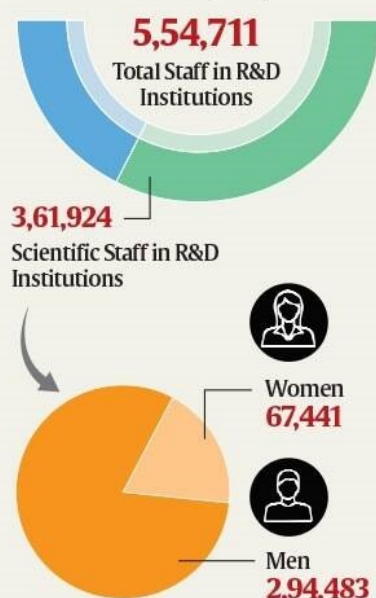
Source: Department of Science and Technology (DST)

## TOP TEN COUNTRIES WITH MAXIMUM EXPENDITURE ON R&D AS % OF GDP



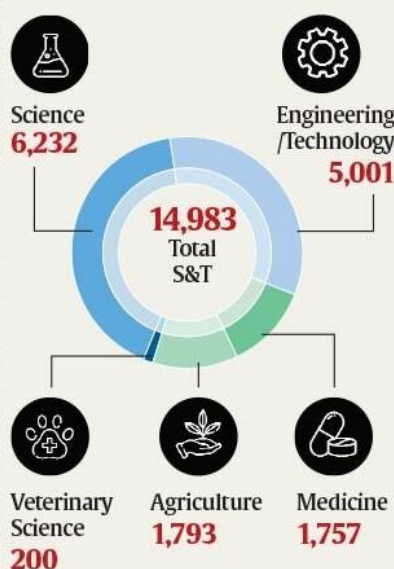
Source: UNESCO Science Report 2021

## WOMEN IN SCIENCE (2021)



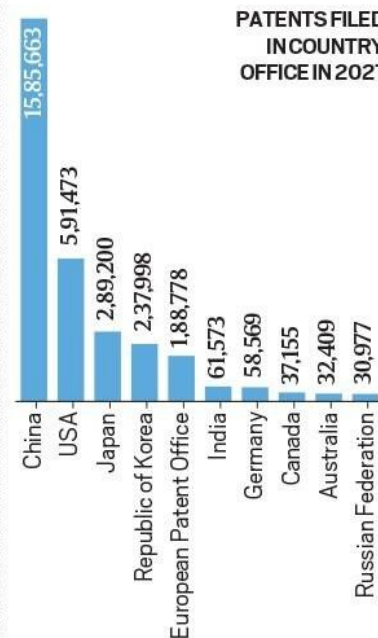
Source: DST

## DOCTORATES AWARDED IN SCIENCE AND ENGINEERING IN 2020-21



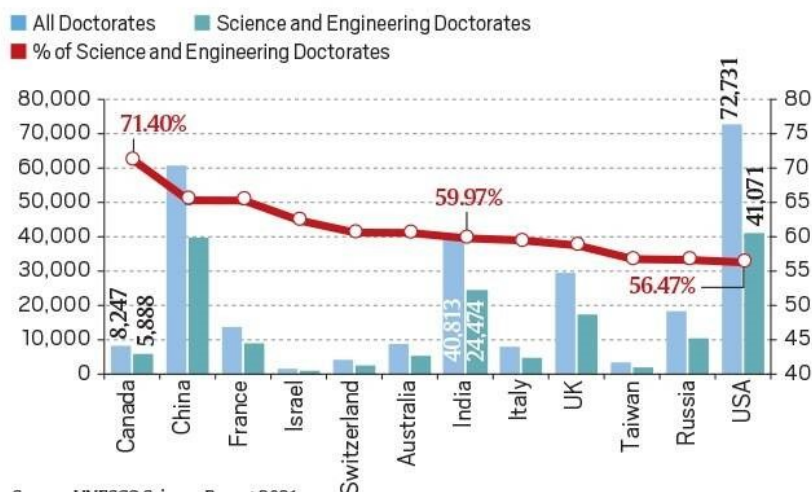
Source: DST

## PATENTS FILED IN COUNTRY OFFICE IN 2021



Source: UNESCO Science Report 2021

## DOCTORATES PRODUCED IN 2018



Source: UNESCO Science Report 2021

## RESEARCHERS PER MILLION POPULATION

|                    |       |
|--------------------|-------|
| Israel             | 8,342 |
| Singapore          | 7,287 |
| Japan              | 5,455 |
| USA                | 4,821 |
| United Kingdom     | 4,684 |
| Australia          | 4,532 |
| Canada             | 4,516 |
| Russian Federation | 2,722 |
| China              | 1,585 |
| Brazil             | 888   |
| South Africa       | 484   |
| Mexico             | 349   |
| India              | 262   |

Source: UNESCO Science Report 2021

- **Lack of collaboration**- There is a weak linkage between academia and private industry in India compared to Europe or America.
- **Diverse education standards**- The Indian education system is diverse in standards, impacting the quality of research produced by universities.
- **Skewed focus**- Indian research is primarily skewed towards basic research and lacks application-oriented R&D.
- **Weak enforcement of IPR**- Inadequate enforcement of Intellectual Property Rights in some areas despite improvements in IPR regime.
- **Non-Competitive global R&D**- Despite a growing talent pool, Indian R&D remains globally non-competitive.

### What can be done?

- **Increase funding**- India should aim for at least 3% of GDP annually until 2047 for meaningful impact on development.
- **Political will**- It is important to prioritize and increase R&D expenditure.
- **Diversify funding sources**- Encourage private sector participation through incentives like tax rebates and foreign direct investments.
- **Simplify regulatory mechanisms**- To build investor confidence streamline approval process as this would make India an attractive FDI destination in R&D.
- **Capacity building**- There is a need to enhance bureaucratic capacity for evaluating science projects.
- **Regular inspection**- There is a need to regularly monitor and evaluate the project utilization to prevent it from under-utilization.
- **Provide incentives**- The government can explore mechanisms to attract private investments by providing tax incentives.
- **Prioritize R&D**- The Ministry of Finance should recognize R&D as core element of India's growth journey.
- **Public sensitisation**- The government should increase awareness among the public about the importance of sustainable funding for science.

### Reference

[The Hindu- Sustainable funding essential for India](#)



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