

India's Research Framework

What is the issue?

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- India's significance is rising on the world science research stage but it is also facing issues that is undermining the research ecosystem. \n

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What are the positives?

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- UNESCO Science Report 2015 has pointed out that India has become a hub for low cost innovation.
- India has continued building its capacity in low cost engineering. $\slash n$
- Such an approach has helped in making products affordable to the masses and has also enhanced its export profile. \n
- It progress encompasses various domains like space technology, pharmaceuticals and IT and more recently, aviation parts.
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- Global Patent Share India stood $7^{\rm th}$ in terms of the number of patents filed by residents and non-residents domestically. \n
- The top 6 countries are China, US, Japan, South Korea, EU, Germany. $\space{\space{1.5}n}$
- But notably, patents have grown much faster with income in countries like China, Korea, and Japan.
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- Scientific publications It has been growing at an impressive 10%. $\ensuremath{\sc n}$
- In terms of scientific output per dollar spent on research puts India on par with the best in the world. \n
- This suggests that India is an innovation hub, at least in pharmaceuticals,

computer software and automobiles, where the private sector is in lead.

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What are the concerns?

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- The Indian share in the number of patents sealed in India has fallen from 40% in 2001-02 to 15% in 2015-16. \n
- Meanwhile, the number of patents granted by the US Patent Office to Indian applicants has been on the rise, most of them being MNCs.
- The surge in FDI and R&D activity has led to MNCs accounting for over 80% of patents issued to Indians by the US patents office. \n
- This raises questions whether FDI has led to technology assimilation in India, something that China managed to ensure over the last three decades. \n
- On technology transfer, there is a lack of coordination between science and technology policy and the Make in India policy. \n

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How has the funding been for R&D?

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- Central and state governments together set aside Rs. 56,000 crore towards R&D in 2016-17, while the private sector spent about Rs. 43,000 crore. \n
- While the private sector seems to have a clear roadmap for the researches it undertakes, the state needs better targeting for its work. \n
- Indigenous technology development has been sparse except in strategic areas such as space, atomic energy and missiles. \n
- **Electronics import** which accounts for above \$40 billion annually is a measure of a lack of technological self-sufficiency. n
- The amount spent as a % of GDP in R&D fell to just 0.69% in 2016-17. \n
- India produced only 15,300 PhDs in science, engineering and medicine fields

which is only one-fifth of what china and US did.

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- There is contestations that fellowship stipend is also being cut, which dissuades researchers apart from starving critical projects off funds. \n
- Another issue is the unduly prioritising certain niche domains like traditional medicine over other domains of research. \n

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What is the weakness in our education sector?

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- Quality of research has to catch up with ideas that relate to larger issues in science or society, which has proven difficult. \n
- The difficulty is primarily due to the weaknesses in our educational framework, which is more accentuated in the science stream.
- The university system is in near collapse, due to the dismal state of humanities, and with it the lack of the crucial inter-disciplinary ambience. \n
- **Compartmentalisation** A considerable partition is emerging in research and teaching, with research being considered superior, which is affecting both.

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- As teaching has largely come to be perceived as a distraction to research, there has been a constant push of talent out of classrooms. \n
- These attitudes, along with the fact that large grants has been flowing to projects that promise technological outcomes, basic research has suffered. \n
- Government has constituted "Indian Institutes of Science Education and Research" (IISERs) for reviving an inter-disciplinary approach. \n
- But, this is largely a half hearted effort, as higher education accounts for just 4% of public R&D spending. \n

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Source: Business Line

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