

India's Scientific Research Performance: 2009-2013

Salient Highlights

(DST Commissioned Study 2016: International Comparative Performance of Research Base - A Bibliometric Analysis, Elsevier, SCOPUS database)

Volume and Global Share of Publications

- India's scientific research output has shown a significant rising trend over the past few years, research papers publication increased by 68% from 62,955 in 2009 to 106,065 in 2013.
- In 2013, India produced more research papers than Italy, Canada, Spain, Australia, Korea, Sweden Singapore and other BRICS countries except China.
- India's global share in scientific research publications increased from 3.1% in 2009 to 4.4% in 2013.
- In 2013, India's share in global research output by subject areas was highest in Pharmacology and Toxicology (13.5%) followed by Chemistry (7.1%), Chemical Engineering (6.4%), Material Science (5.4%), Environmental Science (5.4%), Veterinary Sciences (5.4%) and Physics & Astronomy (5.2%).
- India's scientific research publications grew by 13.9% (CAGR) as compared to 4.1% for the world during 2009-13.

Research Disciplines and National Output

- India's volume of research publications by discipline was highest in Medicine, Engineering, Physics & Astronomy and Chemistry in year 2013.
- Publication share in national output by discipline in 2013 was highest in Medicine (20.5%) followed by Engineering (19.9%), Physics and Astronomy (14.3%), Chemistry (14%), Computer Science(13.5%), Biochemistry, Genetics and Molecular Biology (13.1%) and Material Science (12.1%) .
- During 2009-13, high growth rate (CAGR) of research publication was observed in Pharmacology & Toxicology (17.3%), Medicine (16.9%), Computer Science (16.7%), Biochemistry, Genetics & Molecular Biology (15.3%), Engineering (14.5%). While Chemistry observed a growth rate of 7.9%.

Collaborations

International

- 17,006 papers from India were the product of international collaboration comprising 16% of India's total research publication output in 2013.
- During 2009-13, India's international collaboration by research publications was highest in Physics & Astronomy (26.7%) followed by Earth and Planetary Sciences (24.0%), Material Science (22.4%), Mathematics (22.3%) and Chemistry (19.1%).
- India's top 3 international collaborating partner countries in research publications were USA, UK and Germany during 2009-13.
- India's share of international collaboration in world output increased from 3.3% in 2009 to 3.9% in 2013.

National

- In 2013, national collaboration accounted for 32.1% of India's total scientific research output.
- In 2013, academic-corporate collaboration accounted for 1.2% of India's total scientific research output.
- In 2013, academic-corporate collaboration was highest for Sweden (6.2%) followed by Japan (5.4%), Germany (5.2%), USA (4.7%), Britain (4.3%), Korea (4.1%), China (1.8%), BRICS (1.6%) and SAARC (1.1%).
- During 2009-13, the academic-corporate collaboration globally was concentrated in subject areas such as Engineering, Computer Science, Material Science and Energy. In case of India, it was concentrated in subject areas such as Computer Science, Chemistry and Pharmacology, Toxicology & Pharmaceuticals.

Citation Impact

- During 2009-13, India registered a citation impact of 0.75, higher than Russian Federation (0.62). Subject area-wise, citation impact was highest in Engineering (0.94) followed by Material Science (0.89), Chemical Engineering (0.87), Energy (0.87).
- In 2013, citation per paper (CPP) was highest in Chemical Engineering (4.53) followed by Chemistry (4.4), Material Science (3.83) and Energy (3.5).
- In 2013, India's citation share was 3.4% of the world citations.
- In 2013, India holds around 3% world share in top 25%, 10%, 5% and 1% of cited papers. This shows that India's growth is quite aggressive at the very top end of the excellence scale.

National Research Institutions

- During 2002-2014, top 5 research institutions in terms of volume of publication were Indian Institute of Science, Bangalore; Indian Institute of Technology, Kharagpur; Indian Institute of Technology, Delhi; University of Delhi, Delhi and Anna University, Chennai.
- During 2002-14, top 100 research institutions include DST's research institutions namely Indian Association for Cultivation of Science, Kolkata; Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore and Bose Institute, Kolkata.
- During 2002-2014, DST research institutions fall within 10 of the top 100 research institutions in terms of citation per paper (CPP). The top position being occupied by Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore followed by Indian Association for Cultivation of Science, Kolkata (4th); and Bose Institute, Kolkata (6th).