(April 2024). AN OVERVIEW OF TECHNOLOGICAL DEVELOPMENT IN INDIA
***International Journal of Economic Perspectives*, *18*(04) 86-89**
ISSN: 1307-1637 UGC CARE GROUP II
Retrieved from https://ijeponline.com/index.php/journal

AN OVERVIEW OF TECHNOLOGICAL DEVELOPMENT IN INDIA

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ABSTRACT

India is recognized globally for its scientific rigour and potential. After all, this is the land of Ayurveda, the land of climate sensitivity demonstrated through the Chipko Movement back in the 1970s, the land where successful nuclear tests like Pokhran-II were conducted, the land where science maestros C.V. Raman (Nobel Prize in Physics 1930) and Anna Mani were born. India was able to gain pace in scientific discovery only after independence. Getting back the reigns of democracy and planning the years ahead to regain our prosperity encouraged people to work towards scientific and technological advancements. In all these years, India witnessed a massive shift in these fields of discovery by strategically aligning its skills and resources.

KEYWORDS: *Technology, Advancement, Science, Development, Research, India*

INTRODUCTION

India was always a superior country, ranging from great kings and civilizations to incredible researchers in all fields. It has always had the history of world visionaries who rightly explained the laws of nature and science. India is called a culture hub. Therefore, the world should know the science that lies in this culture of India.

India has always worked towards general scientific and technological development, continuing the age-old practices. With the help of its youth, India is still working hard and will always keep working hard.

Modern India has had a strong focus on science and technology, realising that it is a key element for economic growth. India ranks third among the most attractive investment destinations for technology transactions in the world. With more and more multinational companies setting up their R&D centres in India, the sector has seen an uptrend in investment in recent years.

Overview

India is among the top countries globally in the field of scientific research, positioned as one of the top five nations in the field for space exploration. The country has regularly undertaken space missions, including missions to the moon and the famed Polar Satellite Launch Vehicle (PSLV).

Submitted: 27Oct 2023, Revised: 09 Nov 2024, Accepted: 18 Nov 2024, Published: April 2024

India is likely to take a leading role in launching satellites for the SAARC nations, generating revenue by offering its space facilities for use to other countries.

The government has introduced multiple policies aimed at projecting India as a science and technology powerhouse and promoting both public and private sector involvement in the R&D practice. As a result, India's gross expenditure on R&D (GERD) has been consistently increasing over the years. The government has also implemented several fellowship schemes to nurture human capacity for advanced research in the country.

By 2022, R&D expenditure is targeted to reach about 2% of the country's GDP. The engineering R&D and product development market in India is forecast to post a CAGR of 12% to reach US$ 63 billion by 2025, from US$ 31 billion in 2019. As per the Economic Survey 2022, India's gross domestic expenditure on R&D (GERD) as a percentage of GDP stood at 0.66%.

IT spending in India will grow 7% YoY to reach US$ 101.8 billion in 2022, compared to U$ 81.89 billion in 2021. India's medical technology sector is forecast to reach US$ 9.6 billion in 2022.

In FY21, there were 5,018 R&D projects, 2,528 fellowships, 3,702 publications, 30,532 ongoing projects and 797 innovations in India.

In FY21, the science and technology sector added 1,497,501 employees, becoming India's top employment generator.

Accenture offers a framework for assessing the economic effect of AI for selected G20 countries in its latest AI research studies and forecasts that AI will raise India's annual growth rate by 1.3% by 2035. India's National Artificial Intelligence Strategy prepared by NITI Aayog outlined a way forward to harness the potential of Artificial Intelligence (AI) in different fields.

A recent web series, "the rocket boys," has invariably shown how the great scientists of India like Dr Homi Bhabha, Dr APJ. Abdul Kalam, and Dr. Vikram Sarabhai, developed Indian atomic and space technologies.

Since ancient times, to the Mughal era, to the British era, to being an independent country, India was and is working and taking the world forward on a scientific timeline. Whether it's the field of space, or atomic energy or metro trains, India has always developed and kept the world in awe. Be it , successful Mars mission in the first attempt, Tarapur atomic energy hub or the Pokhran range, or the Vande Bharat Express.

Recent working in technical and natural sciences

Whether a scientist at an Indian space research organization, or an engineer at Indian railways doing general scientific and technological development for the railway board, all the great minds are working for scientific and public development in India.

Being gifted with natural resources, India has always been closely related to nature and biodiversity, which has led India to evolve natural science to a large extent.

The solar energy projects in rajasthan, wind energy in deccan plateau and biological developments in north east India, scientist have been closely related to these topics.

The upcoming wave of entrepreneurship has led to various innovations , even at the home level, which have the power to transform the world.

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Whether it was Aryabhatta,, Dr. Bose (physics and natural science), or E. Shreedharan sir(metro man of India), just like all these scientists , India is thriving towards a better tomorrow.

Developments/Investments

Some of the recent developments in the field of science and technology in India are as follows:

- In November 2022, Norwest Venture Partners agreed to invest US$ 32 million in Celebal Technologies, which specialises in AI, big data, and enterprise cloud among other technologies. In exchange, Norwest Venture Partners will acquire a minority stake in the company.
- In August 2022, a centre of excellence (CoE) for the Metaverse and Web3 technologies was opened in India by Coforge, a provider of digital services and solutions. Over 1,000 people will be trained and upskilled by the company.
- In August 2022, Samsung announced that it was expanding its industry-academia program PRISM (Preparing and Inspiring Student Minds) across 70 engineering colleges in India. The program will help educate students in the domains of artificial intelligence, machine learning and IoT.
- Technology incubator T-Hub launched the semiconductor companion of the AIC T-Hub Foundation programme to develop innovation and entrepreneurship across the semiconductor sector startups.
- Actis, a global investor in sustainable infrastructure, is planning to invest over US$ 700 million in order to acquire and expand assets for its platform aimed at offering real estate to tenants in the life sciences and allied sectors in India.
- In March 2022, Toyota launched its Mirai hydrogen fuel cell car in India. The Indian Oil Corporation would be supplying hydrogen to power the car.
- India's Top 5 IT firms (TCS, Infosys, Wipro, HCL and Tech Mahindra) added more than 122,000 employees in in the first six months of FY22, nearly matching the 138,000 employees hired in the entirety of FY21.
- In October 2021, Biz2Credit, a fintech company, announced plan to invest US$ 100 million in India over the next five years on research and development activities and expansions.
- From 2014 to 2021, India recorded a 572% growth in patent approvals.
- To accelerate digital innovation in India, NITI Aayog, Amazon Web Services and Intel have come together to develop a new experience studio to boost problem-solving and innovation between government stakeholders, start-ups, enterprises and industry experts. The new experience studio will use technologies such as artificial intelligence, machine learning, Internet of Things, augmented reality, virtual reality, blockchain and robotics to accelerate their use in the public sector.
- TechnoPro, a Japanese tech firm, plans to hire 10,000 engineers and researchers in India by 2022-23.
- Qualcomm plans to invest US$ 8.5 million on design initiatives in India, which would include funding its innovation labs at Hyderabad and Bangalore for R&D.

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CONCLUSIONS

India now ranks third in terms of the most attractive investment destinations for technology transactions globally, which definitely infers that scientific realms in India have progressed a lot. In the 21st Century, India has found its place amongst the top countries in scientific research. For instance, in space exploration, with its moon missions and Polar Satellite Launch Vehicle (PSLV), India has climbed up in the top five nations for space research globally. With the focus on Science, India is progressively working towards becoming a global leader in industrialization, machine development and technological development. As both challenges and hope lie ahead for India, our developments' optimism shall steer our spotlight from 'challenges' to 'hope' soon.

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