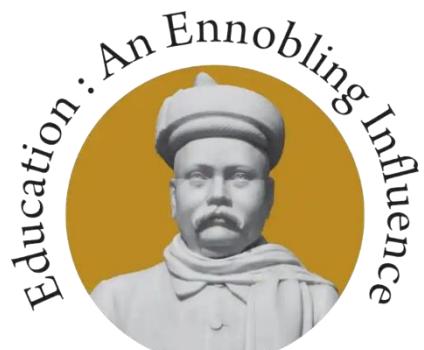
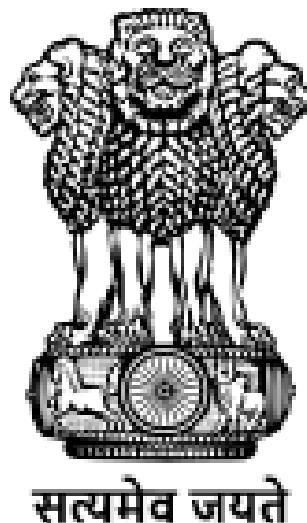


GOKHALE INSTITUTE OF POLITICS AND ECONOMICS, PUNE



Gopal Krishna Gokhale

TOPIC: MINISTRY OF SCIENCE AND TECHNOLOGY: DEMAND FOR GRANTS ANALYSIS



**विज्ञान एवं
प्रौद्योगिकी मंत्रालय
MINISTRY OF
SCIENCE AND
TECHNOLOGY**

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INTRODUCTION

In the journey of progress and innovation, the Ministry of Science and Technology plays an important role in shaping the technological future of our nation. As a cornerstone of research, the Ministry takes the responsibility of fostering scientific research, driving technological advances, and driving the nation toward a future marked by innovation and excellence.

The Ministry has three Main departments:

- i. The Department of Science and Technology DST promotes new scientific ideas, by coordinating in cross-sectorial linkages. It formulates policies and creates schemes to encourage scientific research within the country.
- ii. Department of Biotechnology (DBT) This department gives advances to biotechnology research projects that contribute to healthcare, the environment, and agriculture.
- iii. Department of Scientific and Industrial Research (DSIR) The department focuses on Industrial research, by fostering and funding industrial growth with technological development.

The allocation of funds through demands of grants is an important prospect of the government's financial planning. The assignment examines the demand for grants analysis for the Ministry of Science and Technology. Analyzing the budgetary allocations through all three departments helped us understand how the India Government gives importance to the field of Technology and Science. We will try to observe the allocation of funds, trends in expenditure, and key areas of focus under each department of the ministry. The analysis will also explore the challenges faced by the Ministry in its work and discuss future opportunities.

Ministry of Science and Technology

The Ministry of Science and Technology was established to promote new areas, policies, and programs related to Science and Technology and Innovation. It has three main departments namely the Department of Science and Technology (DST), the Department of Biotechnology (DBT), and the Department of Scientific and Industrial Research (DSIR).

The Ministry was established in the years 1971 to play the role of the most crucial department for organizing coordinating and promoting science and technological activities in the country.

Let's talk about the three departments and the work done by them :-

The Department of Science and Technology (DST) has major responsibilities some of which are mentioned below

1. Formulation of policies relating to Science and Technology.
2. Matters relating to the Scientific Advisory Committee of the Cabinet (SACC).
3. Promotion of new areas of Science and Technology with special emphasis on emerging areas.
 - i. Research and Development through its research institutions or laboratories for the development of indigenous technologies concerning biofuel production, processing, standardization, and applications, in co-ordination with the concerned Ministry or Department;

- ii. Research and Development activities to promote the utilization of by-products to develop value-added chemicals.

The role of the Minister of State for Science and Tech was played by Dr. Jitendra Singh. He is an accomplished physician holding an MBBS degree from Stanley Medical College, Chennai an MD from a government college in Jammu.

Department of Biotechnology (DBT)

The vision of the Department is to position biotechnology as a premier precision tool, contributing to wealth creation and social justice, particularly for the welfare of the less privileged. The mission is centered on advancing biotechnology's potential for human benefit, focusing on research, infrastructure, human resource development, industry promotion, and societal programs. Key objectives include realizing the full potential of biotechnology, enhancing efficiency in various sectors, and promoting socio-economic development, with core values emphasizing integrity, transparency, teamwork, and commitment guiding their endeavors.

Department of Scientific and Industrial Research (DSIR)

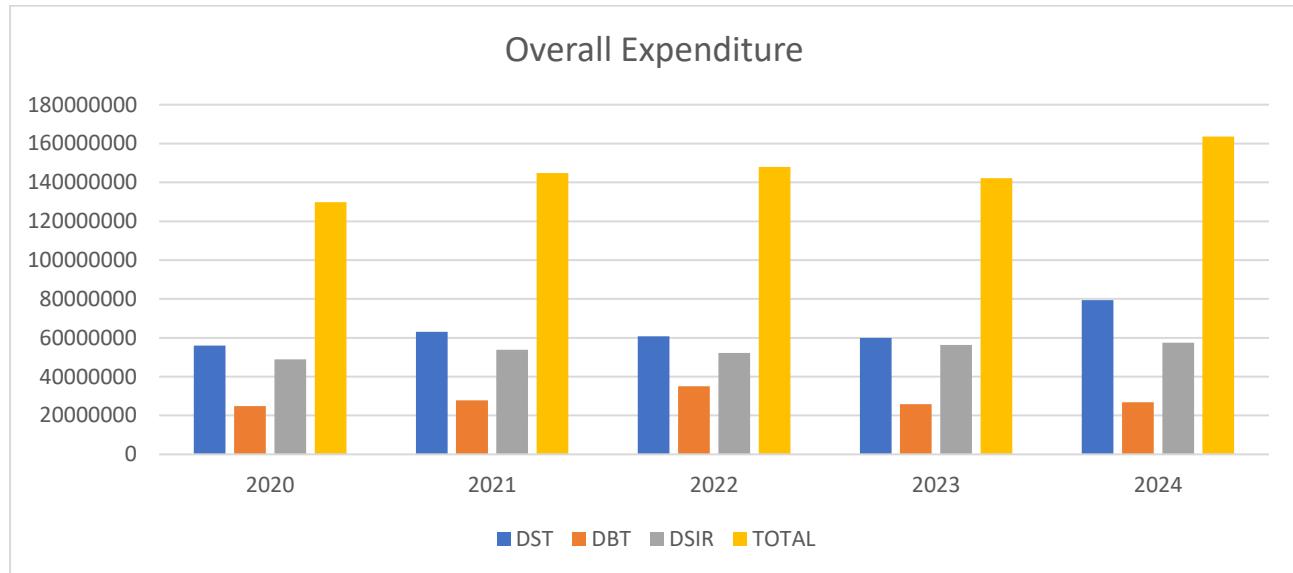
It was established in the year 1985 under the Ministry of Science and Technology this department is for promoting, developing, and transferring indigenous technologies. Dr. Kalaiselvi is the Secretary of DSIR and also a Director General of the Council of Scientific and Industrial Research. The DSIR aims to boost research and development in industries and also promote MSMEs. It also plays an important role in facilitating technology transfer between scientific labs and industrial establishments through agencies like National Research Development Corporation (NRDC) and encourages R&D investments through Central Electronics Limited (CEL)

1. OVERVIEW OF THE FINANCES

Expenditure:

The Ministry of Science and Technology allotted 16,631 cores in 2023 and it was only 0.36 percent of the overall union budget. In the following graphs and charts, we try to show the expenditure pattern under the ministry. For the analysis, we took data from the year 2019-2020 to 2023-2024. We used actual budget estimates for the graphs

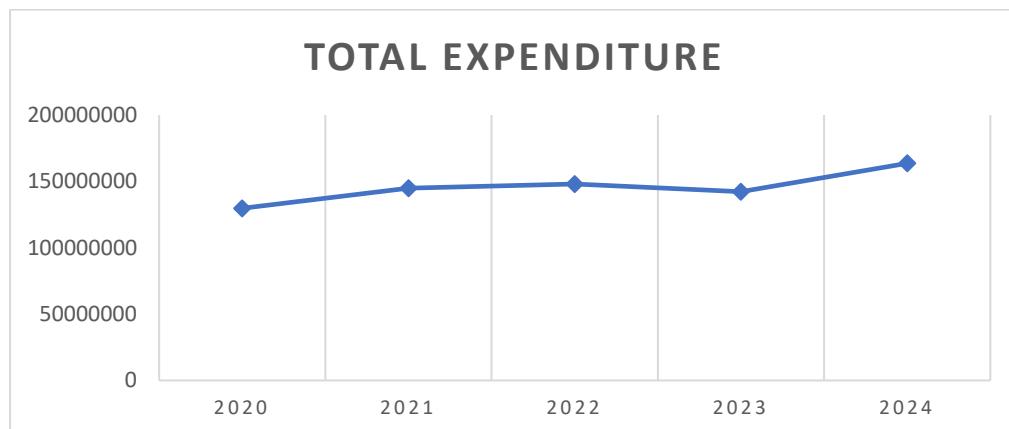
Figure 1.1: 5-year expenditure of Ministry and Science and Technology



It shows an overview of the Ministry of Science and Technology's expenditure across its three main departments which are 1) the Department of Science and Technology (DST) 2) the Department of Biotechnology (DBT) 3) the Department of Scientific and Industrial Research (DSIR) for 5 years.

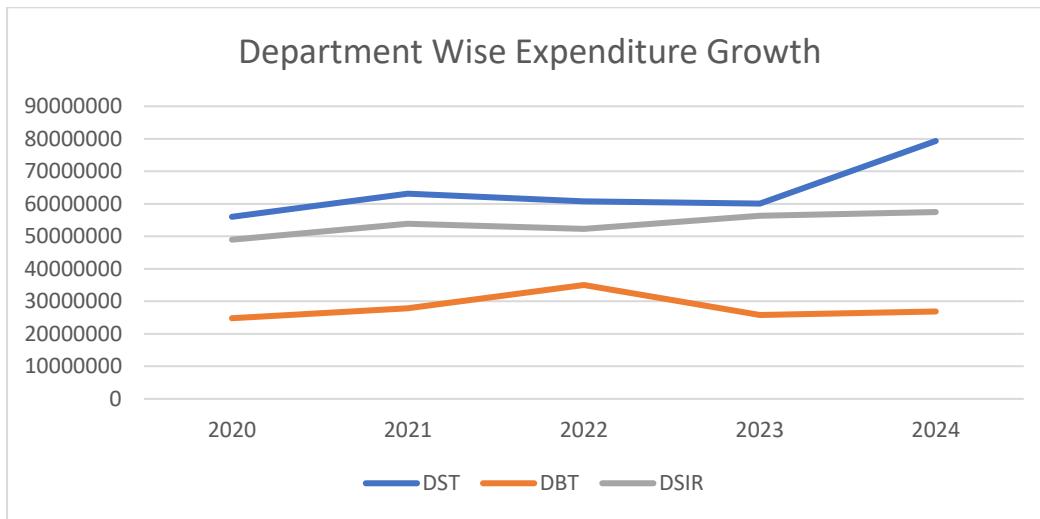
The year 2021 saw an increase in expenditure by 11.6% amounting to RS.144,853,700. The spike was due to the contribution by the ministry in the time of COVID-19. After the year 2021 there was a significant decrease in the funds allotted it fell as low as 2.2 and -3.9 in the years 2022, and 2023 respectively. In the most recent Demand for grants, the expenditure has again increased to 15.1 as the ministry has planned out various schemes and research projects.

Fig1.2: Growth in Total Expenditure in 5 years combining all 3 departments



From Fig 1.2 We can see that expenditure through the span of 5 years has seen an upward trend which is a positive sign for the country's development.

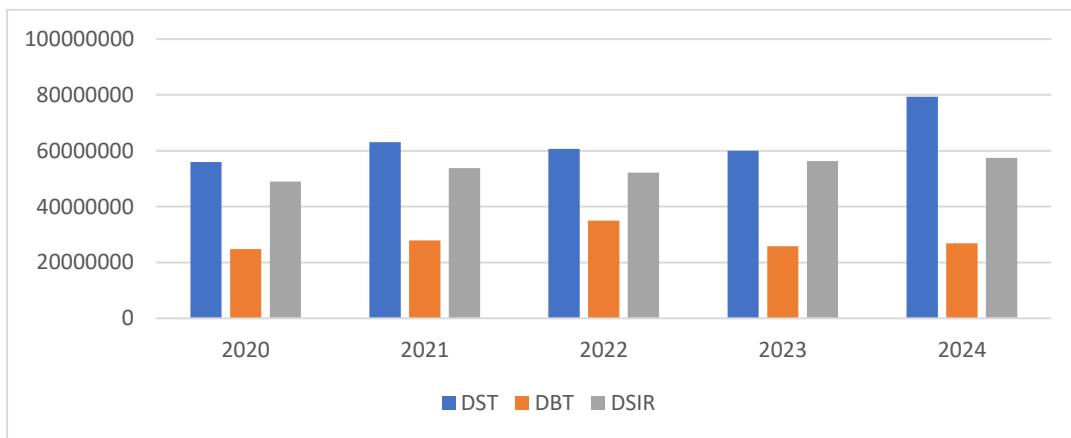
Figure 1.3: Department wise expenditure growth of 5-year



This graph depicts expenditure incurred by three main departments of the Ministry of Science and Technology namely the Department of science and Technology (DST), the Department of Biotechnology (DBT), the Department of Scientific and Industrial Research (DSIR) over the span of 5 years.

From the following graph, we can infer that DST has the highest proportion of expenditure following DSIR and the lowest to DBT.

Figure 1.4: Comparison of all three departments of the Ministry.



We can analyze from the graph that every year Department of Science and Technology gets the highest amount of funding in the Ministry.

2. DEPARTMENT WISE ALLOCATION

In Demand for grants, we have two types of expenditure one is revenue and the other is capital, and then the sum of two becomes the total expenditure needed for the financial year by the particular ministry in our case it is the Ministry of Science and Technology. In the following graphs, we can see the difference between revenue and allocation in two departments of the ministry namely the Department of Science and Technology (DST) and the Department of Scientific and Industrial Research (DSIR).

As represented in the graphs, we can see that the proportion of capital expenditure in terms of revenue is much lower in both departments throughout the years as the Ministry focuses more on research projects and prioritizing institutions over others.

Figure 2.1: Revenue and Capital of DST

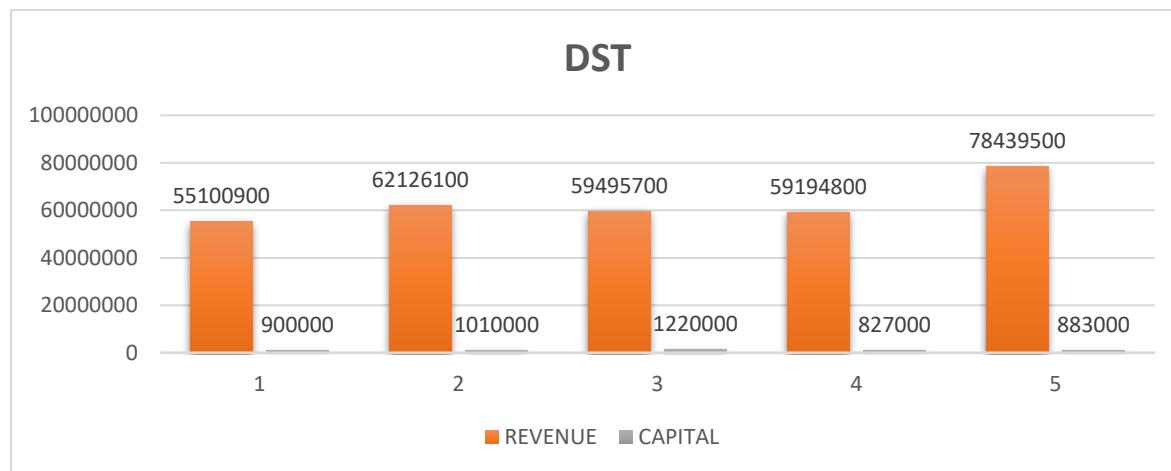


Figure 2.2: Revenue and Capital of DSIR



3. MAJOR ALLOCATION HEADS

In each department of the Ministry, there are major allocation heads we have tried to observe their funds for the years 2021 to 2023 we have also calculated changes in the percent of their allocation compared to previous years the data we found is attached below

Table 1: The Department of Science and Technology (DST)

DST			
<u>Particulars</u>	<u>2021-22</u>	<u>2022-23</u>	<u>% Change</u>
Secretariat- Economic Services	4051800	4183900	3.3
Inovation. Technology Development and Deployment	6855000	6170000	-10.0
NATMO	284000	345000	21.5
Institutional Research	2800000	3150000	12.5
Assistance to scientific autonomous Institutions/ Professional Bodies	14880000	15000000	0.8
Science and Technology Institutional and Human Capacity Building	10698000	10780000	0.8

Table 2: The Department of Biotechnology (DBT)

DBT			
<u>Particulars</u>	<u>2021-22</u>	<u>2022-23</u>	<u>% Change</u>
Biotechnology Industry Research Assitance Council (BIRAC)	400000	350000	-12.5
Assistance to autonomous Institutions	8469100	8658200	2.2
Biotechnology Research and Development	10072600	8000000	-20.6

Table 3: The Department of Scientific and Industrial Research (DSIR)

DSIR			
<u>Particulars</u>	<u>2021-22</u>	<u>2022-23</u>	<u>% Change</u>
National Laboratories	46692700	51027000	9.3
Assistance to CSIR	55627600	51442700	-7.5
National Research Development Corporation	100000	100000	0.0
Industrial R&D	185000	240000	29.7

4. Initiatives and ongoing research under each department

Under the Ministry of Science and Technology, there are three departments one is the Department of Science and Technology, which is a central agency for organizing, coordinating, and advancing in areas of science and technology activities in the country. Their key focus is on providing grants to research institutes, associations and individuals including students and scholars contribute to research and innovation. The department implements various schemes and programs aimed at capacity building, research and development, technology development, innovation, entrepreneurship, and enhancing science-society connections, with specific objectives in distinct domains.

Human Capacity Building Programmes

Innovation in Science Pursuit for Inspired Research (INSPIRE)

The Department through its INSPIRE program, aims to develop a passion for research technology and science among the youth of the country. It also aspires to build the human resource pool to strengthen the science and technology system and expand the R&D base of the country. They successfully promoted this scheme in 2010. This has five components. The first component is the INSPIRE Awards which gives encouragement to students under age 10-15 who want to pursue a career in science and research. The INSPIRE awards under MANAK(Million Minds Augmenting National Aspiration and Knowledge) are being executed by DST with the National Innovation Foundation. A total of Rs. 580000 (rs in thousands) is being approved in demand for grants for INSPIRE in the year 2022-23 of which s.450000 has been used in span of one year.

68.02	INSPIRE Awards (MANAK)	
68.02.26	Advertising & Publicity	0
68.02.31	Grants- in- aid General	580000
Total- INSPIRE Awards (MANAK)		580000

Institutional Capacity Building Programmes

The R&D Infrastructure division its goal is to strengthen the country's scientific and technical infrastructure bodies to complete their goal they offer various schemes some of them has mentioned below

FIST- Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions – It provides financial aid to higher educational institutions and universities for them to install and upgrade their R&D laboratories.

PURSE-Promotion of University Research and Scientific Excellence: Aims to strengthen the scientific research capacity of countries leading universities and support them in order to nourish the research ecosystem and provide a strong R&D base.

SAIF – Sophisticated Analytical Instrument Facilities: It is a regional scheme with the aim to provide analytical instruments to researchers in general and especially from the research institutions which does not have the means to afford them on their own to carry out research.

Department of Biotechnology DBT

SPARSH- Social Innovation Programme for Products to Social Health- This program is promoted by BIRAC under the sponsorship of DBT and the Government of India. Under this scheme, the department assists various social health programs and offers new ideas. They also aim to fund these new ideas and innovations that will eventually improve the health of every citizen in this country by providing products with affordable price ranges.

ICGEB – International Center for Genetic Engineering and Biotechnology: It was started by the United Nations Industrial Development Organization in the year 1983. This organization has three components and one of its laboratories is located in New Delhi and it closely works with the Department of Biotechnology in India.

Department of Scientific and Industrial Research DSIR

CSIR Council Of Scientific And Industrial Research - provides financial assistance to promote research work in various fields such as science technology, and agriculture. Engeering, and Medicine. This assistance is in the way granted to professors/experts in the research universities.

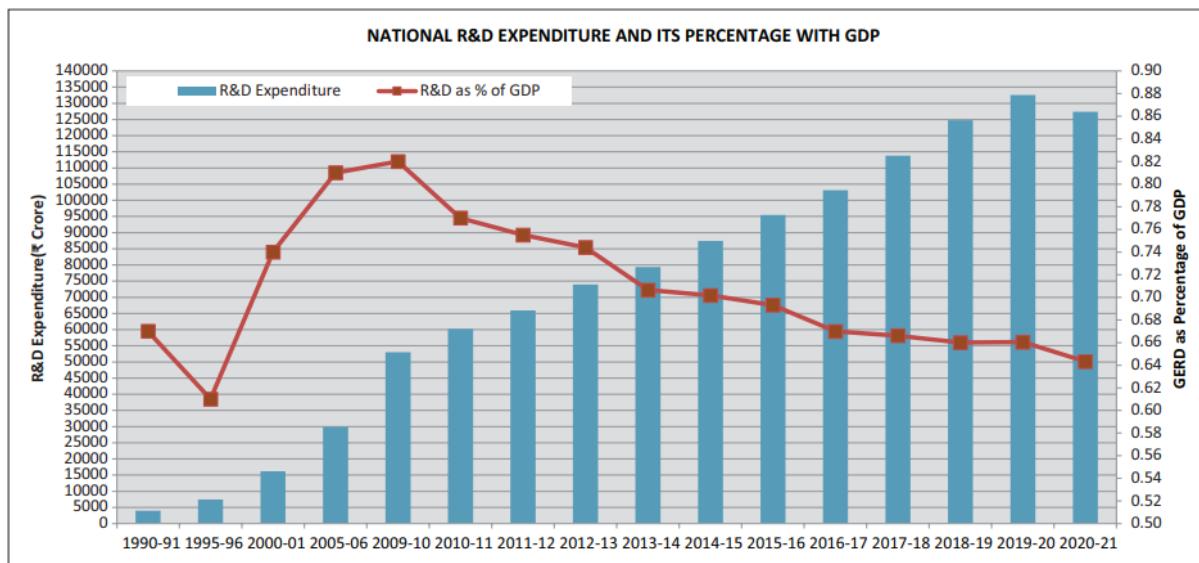
IRDPP Industrial R&D Promotion Programme grants recognition to industries that carry out research and development activities which also includes Industrial Research Organizations (SIROs) and publicly funded research Institutions. The institutions and research centers that are recognized by DSIR are eligible for duty-free imports of specified goods.

6. Challenges Faced by the Ministry of Science and Technology

India's Funding for Research and development activities is on a decline

In the overall budget, the research and development allotted only 0.7% of the entire expenditure. In the year 2023-24 ministry was allotted 12850 (rs in cores) but expenditure stood at 12943 which shows the deficit. The good Initiative by the government of India's National Research Foundation NRF also faces the problem of short funds. We major the expenditure on research and development as a percentage of overall GDP which is called GERD, from graph we can see that R&D expenditure has increased over the years but decline as percentage to GDP. India's expenditure on R&D is not just lower than the US and China but also from Japan.

Figure 3.1: National R&D expenditure and its percentage with GDP



A Brain Drain Phenomenon in INDIA

This term refers to the emigration of skilled professionals such as researchers and scientists from their home country to a foreign. As per UNESCO (United Nations Educational, Scientific and Cultural Organization) in 2023 around 360,000 Indian students were studying abroad, the percentage of which are as follows US-52%, Canada-14%, and Australia-8% these countries are top destinations for students.

A significant portion of professionals also migrated from India. According to the US National Science Foundation, 1 million scientists and engineers who have Indian origin work in the US making a significant portion of the US STEM workforce.

Investment in R&D is in decline

India faces a low investment by the public sector in research and development projects the threat of AI should have increased the amount but we observed no significant increase in investment in last year's budget.

Companies in India haven't been increasing their spending on research and development as it was in the past years. In fact, they have dropped the investment proportion by 9% in the last year, after growing from 11% the year before.

Figure 3.2: Funding by private investors in R&D



7. WAY AHEAD

Combining growth initiatives

The initiatives like ‘Make in India’ and ‘Atmanirbhar Bharat’ focus on re-boosting the manufacturing sector their successful application can be seen as beneficial to the Ministry of Science and Technology. An emerging manufacturing sector encourages private companies to invest in R&D for product innovation and development fostering business relations. This shows the need for proper implementation of policies and schemes on ground levels in India.

Strategic Resource Allocation

The National Research Foundation has proposed an allocation of over Rs 50000 crore for its establishment this gives the opportunity to manage the funding gaps in the ministry. The use of this fund to overcome the deficit in autonomous institutions like CSIR and DST is a short-term solution ministry that should look forward to increasing its funding in the long run. Ensuring transiency in NRF funds can also be considered sustainable growth.

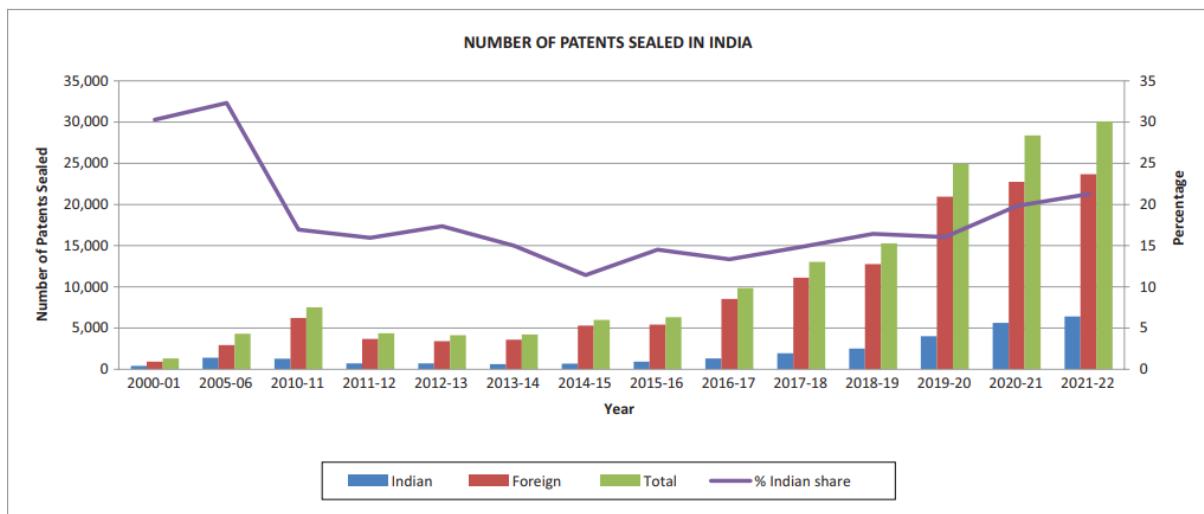
Expenditure as an Investment in Research and Development

In the year 2020-21 The Economic Survey recommended increasing the country’s Gross Domestic Expenditure on Research and Development (GERD) from 0.7% to 2% of GDP this is a crucial need for the R&D sector and ministry. The increase in expenditure can bring out a positive change in the sector.

The use of Intellectual Property (IP) as the catalyst

In the development sector, the National IPR Policy of 2016 plays a vital role in gaining the investor's confidence and can positively attract foreign investment in the country's R&D activities. Strong IP act promotes innovation and provides incentives to corporations for investments in risky but important research projects.

Fig 4.1: Numbers of patents sealed in India



Source: Controller General of Patents, Design and Trade Marks-Annual reports

8. CONCLUSION

The Ministry of Science and Technology plays an important role in improving the country's scientific advancements and technological innovation, propelling India towards a science-driven economy. With its three departments namely the Department of Science and Technology, the Department of Scientific Industrial Research, and the Department of Biotechnology it achieves significant advancement in the field. Each department has specific responsibilities such as DST promoting new scientific research areas, DBT aiming at biotechnological research in the institutes, and DSIR driving research and development in the industries. Over the past five years, the demand for grants for the Ministry of Science and Technology has noticed dynamic fluctuations. From the data, we can conclude that the expenditure of the Ministry has been increasing for the past decade but has short-term fluctuations. The proportion of revenue and capital expenditure has major differences that need to be addressed by the ministry. As we have already discussed in the overall budget allocation the fund MoST gets is quite low. Again it has been increasing in past years but comparing it with other countries' GERD ratio India has to make significant development in this sector. In a recent interim budget, the Finance Minister has said to be allocating Rs. 1 lakh core to science and technology which can be considered as positive news for the Ministry.

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