

Initiatives for Empowering Women in Science & Technology: *A critical evaluation*

July 2024

Sandhya Wakdikar
Praveen Sharma



**CSIR – National Institute of Science Communication and
Policy Research (NIScPR)**

New Delhi - 110012

Initiatives for Empowering Women in Science & Technology: A critical evaluation

**Sandhya Wakdikar
Praveen Sharma**

July 2024

ISBN No : 978-81-970396-3-8



**CSIR – National Institute of Science Communication and Policy
Research (NIScPR)**

Dr. K S Krishnan Marg, Pusa Campus, New Delhi - 110012

PROJECT INFORMATION

Project Team

Nodal Officer:

Dr. Ranjana Aggarwal, Director, CSIR-NIScPR

Principal Investigator:

Sandhya Wakdikar, CSIR-NIScPR

Co-Investigator:

Dr. Praveen Sharma, CSIR-NIScPR

Project Type: In-house

Publication Type: Research Report

Corresponding Author: Sandhya Wakdikar

Email: sandhyaw@niscpr.res.in

Disclaimer:

Although the major part of the report is based on primary data analysis, a few sections of this report are partially based on secondary data and information composed from related sources like reports, research papers, and books. Documents of various ministries/departments and organizations and websites have also been used. Due to the dynamic nature of the internet, resources that are free and publicly available may subsequently change and become restricted; likewise, the location of items may change as menus and web pages are reorganized. While we have made sincere efforts to refer to all these sources, we may have missed some of them.

This report may just be representative of the efforts of the Government. The authors do not claim the completeness of the information.

Acknowledgments

We would like to express gratitude to Professor Ranjana Aggarwal, Director CSIR-NIScPR, for her strong support in conducting this study and for stimulating us at various levels during the study.

We are obliged to the team of experts for their valuable input during interactive sessions. Our exceptional thanks to the Senior officials at DST and DBT who readily agreed to interact and share their experiences and valuable ideas which could enhance the quality of the report. Our experts Dr. Akhilesh Gupta, Dr. Sanjay Mishra, Dr. Nisha Mendiratta, Dr. Namita Gupta, Dr. Anita Aggarwal, Dr. Pratishtha Pandey, Dr. Sangita Kasture, Dr. Vandana Singh, and Dr. Neelam Kumar have encouraged and given us their valuable inputs to the study.

Special appreciation is due to all the women S&T staff of various ministries and institutes under them, like DST, DBT, and DSIR who participated in the survey through the questionnaires.

Special thanks are due to the field experts who agreed to review the report and suggest improvements in our report. Dr. Neelam Kumar has remained a guiding force throughout the gender studies undertaken and has been prompt in her suggestions and we cannot thank her enough!

We are thankful for the help and support for the study extended by our colleagues at CSIR-NIScPR. We would also like to thank the project associates Mr. Tanuj Jajoria and Ms. Archana who were involved in the project task at various stages.

Authors

Preface

The report is a critical “Evaluation of Initiatives for Empowering Women in Science and Technology”. The need arises from a continuous debate globally on the dearth of women choosing careers in STEM. The issue is equally or more important in the context of India since India produces the highest proportion of women STEM graduates in the world (over 40 percent) but their representation in STEM jobs is significantly low, only 14%. This ‘Leaky Pipeline’ phenomenon of lack of women taking up STEM careers is stated to be primarily due to factors like marriage, childcare, and gender-based barriers. Globally ranked at 127th position, India holds 6th position regionally in the 2023 Global Gender Gap Index according to the World Economic Forum Report. Several initiatives are, thus, required to address these challenges to ensure that women get equal opportunities to succeed in STEM. India especially needs to deal with gender disparity in economic resources and opportunities. To pull out of this situation, the Government of India has implemented various initiatives to promote gender mainstreaming, including incentives for women scientists and technologists. Despite these advancements, there’s still a considerable gap to bridge.

It is thus crucial to assess the effectiveness of these initiatives in the context of institutions, and the hurdles and challenges women face in STEM despite the measures to facilitate. With this concern, we conducted this study on women in STEM as a follow-up to previous research conducted by our organization. Based on the study, a report entitled “Women in STEM: A CSIR Survey towards Gender Parity”, was published in March 2022. Several policy recommendations were proposed based on the findings of the survey, to create women-friendly workplaces in CSIR labs. The report suggested specific submissions that could lead to further debate and incorporation of relevant initiatives for achieving gender parity in STEM. The present report, thus, is an extension of the above-mentioned earlier study. It focuses mainly on assessing the preparedness and effectiveness of government institutions/organizations of the Government of India for fostering a gender-balanced work environment within the Science and Technology (S&T) domain. This study may lead to a comprehensive understanding and suggest how to address the challenges hindering the advancement of women working in STEM fields.

This research employs a mixed-methods approach, combining secondary and primary data collection techniques to gather a comprehensive perspective on gender equality efforts within scientific organizations. Two major Government ministries, i.e. DST and DBT have been included in the study. Data has been collected primarily from women scientists of DST and DBT and their autonomous institutions. DSIR was also included in the study at a very late stage on the recommendation of experts although a similar study was conducted for CSIR earlier. Data has also been collected from the heads of division at these ministries and of the autonomous institutions in the ministries. To gain a holistic view, a few interviews with officials were also conducted to gain insight before the primary data collection. The integration of methodologies, including questionnaires and interviews, was paramount in capturing not only overarching trends but also individual experiences to develop a more detailed understanding of gender-related challenges women face in STEM.

The report mainly offers a comprehensive analysis of data to shed light on efforts undertaken for gender equality promotion within India’s STEM domain. It also aims to highlight the substantial contribution of women, who make up nearly half of India’s population, in diverse fields of scientific education, research, and application. Through a meticulous investigation, the experiences, challenges, as well as progress

concerning women's representation in STEM are unveiled. The assessment spans research projects, funding allocation, and participation in institutional committees to provide a holistic view of the current status and presence of women in these crucial domains. The report also documents suggestions from respondents on how to promote women in STEM. The study hopes to provide help in formulating more effective policy changes toward the establishment of a women-friendly STEM workplace, which is safe, violence-free, and equally stimulating for women as it is for men.

Table of Contents

Project Information	ii
Disclaimer	ii
Acknowledgment	iii
Preface	v
Executive Summary	1
1. Introduction	5
Women in STEM	5
Background for the Study	7
Implications of the Study	8
2. Science and Technology in India	9
Advancement of Indian Science	9
3. Promoting Science among Women	11
S&T Parks	16
4. Methodology	19
Objectives	19
Data Collection and Design of the Study	20
Limitations of the Study	22
5. Findings and Results	23
Secondary data	23
Primary Survey Results	29
Comparative analysis	43
6. Discussion and Conclusion	45
7. Recommendations	49
References and Suggested Readings	50
 List of Appendix	
1. Overview of DST, DBT & DSIR	55
2. Initiatives of the Indian Government for women	57
3. DST Initiatives	62
4. DBT Initiatives	68
5. Industry Initiatives	71
6. Startup India	74
7. Incubation centers	77

List of Tables

1. Initiatives of organizations for Women in STEM	13
2. Industry programmes for Women in STEM	14
3. Start-Up Programs for women in STEM	16
4. Gender distribution in DST, DBT, and DSIR	24
5. Gender distribution in DST, DBT, and DSIR Institutes	25
6. Geographical locations of Institutes under DST and DBT	25
7. Projects funded by DST during 2019-2021	26
8. Projects Funded by DBT during 2019-2024	26
9. DBT Project Information during 2017-2022	27
10. Enrolment at Undergraduate Level in Major Disciplines	29
11. Representation of respondents (Questionnaire 1)	30
12. Women respondents in DSIR	30
13. Departmental Representation in the Survey (Questionnaire 2)	31
14. Age distribution of respondents at various scientific levels	32
15. Scientists' Achievements	33
16. Facilities available to % women respondents in DST and DBT institutes	40

List of Figures

1. Chronology of initiatives of the Government of India for women in STEM	12
2. Map of S&T Parks in India	17
3. Gender representation in DST, DBT and DSIR	23
4. Gender representation of the scientific workforce in DST Autonomous Institutes	24
5. Gender representation of the scientific workforce in DBT Autonomous Institutes	24
6. Gender representation of the scientific workforce in DSIR	24
7. Gender representation in Ministries and their Institutes	25
8. % women under INSPIRE Programme from 2019-2023	27
9. Gender-wise distribution of STEM Enrolment between 2016-17 to 2020-21	28
10. Gender-wise STEM Enrolment during 2016-21	28
11. Representation in Survey (Questionnaire 1)	30
12. Number of women respondents in DST Institutes	30
13. Number of women respondents in DBT Institutes	30
14. Distribution of respondents by designation	31
15. Distribution of respondents by education	31
16. Age-wise distribution of respondents	32
17. Distribution by nature of duties	32
18. Representation in committees	34
19. Sexual Harassment in the workplace	35
20. Reporting sexual harassment	35

21. Opinion on skill utilization	36
22. Opinion on workplace gender neutrality	36
23. Job satisfaction	36
24. Opinion on promotions overlooked despite eligibility	36
25. Perception on the reward systems in comparison to male colleagues	37
26. Working harder compared to male colleagues	37
27. Experience on networking	37
28. Obligated to quit job	37
29. Support system for looking after children	38
30. Responsibility of family	38
31. Working from home	38
32. Stress at work	38
33. Access to stress-reducing programmes	39
34. Accommodation during travel	39
35. Travel grant procurement experience	39
36. Experience while commuting in other places	39
37. Availability of feeding facility at the workplace	40
38. Access to a daycare facility in the organisation	40
39. Availing CCL	40
40. Experience while availing of CCL	40
41. Judicious CCL application (opinion of heads)	40
42. Sanctioning of CCL by Heads	41
43. Availing CCL: Perception of women	41
44. Encouragement to pursue STEM	41
45. Support received from family for pursuing a doctorate	42
46. Reasons for taking up the present job or assignment	42
47. Awareness regarding Government schemes for promoting women in STEM	42
48. Recommendation on government schemes	42
49. Suggesting women to undertake a career in S&T	43

Keywords

S&T, Women, Women in Science and Technology, Gender equality

Acronyms

AICTE	All India Council for Technical Education
AIF	American India Foundation
AISHE	All India Survey on Higher Education
BioCARE	Biotechnology Career Advancement and Re-orientation
BIRAC	Biotechnology Industry Research Assistance Council
CBSE	Central Board of Secondary Education
CCL	Child Care Leave
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CEL	Central Electronics Limited
CSIR	Council of Scientific and Industrial Research
CSR	Corporate Social Responsibility
DBT	Department of Biotechnology
UMMID	Unique Methods of Management of Inherited Disorders Initiative
DISHA	Department of Science and Technology Initiative Supporting Humanitarian Actions
DOS	Department of Space
DSIR	Department of Scientific and Industrial Research
DST	Department of Science and Technology
DWCD	Department of Women and Child Development
EMBO	European Molecular Biology Organization
G20	Group of 20
GATI	Gender Advancement for Transforming Institutions
GBC	Gender Budget Cells
GoI	Government of India
HCL	Hindustan Computers Limited
IAP	Inter Academy Panel
IARI	Indian Agricultural Research Institute
IC	Internal Committee
ICAR	Indian Council of Agricultural Research
ICMR	Indian Council of Medical Research
ICT	Information and Communications Technology
IISc	Indian Institute of Science
IISER	Indian Institutes of Science Education and Research
IIT	Indian Institutes of Technology
INSA	Indian National Science Academy
INSPIRE	Innovation in Science Pursuit for Inspired Research
ISL	Indian Sign Language
IT	Information Technology
IUSSTF	Indo-US Science & Technology Forum
IWSA	Indian Women Scientist Association
KIRAN	Knowledge Involvement in Research Advancement through Nurturing
MoEFCC	Ministry of Environment, Forest and Climate Change of India
MOES	Ministry Of Earth Sciences
MoF	Ministry of Finance
MSME	Micro, Small and Medium Enterprise
MWM	Million Women Mentors
NA	Not Applicable
NIPGR	National Institute of Plant Genome Research
NIScPR	National Institute Of Science Communication and Policy Research

NIT	National Institute of Technology
NRDC	National Research Development Corporation
NSTMIS	National Science & Technology Management Information System
Ph.D.	Doctorate of Philosophy
PI	Principal Investigator/ Project Investigator
PoSH	Prevention of Sexual Harassment
POWER	Promoting Opportunities for Women in Exploratory Research
R&D	Research and Development
RGCB	Rajiv Gandhi Centre for Biotechnology
S&T	Science and Technology
SCIP	Second Careers Inspiring Possibilities
SDG	Sustainable Development Goals
SEED	Science for Equity Empowerment & Development
SERB	Science and Engineering Research Board
STEM	Science, Technology, Engineering & Mathematics
STEMM	Science, Technology, Engineering, Mathematics and Medicine
STEP	Science & Technology Entrepreneurship Park
STEWARD	STEM Women Scholars And Researchers Development
STI	Science, Technology, and Innovation
STIP	Science, Technology, and Innovation Policy
SWATI	Science for Women-And Technology & Innovation
TBI	Technology Business Incubator
TCS	Tata Consultancy Services
TDB	Technology Development Board
TiE	The Indus Entrepreneurs
TIFR	Tata Institute of Fundamental Research
UGC	University Grants Commission
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WEDP	Women Entrepreneurship Development Programme
WEQ	Women Entrepreneurs Quest
WEST	Women in Engineering, Science, and Technology
WFH	Work From Home
WIDUSHI	Women's Instinct for Developing and Ushering in Scientific Heights & Innovation
WISE	Women in Science and Engineering
WIT	Women In Technology
WOS	Women Scientists
WoW	Women of Wipro
WTP	Women Technology Parks

Executive Summary

It has been argued quite often that Women in STEM face numerous challenges, often juggling personal and professional responsibilities while steering discriminatory policies and gender-blind structures. These hurdles hinder equal participation and retention of Women in STEM occupations. Addressing these obstacles is essential to achieving Sustainable Development Goal # 5 on gender equality and ensuring women's full contribution to science and technology.

Our earlier study conducted during 2021-22 on "Women in STEM: A CSIR Survey towards Gender Parity", discussed the meager depiction of women in leadership roles in CSIR. The report also made several policy recommendations to address the issue.

In the present project, we look at the broader trends and initiatives by the Government organisations in the country. The study includes the Department of Science and Technology (DST), the Department of Biotechnology (DBT), and the Department of Scientific and Industrial Research (DSIR). We have attempted to examine initiatives and practices to enhance the contribution and empowerment of women in STEM.

The methodology adopted was a secondary survey followed by a primary one.

- The secondary survey focused mainly on the collection of information that could illustrate and evaluate the Government initiatives to promote gender parity and women's encouragement in STEM fields. Gender auditing was conducted in the select S&T ministries and their allied institutions on the S&T manpower. During the process, the emails were also collected which helped post questionnaires for primary data collection. Gender-wise audits of the research grants of these ministries were also carried out.
- The primary data was gathered through two types of questionnaires, one addressed to women S&T of these organisations, and the second one was addressed to the heads in ministries and the autonomous institutes.
- Further a comparative analysis was carried out between the present study and the previous study (of CSIR) to bring out the differences/similarities of issues, and challenges that women face in S&T and the implementation of policies by these organisations.
- This was also helpful in the policy recommendations for bridging the gender gap in S&T.

A few salient observations based on Secondary data followed by primary survey are as follows:

- ➔ DST has had 17 secretaries of which only one was a female, a DBT secretary with an additional DST charge.
- ➔ 2 of the 9 secretaries of DBT have been women.
- ➔ For DSIR, the current secretary holding office is the first woman to hold the position.
- ➔ At the ministerial level, DBT has a good gender parity Index with a 42% female workforce in S&T, while DST has about one-third of women in the S&T workforce.
- ➔ Currently two autonomous institutes of DST and three of DBT are headed by women of the 17 and 16 institutes respectively.

- ➔ However, more than half of the divisions in both DST and DBT are headed by women.
- ➔ More than half of the DST institutes exceeded the national average of 18.6% women's representation in S&T.
- ➔ About one-third of the institutes affiliated with DBT were below the national average in terms of representation of women scientists.
- ➔ In DSIR, NRDC has a better women representation in the scientific cadre, while CEL shows a substantial gender disparity. CSIR, as observed in our previous study, revealed women's representation was lower than the national average in S&T.
- ➔ DBT has a slightly higher percentage of females than DST and DSIR, whereas DSIR institutes exhibit the lowest female representation (17%), signaling a significant gender disparity compared to the national average.
- ➔ Funding of projects by both DST and DBT depicts gender imbalance in the PIs, with male PIs outnumbering their female counterparts by a more than 3:1 ratio.
- ➔ Over the years, the percentage of fund allocation to male PIs by DST has been higher compared to that by DBT.
- ➔ The number of projects funded by DST from 2018-19 to 2020-21 has declined. Also, the % female PIs in the projects during this period has gone down from 28 to 20% only. Likewise, the funding to female PIs during this period has also been reduced from 25% to 17%.
- ➔ The number of projects funded by DBT from 2019-20 to 2023-24* has reduced considerably, although the percentage of female PIs in the projects during this period has been somewhat constant between 22-24%. The funding amount to female PIs during this period has also been between 19 to 26%.
- ➔ Under the INSPIRE Scheme percent of females receiving INSPIRE Fellowships are about two-thirds over the past few years, indicating a positive step toward achieving gender parity in the coming years. However, faculty fellowships have been relatively low, but data for the past two years show a rising trend.
- ➔ Female enrollment in 2020-21 in science was 53.11%, and in engineering and technology was 29.26%. These trends suggest that more young women are coming forward to pursue education in science and engineering.
- ➔ The primary survey was done through the 1st questionnaire targeted at women S&T had a good response rate of above 55% from DST, DBT, and DSIR institutes.
- ➔ The 2nd questionnaire that was sent to the heads in the ministries and the directors of the autonomous institutes had only 9 responses out of the 52, a response rate of below 18%.
- ➔ The questionnaire for women S&T had about 58% of the respondents in the mid-age bracket of 35-50 years and another 37% were above 50 years of age.
- ➔ 97% of respondents carried out research activities, with some of them additionally having to teach or manage science.
- ➔ Mid-level scientists (E&F) have an average of about 43 publications. This grade also demonstrates a significant contribution to patents and awards. Scientist G stands out prominently with the highest total publications, and leading in both patents and awards.
- ➔ Many women scientists have headed various committees, such as Research Group Heads, Heads of IC, and Committee Representatives.
- ➔ Among the women respondents, a few reported experiencing sexual harassment in the workplace. Only 25% of these have indicated reporting the issue to a higher authority.
- ➔ The majority of respondents indicated that their profession allows them to effectively utilise their skills and abilities.

- ➔ One in four respondents rate their institutions on gender inclusivity based on their experiences as ‘average’ and another 17% feel that concerted efforts to address disparities and promote inclusivity are required.
- ➔ The majority of respondents reported positive attitudes towards their job or assignment.
- ➔ 44% of respondents reported sometimes being overlooked for promotion despite eligibility.
- ➔ A significant portion of women respondents reported sometimes not being properly rewarded compared to their male colleagues, with 23% experiencing this very often.
- ➔ Only 28% stated they did not feel the need to work harder than male colleagues to prove parity.
- ➔ A significant number of women respondents reported sometimes missing out on grants due to less networking or awareness compared to their male colleagues,
- ➔ About three-fourths of the women had no compulsion to quit their previous jobs for any reason.
- ➔ Facilities at the workplace like feeding facilities are not available to 86% and daycare facilities are not available to 74% of the respondents.
- ➔ There is, however, a diverse source of support for child care within the family, with the most common being from their husbands, followed by house-help, parents, and in-laws.
- ➔ A significant number of respondents i.e. more than four-fifths, are required to take care of old parents, in-laws, or siblings.
- ➔ The majority indicated experiencing stress ‘Sometimes’ at work.
- ➔ However, access to stress management programmes was reported by only 24% of respondents.
- ➔ Experience while traveling to other places for official work including accommodation arrangements, procuring travel grants or commuting was a very good or good experience for the majority of the respondents.
- ➔ Meanwhile 42% of the respondents availed of the CCL and their experience in getting it sanctioned has been ‘good always’ for most of them.
- ➔ There were diverse attitudes of male colleagues towards women availing CCL.
- ➔ As per the 2nd questionnaire, more than half of the heads felt that not everyone in their organization avail the facility of CCL judiciously. But most of them sanction the CCL applications ‘most of the time’ without questioning their staff.
- ➔ Encouragement for pursuing STEM was from self for about half of the respondents while 46% credited it to either parents or teachers.
- ➔ Four-fifths received support from their families during their Ph.D. studies.
- ➔ ‘Passion’ was the dominant reason for taking up the S&T job.
- ➔ 27% indicated that they were unaware of the various government schemes for supporting and encouraging women in STEM.
- ➔ About half of the women have not availed of the various schemes meant for women in S&T.
- ➔ A majority of respondents highly recommend other women to opt for a career in STEM.

Recommendations

Some important policy recommendations are enlisted to speed up the gender parity in S&T in India.

- Recalibration/ inclusive policies are required.
- Budget for outreach should be increased.

- Outreach through programmes like Maan ki baat, etc. can be initiated for awareness.
- Experts felt that not just the number but also the role of women should be enhanced.
- Academic age should be considered for entry to the careers especially for women given the different roles which they have to perform.
- Exposure visit to Nordic countries to understand gender equality
- Recalibrating the system
- Initiation of an Equal Responsibility Program.
- Flexi time/work-from-home options for women,
- Creation of good facilities, including Daycare facilities near institutions.
- Providing facilities for working mothers like feeding rooms and daycare.
- Collaboration between States, Union governments, institutions, and organisations for common facilities.
- Financial and spatial viability challenges for small organisations.
- Prevention and efficient punitive actions ensuring a safe environment for women at work.
- Exit interviews should be made mandatory for women leaving the organisations to know the circumstances in which they have to quit so that appropriate steps can be taken by the organisation from time to time.
- Workshops should be held on:
 - a) Role and Responsibility at the Organisation level,
 - b) Work-life Balance training programs,
 - c) Leadership Role.



1. Introduction

The twentieth century was the age of extremes, the age of wars with two world wars, and the age of books. It witnessed a revolution in economic productivity, and will also be remembered as a century where women gained equal rights with men. It saw women breaking through centuries-old barriers of gender roles and making incredible strides in various fields, including Science, Technology, Engineering, and Mathematics (STEM). However, there is a long way to go beyond the gender binaries. More than four decades have passed since the United Nations (UN) Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) was adopted at the United Nations General Assembly in 1979. It entered into force as an international treaty on 3rd September 1981 after the twentieth country had ratified it. Even in the twenty-first century, gender bias unfortunately is a major hurdle in the way of achieving inclusive development of societies and nations.

The UN elucidates that Gender equality is not only a fundamental human right but a necessary foundation for a peaceful, prosperous, and sustainable world. The UN's Sustainable Development Goal (SDG)#5 addresses this crucial issue, setting specific targets and indicators to measure progress. While progress has been made e.g. more girls in school, less early marriage, and increased female representation in leadership, further initiatives are needed. SDG# 8 emphasizes decent work and economic growth, underscoring the necessity of ensuring equal opportunities for women in the workforce. This includes breaking down barriers in STEM fields and fostering an environment where women have equitable access to quality education and can also have equal employment opportunities. Empowering women in these sectors can drive economic sustainability and promote inclusive growth that will benefit societies at large. Additionally, SDG#10 highlights the significance of reducing inequalities within and among countries. To achieve this, addressing gender disparities becomes pivotal. Ensuring equal access to education, healthcare, and decision-making for women and girls worldwide is a cornerstone in narrowing these gaps.

Women's empowerment should occur along the economic, socio-cultural, familial/ interpersonal, legal, political, and psychological dimensions. Each of these should be measured at various levels of social aggregation, from the household to the community, to broader national, regional, and global levels. It is not easy to quantify women's contribution, especially in countries like India. According to one global estimate, the 'invisible work' done by women at home, maintaining the labour force, and keeping the social framework in good order is worth \$ 11 trillion (UNEP 1995). This figure underscores the critical, yet often overlooked, contribution women make to the economic engine of society.

Women in STEM: Historically, gender disparities have been observed to a vast extent in the field of science and allied subjects. Although women constitute half of the total labour force, they account for less than one-fourth of jobs in STEM fields. Empowering women in Science is vital not only to foster inclusivity but also to drive scientific advancement and meet the demands of an evolving world. Society can gain immeasurably when women are empowered to perform to their fullest potential. Their participation is essential for holistic problem-solving, innovation, and achieving comprehensive societal development.

Studies on women in Science and Technology (S&T) or broader areas of STEM are crucial endeavours driven by the pressing need to address the stark underrepresentation of women in these fields. Even though participation rates of women in STEM education and employment have been growing over a few years, women are still underrepresented in the major fields of STEM. In the case of India, STEM graduates constitute 43% of women (Ministry of Education, AISHE report 2021-22), yet their representation in STEM jobs stands paradoxically low with a presence of 18.6% of women directly involved in the Research and Development (R&D) activities (DST, 2023). This raises concerns about gender parity and inclusivity in scientific domains. The area warrants attention due to its broader implications. First, it restricts the utilisation of the immense talent and potential that

women bring to scientific innovation and progress. Second, it hampers the overall goal of achieving gender equality, an essential component of societal development and progress. By excluding women from STEM careers, we limit diverse perspectives, innovation, and the robust growth of these fields. Addressing the barriers hindering women in S&T is crucial for creating a more equitable and progressive society.

India exhibits a high percentage of women's enrollment in STEM education, compared to some developed nations like the US, France, and Canada. Yet, when it comes to transitioning women from STEM education to careers, there's a significant divergence. The 'Leaky Pipeline' phenomenon leads to a large disparity between the high enrollment of women in STEM education and their low representation in STEM careers.

Gender bias and traditional role segregation are key reasons for the underrepresentation of women in STEM education and careers. Several studies and surveys on Women in STEM have found that women in India tend to drop out of the workforce at key phases in their lives, notably around childbearing years and later at mid-management levels. Overcoming gender bias is pivotal for achieving inclusive development, requiring equal participation of women across all fields. Urgent strategies to empower women in STEM are imperative. Indian science certainly requires major attitudinal, institutional, and structural changes (Kumar, 2009).

Women scientists face multidimensional obstacles—personal professional and socio-cultural. While the former two remain barriers, the socio-cultural biases hinder progress. Thus, women go through numerous challenges and biases while pursuing a career in science. Women in all professions perform a double role of managing job and domestic responsibilities, which has been commonly referred to as a 'dual burden'. In science, the dual burden is combined with various problems that are specific to the scientific profession (Sangar 2014). The prevailing socio-cultural systems in India result in a 'triple burden' for women in academic and scientific careers. This 'triple burden' on women encompasses the stress of navigating a male-dominated environment that often conflicts with established scientific norms, the unequal burden of domestic responsibilities, and the challenge of building social capital and gaining access to influential networks. This burden, observed across diverse countries, highlights the pervasive impact of gender biases and societal expectations on women's

career trajectories in science. It creates significant obstacles, hindering their professional advancement and well-being (Gupta et al., 2005).

In STEM, women confront various hurdles that hinder their participation and success. One significant barrier is biased recruitment and promotion practices, where gender bias influences decisions, limiting women's access to opportunities and career growth. Additionally, there's a persistent challenge in balancing diverse roles, the stigma of sexual harassment, and deeply ingrained societal mindsets, among others. As a result, women continue to be understated in Science, engineering, computer science, physical science, mathematics, etc. Addressing these barriers is crucial as women's inclusion in STEM is integral to overall societal development. To improve the well-being and productivity of women in STEM, flexible work arrangements, supportive management policies, fair assessments, and mentorship programs are crucial to reduce stress and enhance work-life balance.

Additionally, the scarcity of women in high-ranking leadership roles within pivotal scientific bodies such as DST, DBT, and IITs remains striking, with only one woman having held the secretary position at DST, two at DBT, and no women as IIT Director to date. Gupta (2020), who analysed how scientists rationalize organizational gender inequality, and how discussions on equality perpetuate workplace gender disparities, stated that the underrepresentation of women in prestigious research organizations, especially in leadership roles, is well-documented. The appointment of the first woman Director General of the Council of Scientific and Industrial Research (CSIR) signifies a noteworthy milestone and highlights the persistent gender disparity in top-tier scientific positions. This lack of representation underscores the urgency to break down barriers and create more inclusive opportunities for women to assume leadership roles in STEM, ensuring a diverse and equitable landscape that fosters innovation and advancement.

The role of India's stakeholders in supporting women in science is immense: they not only help promote India's national development and scientific advancement but also design innovative solutions to the problems faced by women in science. The Science Technology and Innovation Policy (STIP) 2020 has mandated the enhanced representation of women, at least 30% of the total strength, in all decision-making bodies including selection and evaluation committees.

It also highlights the efforts required to attract young women/girls and other excluded groups and foster awareness and interest in STEM fields and eventually, careers in science.

The National Research Foundation Act, 2023 also called the Anusandhan National Research Foundation Act, 2023, marks a pivotal moment for India's research landscape. This act aims to strengthen the research ecosystem in the country, paving the way for global leadership in addressing global challenges across various domains.

The 73rd-74th Amendment of the Constitution mandates 33% reservation for women in the local governance. The Women's Reservation Bill introduced by the Prime Minister, promising 33% of seats for women in Parliament and state assemblies, marks a historic step towards gender equality. However, the Indian Government has been proactive in including women in its development for a long time and has brought out various changes at various stages. Some of these have been listed in **Appendix 2**. The increased representation in governance can also be a motivating factor for women in STEM by boosting visibility, influencing policies, dismantling barriers, and addressing specific challenges. However, its success hinges on supportive policies and cultural shifts to truly create a thriving environment for women in STEM.

The Ministry of Education aims to increase girls' enrollment in IITs and NITs, the implementation of supernumerary seats led to a remarkable rise in female enrollment. In IITs, the percentage surged from a mere 8% in 2016 to an impressive 20% in 2021-22. Similarly, NITs saw a commendable increase, reaching approximately 22.1% enrollment of girls in 2021-22, up from the previous 14%. According to the All India Survey on Higher Education (AISHE) Report, the number of female students pursuing STEM courses has steadily risen from 4,197,186 in 2016-17 to 4,387,248 in 2020-21. This sustained increase signifies a positive trend in encouraging more women to pursue science, technology, engineering, and mathematics disciplines.

Moreover, the Government of India has implemented a series of legislative measures addressing discrimination and promoting gender diversity, including the Right to Education Act, the Sexual Harassment of Women at Workplace Prevention Act, the Equal Remuneration Act of 1976, and the Maternity Benefit-Amendment Act of 2017 among others.

Background for the Study

As discussed, in Science, Technology, Engineering, and Mathematics (STEM), the participation of women remains disproportionately low despite India's record of producing a high percentage of female STEM graduates.

Empowering women in STEM fields is crucial for India's scientific advancement. By fostering an inclusive environment and providing them with the necessary education and training, we can harness their potential and break down barriers to women's participation in STEM. This aligns with the Prime Minister's vision of not only empowering women through science but also empowering science through the contribution of women.

However, the visibility of women is not evident in various awards. The prestigious Shanti Swarup Bhatnagar Awards, intended to honour scientific excellence, have notably lagged in recognizing women scientists, with only 3.4% of awards conferred to women since 1958. This gender gap extends to the Nobel Prize, where female laureates remain disproportionately low across categories like Chemistry, Physics, Economics, and Medicine. Additionally, all directors of Indian Institutes of Technology (IITs) have historically been male (a total of more than 110 till 2023), revealing a significant gender disparity in top leadership roles within these institutions.

Continuing from our initial study on women in STEM at CSIR, we have expanded the research to examine broader trends and initiatives across other scientific ministries and governmental organizations in India, including the DST, the DBT, and their respective autonomous institutes along with the DSIR. This broader perspective will help us identify patterns and practices that can be used to enhance the participation and empowerment of women in STEM fields throughout the prominent S&T ministries.

The CSIR-NIScPR report (2022), highlighted the under-representation of women in leadership positions within CSIR. The report also made several policy recommendations to address this issue, and the appointment of a woman Director General is a positive step in the right direction and hence being considered by the authors as a major milestone of the study. It also identified significant challenges faced by women in STEM fields within CSIR institutions.

Recognizing the crucial role of government support in fostering gender equality and empowering women

in STEM, this new study delves deeper into potential government interventions and their impact on women's career trajectories in S&T. It aims to inform policy changes for safer, more inclusive STEM workplaces by analyzing data from the S&T ministries and also identified the gaps which are needed for inclusive participation of women in these fields.

Implications of the study

Under the Ministry of Science and Technology, the DST, the DBT, and the DSIR play a vital role in shaping India's scientific landscape and propelling advancements across numerous sectors. Their substantial influence on scientific policies, research funding, and technological innovation makes them crucial for our investigation into how scientific organizations can empower women in STEM.

All three departments DST, DBT, and DSIR are major recipients of government funding within the Science and Technology sector in India. DST accounts for 42% of total allocation, DSIR 40% and DBT receives 18%, signifying their robust financial resources to drive

initiatives aimed at supporting women in scientific endeavors. These departments oversee a vast array of initiatives and programs that directly impact women in STEM fields, encompassing funding opportunities, research grants, and talent development schemes.

With their diverse scopes encompassing fundamental research, applied sciences, technological innovation, and Indigenous technology solutions, DST, DBT, and DSIR provide a comprehensive lens for understanding gender dynamics, challenges, and initiatives within scientific organisations.

Their strategic importance in key sectors like healthcare, agriculture, technology, and indigenous manufacturing (spearheaded by DSIR) further underscores their relevance to our research. This allows for a detailed analysis of the efforts and barriers faced by women in STEM within government scientific bodies, providing valuable insights into fostering a more inclusive and equitable scientific landscape across diverse fields. **Appendix 1** gives an overview of these government establishments selected for the study.



2. Science and Technology in India

The S&T ecosystem involves a complex network of government agencies, and public and private organisations, with the government contributing significantly to its development. Dominated by key sectors such as Drugs and Pharmaceuticals, Textiles, and Information Technology, India's industrial R&D landscape is vibrant and diverse. With 15 ministries, 35 State Science & Technology Councils, and a workforce of nearly 5.55 lakh personnel engaged in R&D, India's S&T prowess is notable.

India's robust economic growth and demographic advantage, anchored by a young and skilled population, have propelled it to become the world's third-largest economy by purchasing power. The government's strategic emphasis on S&T is evident through policies fostering a thriving S&T infrastructure and industrial landscape. Notable initiatives like the National Artificial Intelligence Strategy and the Indian Space Policy-2023 underscore India's commitment to scientific exploration and innovation.

India's vibrant economies, youthful demographic, and strategic focus on S&T propel it to a significant role in global innovation. Foreign multinational companies are increasingly investing in R&D collaborations with Indian institutions, leveraging the country's growing skill base. India's impressive scientific publication output and patent filing activity, primarily in the private sector, position it as the world's third-largest contributor, following China and the United States.

Advancement of Indian Science

The modern scientific journey in India began with establishing important ministries that have shaped the nation's advancements. The Indian Council of Medical Research (ICMR), evolving from the Indian Research Fund Association in 1911, has been at the forefront of medical breakthroughs. It has pioneered indigenous drug studies, combated serious diseases, and collaborated with global health organizations to address emerging infectious diseases.

The Imperial Council of Agricultural Research was established in 1929 and was restructured into the Indian Council of Agricultural Research (ICAR) post-independence, transforming India's agricultural landscape. Through research and education, ICAR has strengthened India's self-sufficiency in food grain production and established its position as a significant exporter. Innovations in crop varieties, farming techniques, and eco-friendly agriculture have amplified India's standing in global agricultural markets.

The Council of Scientific and Industrial Research (CSIR), established in 1942, is the largest R&D organization in India. It covers diverse domains such as aerospace engineering, metallurgy, chemicals, and environmental science. The Department of Atomic Energy, initiated in 1954, oversees all atomic energy-related government activities. It has significantly propelled India's nuclear capabilities, facilitating peaceful atomic energy applications across various sectors. This pivotal ministry remains a cornerstone in India's technological and scientific advancements. The scientific landscape of the country was further enriched with the establishment of the Defense Research and Development Organization in 1958 spearheading the development of advanced defense technologies. Its innovation canvas extends from cutting-edge radar systems to pivotal soldier support solutions like NBC products and telemedicine advancements.

Further in 1971, the government established the Department of Science & Technology (DST) which has been instrumental in crafting and executing S&T policies in India. The DST in India plays a pivotal role in promoting scientific R&D. With a multifaceted approach, the DST supports R&D endeavors, orchestrates interdisciplinary S&T collaborations, and allocates funds to research institutions. Beyond these roles, it oversees autonomous S&T bodies and endeavors to democratize science, ensuring its impact positively reaches marginalized communities, thus driving an inclusive agenda for progress. The Department of Space (DOS), established in 1972, spearheads the country's

foray into space exploration and technology. Dedicated to leveraging space science for national development, DOS has achieved indigenous launch capabilities, transformed communication through INSAT, and propelled sustainable growth using satellite imagery in remote sensing programs.

The Ministry of Environment, Forest and Climate Change (MoEFCC) in India spearheads multifaceted programs aimed at environmental preservation. These initiatives encompass biodiversity conservation, afforestation drives, pollution control measures, and restoration of degraded areas. MoEFCC's strategic policies also focus on animal welfare, promoting a harmonious coexistence between wildlife and human activities. Through these diverse programs, MoEFCC endeavors to ensure a sustainable and ecologically balanced future for India. In 1981, the Ministry of New and Renewable Energy was formed to drive India's renewable energy agenda, focusing on solar, wind, hydro, and other renewable sources. The Ministry of Science and Technology established the Department of Scientific and Industrial Research (DSIR) in 1985, emphasizing the pivotal role of technology transfer and commercialization in advancing industrial innovation.

Established in 1986, the Department of Biotechnology (DBT) has been pivotal in shaping India's biotechnology landscape by developing institutions, fostering research, and creating regulatory frameworks. DBT's vision emphasizes harnessing biotechnology for societal advancement through research excellence, industry collaborations, and

addressing social aspects like healthcare, agriculture, energy, and the environment.

In 1995 the Technology Development Board (TDB) was formed to translate research into commercial products and boost indigenous technology. Through the Global Innovation & Technology Alliance, TDB fosters international collaborations, stimulating industrial R&D. It also actively contributes to the venture capital sector, supporting early-stage technology-oriented projects, and recognizes excellence in commercializing indigenous technology through national awards. Established in 2006, the Ministry of Earth Sciences (MoES) emerged from the Department of Ocean Development with a focus on exploring earth sciences. MoES ambit spans meteorology, coastal management, and polar research, emphasizing sustainable resource utilization. The Science and Engineering Research Board (SERB) was established in 2008 and focuses on funding basic research in science and engineering. It plays a pivotal role in building research infrastructure and fostering collaborations between academia, labs, and industry. The Ministry of Electronics and Information Technology emerged as a separate entity from the Ministry of Communication and Information Technology in 2016 which was entrusted with formulating IT policies and fostering the growth of the electronics industry.

Collectively, these ministries and departments reflect India's relentless pursuit of technological innovation and scientific advancement, paving the way for future progress, sustainability, and a thriving ecosystem of innovation.

3. Promoting Science among Women

For the overall development of the country women's involvement in all spheres of economic and other activities is vital. Gender-responsive policy-making helps women in a better way, and their specific needs and concerns are integrated. Women constitute about 50% of India's population, but still, they lag behind men on many social indicators like health, education, and economic opportunities. Hence, they warrant special attention due to their vulnerability and lack of access to resources. The way Government budgets allocate resources has the potential to transform these gender inequalities. Various measures taken by the Government to enhance Women's Path to development, progress, and equality through dedicated financial, educational, and other promotional efforts are listed here.

Government Initiatives: The Government of India is dedicated to fostering women's participation and empowerment in the fields of science and technology. Recognizing the pivotal role women play in advancing these domains, the government has initiated a range of programs and policies. These measures aim to provide women with access to education and training in STEM subjects, support their professional growth, and bridge the gender gap in STEM fields. By creating an inclusive and supportive environment, the government seeks to elevate the representation of women in STEM and inspire more girls to pursue careers in science. These efforts contribute to the overall progress of India's scientific and technological landscape.

Many efforts have been made to offer a strong base and encouragement for women in STEM. The Government of India and many private research bodies have been working on promoting women in STEM through providing gender-specific schemes. Various schemes and awards have been introduced for empowering women. They have been working on supporting gender-specific schemes for women.

1. **Rukhmabai Initiatives:** Rukhmabai grants and short film grants on women in STEM
2. **Council of Scientific & Industrial Research:** Relaxation of five years in the upper age limit for women candidates for Fellowships/ Associateships
3. **Indian Sign Language (ISL):** Integration of ISL within STEM education
4. **DST-Women Technology Park:** Capacity building and entrepreneurship development
5. **Beti Bachao Beti Padhao Scheme:** Addressing Child Sex Ratio and empowerment of girls and women
6. **India Million Women Mentors Initiative:** Initiative of STEMconnector(R) to engage one million STEM mentors for girls and women
7. **ATAL Innovation Mission:** Woman-Centric Challenges to address issues faced by women
8. **Startup India:** Supporting entrepreneurship, including women entrepreneurs
9. **Driving Innovation in Science & Technology for Humanitarian Action:** Encouraging women scientists and researchers to work on STEM projects for societal challenges
10. **National Policy on Education 2020:** Provisions and initiatives for promoting education and empowerment of women
11. **Women Scientists and Entrepreneurs Conclave:** Platform for women scientists and entrepreneurs in STEM fields
12. **UDAAN:** Project by the Central Board of Secondary Education (CBSE) to encourage disadvantaged girl students to pursue STEM education
13. **Supernumerary seats for women at the IITs:** Creating additional seats to improve female enrolment in IITs
14. **INSPIRE Scheme:** Promoting research and innovation in science
15. **Lilavati Awards:** For institutions promoting scientific education and career development for women.
16. **The Indian Academy of Sciences:** Initiatives and reports to evaluate the status of women in science.
17. **National Academy of Sciences:** Workshops and initiatives for gender equality in science

18. **Inter-academy Panel for Women in STEMM:** Examining issues concerning women in STEM fields.
19. **Skill India Scheme:** Skill development initiatives.
20. **BioTechnology Parks:** Establishing biotech parks for research translation and infrastructure support.
21. **VIGYAN JYOTI Scheme:** Hand-holding and interventions to encourage girls in STEM from school to PhD level.
22. **STEM and Gender Advancement:** United Nations Educational, Scientific and Cultural Organization (UNESCO) project to strengthen gender equality in STI fields globally.
23. **SWATI Portal:** Developed, hosted, and maintained by the National Institute of Plant Genome Research (NIPGR), launched as an initiative of the Inter-Academy Panel (IAP) on Women in STEMM
24. **Scholarship and Mentorship programs of the Office of the Principal Scientific Adviser:** Supports women from low-income groups to pursue higher education in STEM and also provides industry exposure to women.

The major focus of the study was to assess the preparedness of the scientific organizations selected for the study for gender parity. Hence the various schemes, activities, and the special efforts made by DST and DBT from time to time have been studied and detailed in the report as **Appendix 3** and **Appendix 4** respectively.

Academic Institutes' Initiatives

1. **IIT Delhi Initiative for Gender Equity and Sensitisation:** This initiative launched in 2018 encourages gender dialogue in STEM and offers student and career counseling to support women's move from study to industry.
2. **IIT Kharagpur student grants exclusively for undergraduate women:** A significant portion of the IIT's student grant programme (INR 6.5 million) is earmarked for undergraduate women. The institute also provides counseling and outreach initiatives for women looking for a career in science.
3. **IIT Bombay dedicated chair for women faculty:** This programme recognises women leaders in academia who can serve as role models for aspiring students.

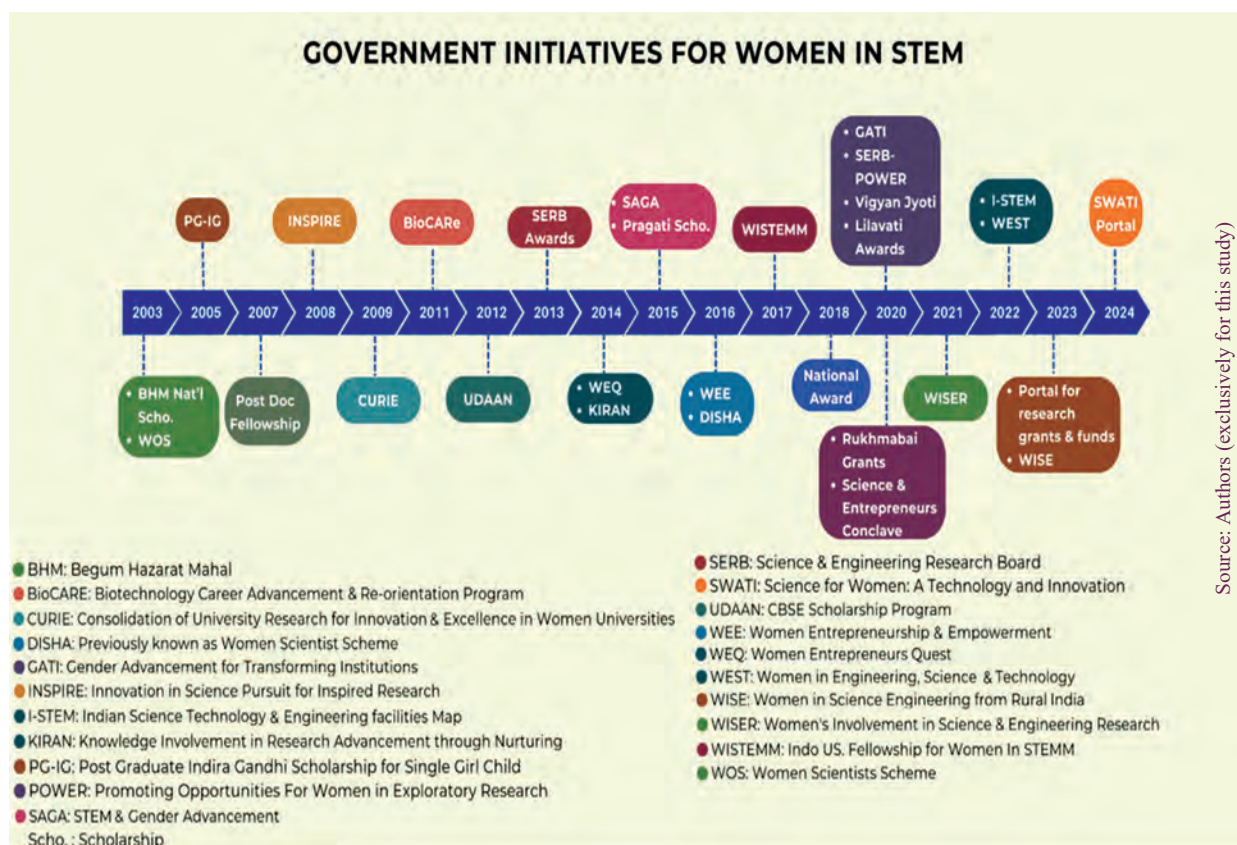


Figure 1: Chronology of initiatives of the Government of India for women in STEM

4. **Women Leading IIT Madras:** This alumni-sponsored initiative aims to guide and support women graduates through professional networking, scholarships, and mentorships.
5. **IISER Pune Prodigious Women in Chemical Sciences:** Managed by the Indian Institutes of Science Education and Research (IISER)'s committee on women and science, this programme organises conferences and strategic planning meetings to improve gender equality. IISER also runs an on-campus childcare centre for working parents in the institute.
6. **Tata Institute of Fundamental Research (TIFR) Child Care Association:** The institute's Women's Cell managed this initiative so successfully that not only does it provide quality childcare, but in such a way that both parents benefit from its services.
7. **Indian Institute of Science (IISc) Women in Science:** IISc celebrates the women teaching and working in the institute through a dedicated website, and promotes funding opportunities for women scientists as part of its Office of Research Grants and through its affiliation with the Indian Academy of Science's Women in Science initiative.
8. **CSIR** gives a relaxation of five years in the upper age limit to women candidates to be eligible for award of Fellowships/ Associateships to pursue doctoral and postdoctoral research to promote women in science & technology.

Government Partnerships with Industry

Following is the list of partnerships with industry focused on promoting women in STEM and supporting other initiatives for gender equality in education (details in **Appendix 5**):

Notable programs by academic institutes for women in STEM

Table 1: Initiatives of organizations for Women in STEM

Organization	Initiative
CSIR	CSIR gives a relaxation of five years in the upper age limit to women candidates to be eligible for award of Fellowships/Associateships to pursue doctoral and postdoctoral research to promote women in science & technology.
IIT Delhi	Initiative for Gender Equity and Sensitisation initiative encourages gender dialogue in STEM and offers student and career counseling to support women's move from study to industry. IIT Delhi has also announced an office of diversity and inclusion.
IIT Kharagpur	• Student grants exclusively for undergraduate women. • Counselling and outreach initiatives for women looking for a career in science. • Women's Leadership Conclave, focusing on 'Women: The Backbone of Society.' The conclave aims to inspire and empower women to take on leadership roles across diverse fields in society. • Winning the Challenges by Women Entrepreneurs: Training for women entrepreneurs, this programme aims to build confidence and business competencies, fostering excellence in project management, finance, marketing, and networking for overall business success and work-life balance
IIT Bombay	• The 'IIT Bombay Gen Zero Women Initiative' will honour and celebrate some alumni and their many outstanding accomplishments. • A dedicated chair for women faculty which recognises women leaders in academia who can serve as role models for aspiring students.
IIT Madras	• Women Post-baccalaureate Fellowships: Fellowships to exceptional female graduates, who are desirous of pursuing a 1-2 year research internship at the interface of biology and engineering at IIT Madras. • Women Leading IITM is an alumni-sponsored initiative that aims to guide and support women graduates through professional networking, scholarships, and mentorships. • STEWARDS (STEM Women Scholars and Researchers Development) is a mentorship programme for women research scholars, collaborating with Women's Forum IITM, alumni association, and grassroots women alumni.

IIT Ropar	Women's Forum: IITRPR Women's Forum ensures a safe and harmonious workplace, promoting gender equality and addressing harassment promptly.
IIT Hyderabad	The Women Leadership Workshop strives to empower women by deepening self-awareness, building strong personal brands, and developing key corporate skills. Focused on navigating challenges in a male-dominated environment, the workshop covers themes such as self-leadership, managing upwards, talent development, work-life balance, and diversity.
IIT Mandi	Exclusive incentives for female B.Tech. Students include covered ACM, IEEE, or ASME memberships, and bus facilities between Mandi and Delhi via Chandigarh at semester start and end.
IISER Pune	• Prodigious Women in Chemical Sciences managed by the IISER's committee on women and science, organises conferences and strategic planning meetings to improve gender equality. • On-campus childcare centre for working parents in the institute.
TIFR	Child Care Association by Women's Cell of the institute.
IISc	Women in Science initiative IISc, through a dedicated website for women, promotes funding opportunities for women scientists as part of its Office of Research Grants and through its affiliation with the Indian Academy of Science's Women in Science initiative.

Notable industry programs

Table 2: Industry programmes for Women in STEM

Industry	Initiatives
IBM	Department of Research, Diversity, and Inclusion: This department strives to create a conducive and inclusive work environment for women researchers and introduces Initiatives that help women address the professional challenges they face.
CISCO	International Girls in ICT Day: As part of their CSR activities, CISCO participates in this programme and aims to reach at least 20,000 girls and encourage them to consider a career in STEM. The programme aims to help girls discover opportunities in the Information and communications technology (ICT) Industry, to promote a more inclusive and diverse scientific community.
Adobe	CodeHers: A women 's-only hackathon to celebrate women in STEM. It aims to help identify the brightest women developers and coders in India through a series of algorithmic programming challenges.
Intel	Protégé Sponsorship Initiative: This initiative creates development opportunities for select senior technical women employees by mapping each of them to a senior leader as a sponsor. Intel also plans to ultimately reach full gender representation (Intel, 2016).
Larsen & Tubro	Renew: Career re-entry for women: A one-of-its-kind initiative that only hires women professionals who took career breaks for any significant reason. This initiative is a step forward in bringing women who left the sciences back into the field.
HCL	Sheinspires: This initiative captures the life stories of women who have excelled in different STEM fields. It aims to inspire young women and girls to pursue science.
TATA	SCIP, MWM Joint Initiative: Starting from International Women's Day in 2008, TATA has welcomed women who have taken a break back to careers tailored to their availability and flexibility. A unique initiative launched in 2020 to provide valuable mentoring to women in science, and develop a digital platform to showcase best practices, share resources, and discuss challenges of gender equity and inclusion.

Dr. Reddy's Laboratories	Sashakt Scholarship: A scholarship programme for girls from rural areas and economically weaker sections of society, to help them pursue higher education in the sciences.
Wipro	Women of Wipro (WOW): Launched in 2008, the Women of Wipro programme promotes gender equality and equal opportunity within Wipro to support the career ambitions of women in technology and create leadership positions for them.

1. Women in STEM Caravan
2. Scholarship and Mentoring for Women in STEM Education and Careers
3. Digital Safety Work by Centre for Social Research
4. American India Foundation's (AIF) Digital Equaliser Program
5. EY STEM App Global Women in Technology (WIT)
6. IIM Bangalore's Tanmatra Programme
7. IBM Department of Research, Diversity, and Inclusion
8. CISCO International Girls in ICT Day
9. Adobe CodeHers
10. Intel Protégé Sponsorship Initiative
11. Larsen & Toubro Renew: Career Re-entry for Women
12. HCL SheInspires
13. TATA Second Career Inspiring Possibilities (SCIP)
14. TATA Consultancy Services (TCS)–Million Women Mentors (MWM) Joint initiative
15. Dr. Reddy's Foundation- Sashakt Scholarship
16. Wipro-WOW
17. Adobe's Women in Tech Scholarship

Startup Initiatives

The startup programme was initiated by the government in 2016 to promote and support start-ups in India by providing bank finances. Under this programme, several initiatives have been directed at start-ups by women, especially in science and technology (See table 3). A few initiatives have been highlighted here and detailed start-up initiatives by DST and DBT, along with various state programmes under this mission have been given in **Appendix 6**.

1. **HexGn startup-ready programme for women in science and technology:** Exclusive Startup

acceleration programme for women in collaboration with Invest India (AGNIi, and Startup India) aimed at fast-tracking women entrepreneurs in science & technology.

2. **Virtual incubation programme for women entrepreneurs by Zone Startups India:** Virtual Startup Incubation in collaboration with Startup India focusing on tech-based innovations led by women entrepreneurs. The programme nurtures 20 early-stage startups through a 2-month incubation journey.
3. **Accelerating Women Entrepreneurs programme by WICCI Banking and Credit Council (WICCI BCC):** A high-impact learning programme covering all aspects of business acceleration for women-led businesses. It includes preparing business models for growth, exploring financing options, mentorship, and networking opportunities, culminating in a speed networking session with investors.
4. **iAspire programme for women in technology:** A programme aiming to equip women founders with the necessary tools to actively contribute and co-create in the startup ecosystem.
5. **ImpactAim SDG5 Accelerator programme for women:** Targeting key barriers to growth faced by Women Climate Entrepreneurs through personalised support based on their sectoral and functional needs.
6. **Speed mentoring for women by Startup India:** A Speed Mentoring Session on International Women's Day providing aspiring women entrepreneurs face-time and interaction with renowned women leaders in New Delhi.

Other Initiatives:

1. **The Indian Association of Women Scientists (IWSA):** Mumbai-based organisation promoting women in science since 1973.
2. **BiasWatchIndia:** Online platform documenting gender representation in conferences

Table 3: Start-Up Programs for women in STEM

Year	Organisation	Initiative
2020	HexGn	Startup acceleration programme for women in science and technology
2020	Zone Startups India	Virtual Startup Incubation programme for women entrepreneurs
2020	WICCI Banking and Credit Council	Accelerating Women Entrepreneurs program
2020	iAspire	iAspire programme for WIT
2021	ImpactAim	SDG5 Accelerator programme for women
2023	Startup India	Speed mentoring for women

3. **Million Women Mentors:** An initiative of STEMconnector(R) involving STEM mentors.
4. **Million Women Mentors:** 20 women mentees from IIT Delhi, participated in a Global Mentoring programme for women scholars in STEM fields named ‘Million Women Mentors’, initiated by Pepsi Co.,
5. **Feminist Approach to Technology:** A not-for-profit organisation working towards sustainable development and equality through a feminist approach to technology.
6. **The Life of Science (TLoS):** A science media platform collating experiences of women and minorities in science.
7. **The European Molecular Biology Organization (EMBO):** Addressing gender imbalances in life sciences.

S&T Parks

The government initiated a programme in the early 1980s ‘Science & Technology Entrepreneurs Park’ (STEP) programme to relook into the methodology of innovating and bringing about a culture of entrepreneurship. Under this, the government established various S&T parks while a few have also been established by private entities. These parks could be categorized as research parks, biotech parks, technology parks, etc. some specifically for women in rural areas known as Rural women technology parks (WTP). These are mostly affiliated with the government, private research bodies, or even universities.

An atmosphere of innovation and entrepreneurship in these parks helps in raising and nurturing the growth of firms by imparting knowledge on innovative ideas,

helping in the transfer of technologies, and research outcomes progressed to viable commercial products. Science parks are also often seen as motivation for the formation of new high-technology firms and industries. They in turn could be appealing to investments from foreign companies and also promote exports. All this often enhances the country’s economic development.

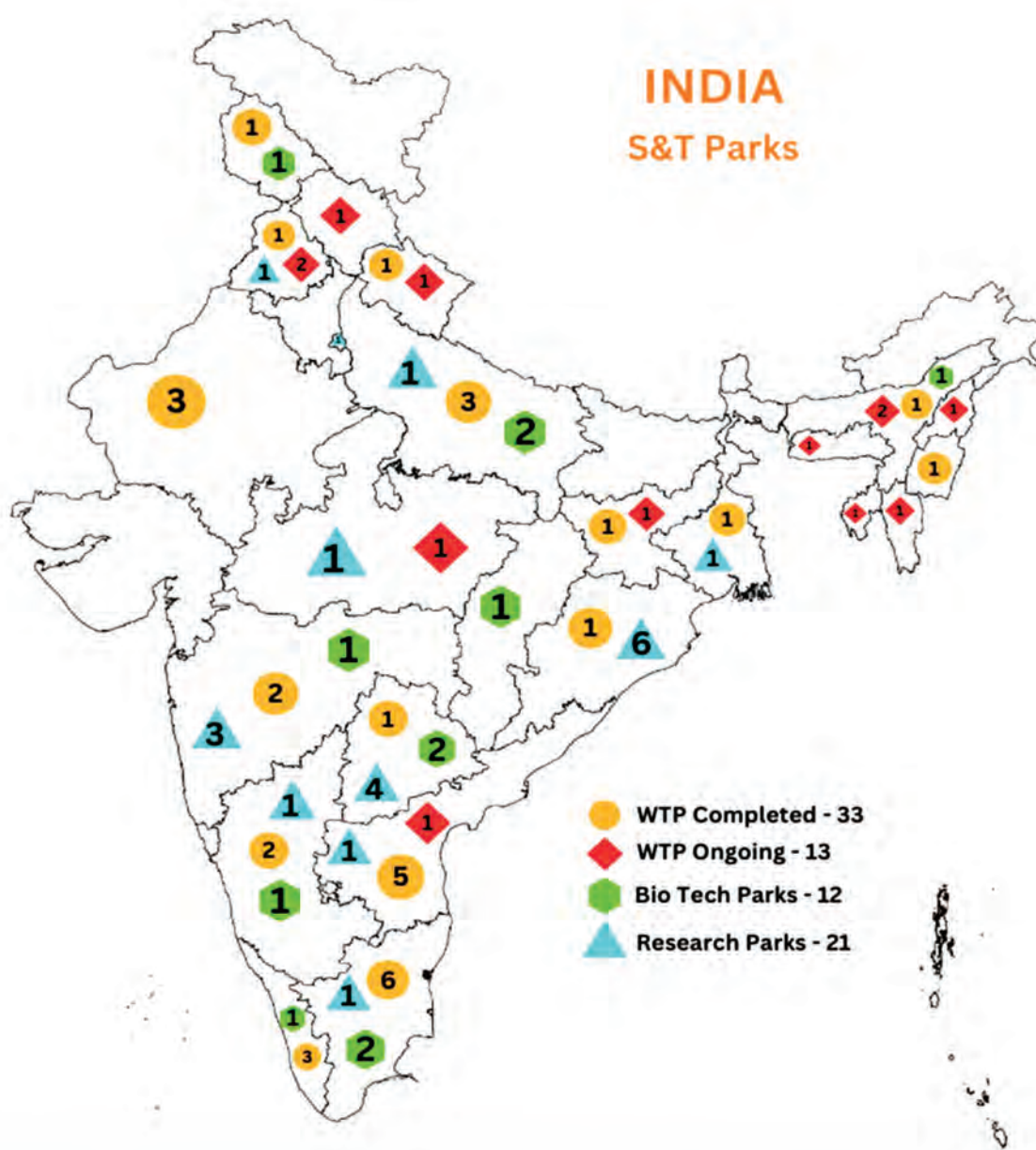
The Women Technology Park (WTP) programme is a women's scheme Funded by the Science for Equity Empowerment and Development (SEED) division, DST under the “Science & Technology for Women” scheme. The objective of the project is to set up a Rural Women Technology Park (RWTP) for Women Empowerment through Skill Enhancement, Entrepreneurship Development, and Providing Market Linkages Using ICT”. Women Technology Parks are established in rural and peri-urban areas as technology modulation, adaptation, and training Centres for women groups mainly from farming communities. They promote the development and adaptation of appropriate technologies, transfer proven technologies, and demonstrate live technology models to improve the weakest link of the predominant livelihood system of women in an area. It also promotes social entrepreneurship and women’s employment based on the strongest link of the livelihood system. They create an environment, where scientists and technologists from mentoring organisations could provide knowledge and appropriate technology for adoption and practice by women groups at their farms or workplaces.

Women receiving training through these WTPs can form Self Help Groups and set up their micro-enterprises to become self-reliant. WTPs help create an environment that facilitates scientific and Knowledge Organisations or individuals to extend the recently developed technology or methodology that can be

adopted by rural women to establish micro-enterprises and thus become self-reliant.

So far 33 WTPs have been completed successfully and some of them are sustaining themselves and 13 Parks are still ongoing in various parts of the country. There are 13 ongoing projects, 2 each in Assam and Punjab while one each in Andhra Pradesh, Meghalaya, Mizoram, Tripura, Himachal Pradesh, Jharkhand, Madhya Pradesh, Uttarakhand, and Nagaland. With more such Parks being planned in the future all over India, the WTPs can play an important role in creating *AtmaNirbhar Bharat* at the community level.

Bio-Technology Parks in India: The DBT has partnered with various State Governments to establish Biotech Parks. So far, there are 11 BT parks in various states of India, with two in Tamil Nadu and one each in Andhra Pradesh, Assam, Chhattisgarh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Telangana, and Uttar Pradesh. The focus areas of these parks are Promoting BT, pharmaceuticals and life sciences R&D, Industrial BT R&D, bioprocessing, and fostering innovation in BT. Some of them provide BT incubation facilities and support for biotech startups. A park in Tamil Nadu is specially established for women with



Source: Prepared by authors by compiling all information from various websites

Figure 2: Map of S&T Parks in India

a focus on women entrepreneurs and professionals. It is 'The Golden Jubilee Biotech Park for Women' in Chennai

Research Parks: With a mission to create a world-class ecosystem that would foster leading-edge innovation in the country, the research parks are normally established at Top-tier Higher Educational Institutions. These Parks are set up to foster research collaborations with top-rated industries; enable entrepreneurship; incubate students and build strong academic linkages that can help facilitate the exchange of knowledge and expertise between academia and industry. It is meant to increase the outreach of academic content to the industry and enable the industry to add value to academic programmes through partnerships.

As of now, there are 21 research parks, some fully established while a few are in the process of completion shortly. Various IITs, some at IISER, and IISc are some of the locations of these parks. Please see Figure 2 (Map of India: S&T parks) for locations of the research Parks, S&T Parks, and WTP in various states of India.

Incubation centres: Technology Business Incubators (TBI) in India, have become the new contributors to the growth of the Indian economy by nurturing startups and fostering collaborations between academia, research institutions, and the private sector. They are considered to be the transformers of job-seekers into job creators by providing essential resources, mentorship, and networking opportunities. They also provided services, including workspace, shared office services, access to specialised equipment, funding assistance, etc. TBIs are institutional mechanisms that are crucial hubs for fostering innovation and entrepreneurship and a launch pad for innovative startups, particularly those focused on technology-intensive or knowledge-driven sectors.

With its emphasis on collaboration with academia and public research institutions, TBIs not only support the commercialization of R&D output but also contribute to the progression of the knowledge-driven economy. Some incubation centres are listed in **Appendix 7**.

4. Methodology

The proposed project strongly aligns with the Government's policies of women empowerment which are announced from time to time including India's G20 priorities. India holds the presidency of G20 which is a premier forum for international economic cooperation and requires becoming a leader in a true sense by setting an example of women empowerment especially when it comes to providing a conducive work environment and work-friendly policies for women in STEM. The objective would be to assess the efforts made by the Government to foster gender equality in STEM.

Objectives

The study thus aims to:

1. Examine/ Evaluate/ Assess the Government initiatives to promote gender parity and women's encouragement in STEM fields.
2. Gender auditing of S&T manpower in Select S&T institutions in the country.
3. Gender-wise audit of the research grants in these organizations
4. Comparative analysis of #2 and #3 with CSIR (based on an earlier study conducted by the authors at the CSIR level).

Target Beneficiaries:

- Scientific ministries and institutions
- Ministry of women and child development
- Policy institutions

The study focuses on assessing the government's readiness to incorporate a gender-balanced work environment in the S&T field. This research employs a mixed methods approach, combining secondary and primary data collection and analysis techniques, to comprehensively assess the efforts of scientific organisations for empowering women in STEM. By capturing both broad trends and individual

experiences, this methodology provides a nuanced and comprehensive understanding of the challenges faced and advancements made in promoting gender equality within scientific organisations.

To obtain comprehensive primary data, the study targeted gender-specific information from prominent scientific organisations, specifically the DBT and the DST, alongside data sourced from their respective affiliated institutes under these ministries. DSIR was also included in the study after the expert's opinion during the mid-term review of the project. As a similar study was undertaken for CSIR in 2020-21, only the National Research Development Corporation (NRDC), Central Electronics Limited (CEL) along the Department of Science and Technology (DSIR) were included in the primary survey during this study. Direct sourcing of institutional details from the official ministry websites streamlined the extraction process, allowing for the comprehensive compilation of data relating to their diverse STEM workforce roles, including scientists, professors, and technical staff.

To ensure a robust understanding, multiple data collection methods like triangulation- questionnaires, interviews, case studies, and unobtrusive methods were utilised deliberately. It was felt that, while questionnaires help in obtaining general facts more objectively, the semi-structured interview schedules and case studies would provide more nuanced insights into gender-related challenges.

To effectively consolidate and streamline the extensive dataset, a systematic series of steps were followed. The initial step was structuring the organisation's information meticulously. It was accomplished by creating distinct Excel spreadsheets for the selected ministries i.e. DBT, DST, and DSIR. Within these tailored sheets, a systematic sub-page framework was employed to categorize data about individual institutes. This approach ensured a coherent and well-organized representation of the information collected.

Data collection and design of the study: The study relies on a comprehensive approach:

1. **Secondary Data Collection:** Information was sourced from diverse S&T organisations and ministries to identify critical information gaps and contradictions, aiding in contextualising the research. Additionally, a database of women in S&T, including their contact details, was compiled by individually accessing the websites of autonomous institutes under DST and DBT.
2. **Primary Survey of Women in STEM:** This phase involved a dual-pronged approach using two tailored questionnaires. The first questionnaire targeted women scientists within DBT and DST-affiliated autonomous institutes, and DSIR aiming to capture their unique perspectives and experiences within the STEM landscape. Simultaneously, a separate set of questionnaires was directed towards directors within the institutes and department heads in DST and DBT to get the organisational viewpoints. This approach enriched the study with a multi-dimensional viewpoint.
3. **Structured Interviews:** Structured interviews were also conducted with officials involved in specialised government schemes for women in STEM like GATI, KIRAN, etc.

The major approach in data collection and data analysis has been as follows:

- Extensive research of secondary sources of information has been done to arrive at a proper methodology and research query.
- Secondary sources include government reports, project reports based on surveys, and research articles. In addition, to get a glimpse of the status of women in STEM in the country, the GoI portals have also been referred to.
- To frame a set of effective questions to procure authentic information, extensive efforts were made before designing the questionnaire. The base for the questionnaire was the previous study questionnaire with the addition/deletion of questions that were thought or not found relevant for the study.
- Primary data, collected through self-designed questionnaires, was employed in the study to support the discussion and arrive at policy recommendations.
- To make a comprehensive assessment of performance and career attainment of women,

information regarding educational qualifications, occupation, and career, breaks, if any, in education and employment, academic and non-academic infrastructure and facilities, work environment interaction, sharing of household responsibilities, etc., was obtained from women respondents.

- Heads of divisions or institutions were asked to give suggestions for policy change to promote career continuity and advancement for women in STEM.

Secondary Source data: To complement the primary data collected through questionnaires and interviews, a comprehensive approach was taken to gather secondary information from various S&T organisations and ministries. This secondary data broadened the study's context, identifying critical information gaps and contradictions. This meticulous data compilation offered a comprehensive snapshot of personnel composition within each organisation, serving as a valuable resource for further analysis and the development of gender-focused initiatives. The email IDs collected from the websites helped post questionnaires for primary data collection. Additionally, including the complete addresses of these institutes provided a geographical perspective, enabling an analysis of regional variations in gender representation.

Expanding the scope of the dataset, a distinct Excel sheet was dedicated to the ministries associated with these organisations. Within this sheet, sub-sheets were organised for each ministry, and essential details about division heads and female scientists were meticulously catalogued. This expansion provided a broader understanding of the organisational structure and personnel distribution within the broader STEM ecosystem.

In addition, comprehensive data on government initiatives supporting women in STEM from 2001 to the present was meticulously compiled. This data collection effort involved gathering information from various sources, including government reports, websites, and academic publications. The compiled data provided a historical context for understanding the evolution of government policies aimed at empowering women in STEM fields.

Efforts extended to extensively detailing the programs and initiatives spearheaded by DBT and DST. This detailed analysis involved reviewing numerous documents, including annual reports and official web pages. Projects funded by DST and DBT were also

studied for gender-wise funding patterns. Moreover, information about the organization's initiatives, programs, fellowships, and awards specifically designed to uplift women in their respective STEM domains was included. This focus on women-centric programs and support mechanisms highlighted the commitment of these organizations to promoting gender equity in STEM fields. The gathered information provided a comprehensive overview of the specific initiatives undertaken by these organizations to promote gender equity in STEM.

Other information on government initiatives for mainstreaming gender of the Government, private bodies, industry, and initiatives under various schemes of government also formed part of the secondary data which have been covered in the chapter on “Promoting Science among Women”.

Capturing Personal Information: Detailed personal information was captured for each institute. For every institute, the various roles held by individuals were comprehensively documented, encompassing female scientists, technical staff, research fellows, associate professors, professors, and project scientists. The critical information collected spanned essential aspects such as names, designations, email addresses, etc. Furthermore, a breakdown of the number of male and female scientists, professors, and nodal officers within each institute was included. This provides an insightful overview of gender distribution in each of the institutes and ministries.

Analyzing Leadership Representation and Organizational Context: Recognizing the profound influence of leadership roles in shaping organizational culture and fostering gender equality, special efforts were undertaken to gather comprehensive details concerning the directors of each institute. By specifying the gender of these directors, a deeper layer of insight emerged into gender representation within leadership positions.

Primary Source data: To delve deeper into the experiences of women in STEM fields, information was gathered through two types of questionnaires via Google Forms targeted at two levels. These questionnaires, to some extent, were aligned with the framework employed in a previous study (Aggarwal et al. 2021, where the authors were involved). A brief description of the questionnaires designed for the collection of information is as follows.

Questionnaire1: The first questionnaire, targeting individual women working in STEM in organizations under study, was designed to collate their experiences in professions and personal lives. The data, based on 31 questions, was collected during September- October 2023. The questionnaire encompassed, apart from their general profiles, inquiries related to multifaceted aspects of career trajectories, work environment, familial support, and societal perceptions. The questions were organised into sections to capture data on various facets including early influences and encouragement in pursuing STEM, familial support during educational pursuits, challenges faced in professional advancement, work-related experiences such as instances of harassment, utilization of work skills, balancing familial responsibilities, and adaptations post-pandemic. The sections covered a spectrum of themes, encapsulating personal experiences, career milestones, work-life balance, institutional support, access to resources, and awareness of government initiatives promoting women in STEM. The questionnaire aimed to evaluate individual perceptions regarding gender equality within their institutions and their awareness and utilisation of governmental schemes designed to encourage women in STEM. Additionally, it sought to gauge satisfaction levels with current job assignments and the overall recommendation of STEM careers to other aspiring women.

Questionnaire 2: The second questionnaire, targeting Heads of ministries and scientific organizations, was proposed to gather insights on their perspectives and practices concerning gender-specific policies and initiatives within these institutions. The data was collected from October to November 2023 and consisted of 13 questions in total. The questions were grouped into clusters to comprehensively address the challenges and opportunities surrounding gender-related privileges, managerial empowerment, utilisation of employee benefits, implementation of women-centric programs, and awareness of gender-related laws.

The questions were designed to collect data on gender-specific privileges and their potential exploitation by employees, exploring opinions on the judicious use of facilities such as flexi-time, work-from-home, and childcare leave. Additionally, the questionnaire delved into the attitudes of sanctioning authorities towards such benefits, assessing ease of approval and the potential for biases in the sanctioning process.

Furthermore, the questionnaire probed into the involvement of heads of divisions or organizations in driving women-centric initiatives and the awareness of legal frameworks like the Prevention of Sexual Harassment (POSH) Act. It sought to identify potential gender-specific obstacles that might impede the productivity of divisions or organisations and aimed to gather suggestions for fostering a more women-friendly environment within these scientific institutions.

The inquiries also invited recommendations for additional initiatives that could further enhance the inclusivity and support for women pursuing STEM careers within these organisational settings.

The primary objective of the questionnaires was to identify any shortcomings or loopholes in the current work environment that might hinder women's advancement and to derive policy recommendations for creating a more women-friendly workplace.

Semi Structured Interviews

To evaluate the effectiveness of women's empowerment initiatives in STEM fields, semi-structured interviews were conducted with officials directly involved in specialised GoI schemes. The interviews, spanned over five months, from August-December 2023, were conducted with a diverse group of eight men and women, all of whom hold significant positions within the Ministries. The interviews centred on three key areas.

- Initially, participants were asked to share their personal experiences in promoting women's empowerment within STEM fields, highlighting both successes and challenges they encountered.
- Following this, the discussion pivoted to seek their perspective on the most effective strategies for implementing women-friendly policies and programs, drawing from their own experiences.
- Finally, participants were encouraged to offer any additional suggestions or recommendations for enhancing the ministry's efforts to empower women in STEM. The participants' extensive experience in policy formulation and implementation provided

a rich understanding of the challenges and opportunities faced by women in STEM fields.

Data Compilation and Analyses

Secondary data was compiled to obtain email to send questionnaires. Also, project funding data was procured for gender-wise analysis. The main objective of studying the various initiatives for mainstreaming gender was also done through this.

The comprehensive primary data collection and analysis efforts undertaken in this study have provided valuable insights into the current experiences and challenges faced by women in STEM fields in India. The efforts and initiatives taken by the heads/ directors to provide a conducive environment for women were studied through the information gathered during primary data collection.

Limitations of the Study

This study is based on data obtained through semi-structured interviews and questionnaires, between August 2023 and November 2023 for the primary survey. The study employed two sets of questionnaires. The first questionnaire targeting individual women yielded valuable insights, but securing responses proved challenging, with some respondents struggling to provide detailed information. The second questionnaire, directed towards heads of ministries and scientific organisations, faced a significantly lower response rate, necessitating multiple reminders to encourage participation. This reduced response rate hindered the achievement of the intended sample size, potentially impacting the representativeness of the collected data.

The study's reliance on questionnaires introduced inherent limitations such as time constraints for respondents and researchers, the potential intrusiveness of questionnaires, and concerns regarding the validity and reliability of questionnaire data further exacerbated these limitations. Additionally, the inability to immediately follow up on or probe deeper into certain responses restricted the scope for comprehensive understanding and validation of the collected data.

5. Findings and Results

The study is based on data gathered from secondary sources and some secondary data was used to get Emails of relevant scientists for sending questionnaires to collect primary data. Here, the findings based on secondary data are presented which is followed by findings of the primary data.

Secondary data:

This section of the report is broadly based on secondary data and information. This has been collected /procured/ from various sources including annual reports, departmental reports, research items, and books. In addition, documents of a few ministries, departments, and organizations have also been consulted/browsed for this purpose.

This section comprises information on the following

- The Secretaries heading the ministries from its inception.
- Gender distribution of S&T workforce in the 3 ministries under study as well as the institutes affiliated to them with a comparative analysis. It is further analyzed based on the geographical locations of the institutes.
- The funding sponsored for various projects by primarily DST and DBT was analysed based on the amount of funds, gender-wise as well as funding proportion to male and female PIs and Co-PIs.
- The INSPIRE scheme of DST has also been analysed
- The AISHE data for students opting for STEM disciplines have also been investigated.

Heads: It was found that from the inception of DST till date there have been a total of 17 secretaries of the Department of which only one has been a female who was a secretary of DBT with an additional charge of DST for a few months only.

Meanwhile of the 9 secretaries of DBT from 1981 when it was established, 2 have been women. For DSIR, the current secretary holding office is the first woman to hold the seat.

Similarly, there is a glaring underrepresentation of women in leadership positions in the DST and DBT autonomous institutes. Out of seventeen DST institutes only two are headed by a woman while in DBT sixteen institutes only three are headed by women. This scarcity of women in leadership roles stifles the scientific community's potential for innovation.

The heads of divisions in the ministries however have a positive side. More than half of the divisions in both DST and DBT are headed by women.

Gender-wise distribution of the workforce :

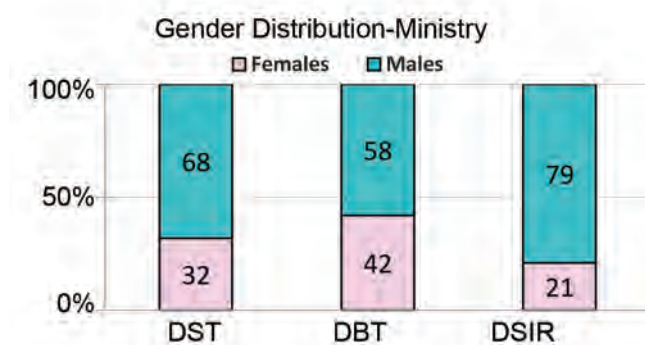


Figure 3: Gender representation in DST, DBT and DSIR

Based on the information from the ministry website (secondary source), the gender-wise distribution of the workforce in the DST, DBT, and DSIR, along with the institutes affiliated with them (except for DSIR) are presented. The data is based on the information gathered from the respective websites between July-August 2023.

Comparative Analysis of Gender Distribution at the Ministries:

Examining the gender distribution at the ministry level is crucial for understanding workforce inclusivity. The data on gender distribution percentages of the STEM workforce in DST, DBT, and DSIR is given in figure 3 and Table 4.

Table 4: Gender distribution in DST, DBT, and DSIR

Ministry	% Females	% Males
DST	32	68
DBT	42	58
DSIR	21	79

Gender Distribution in the autonomous institutes :

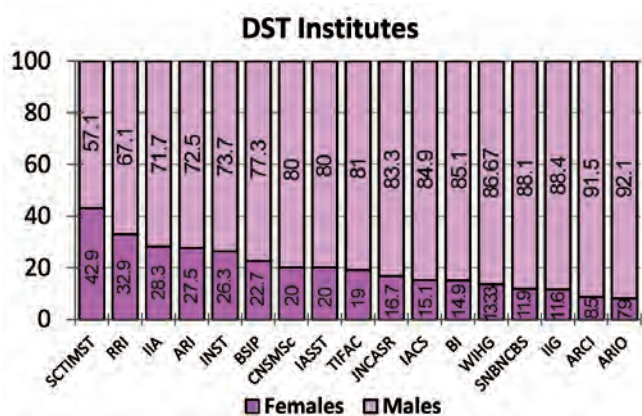


Figure 4: Gender representation of the scientific workforce in DST Autonomous Institutes

DST- The gender distribution across different DST institutes provides insights into its scientific workforce representation as presented in Figure 4. The gender-wise workforce for DST institutes indicates that more than half the institutes, i.e. 9 out of 17 exceeded the national average of 18.6% in terms of women's representation in STEM and only eight institutes were below the national average, signifying areas where efforts to enhance gender inclusivity in STEM may need further attention.

DBT- The gender distribution within various DBT institutes offers valuable insights into gender representation within the scientific community as shown in Figure 5. Eleven out of sixteen institutes have female scientific representation above the national average of 18.6%. On the other hand, about one-third (five out of sixteen) of the institutes affiliated with DBT were reported to be below the national average of women scientists. This insight offers a nuanced understanding of the gender dynamics within DBT institutes, emphasising the need for targeted initiatives to address disparities and promote inclusivity.

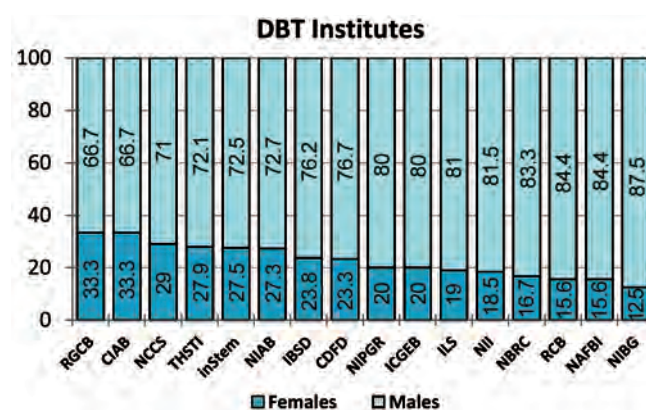


Figure 5: Gender representation of the scientific workforce in DBT Autonomous Institutes

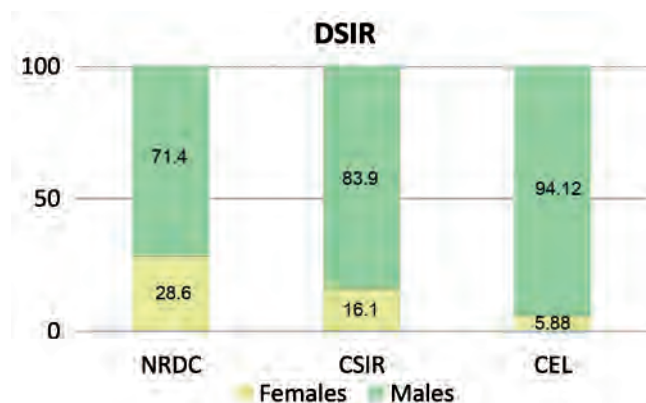


Figure 6: Gender representation of the scientific workforce in DSIR

DSIR- A study of gender distribution within various DSIR organisations will unveil valuable insights into gender representation in the scientific community.

workforce data has been taken from a previous study (Aggarwal, Wakdikar & Sharma, 2022) and shown in Figure 6. It is observed that NRDC has a better women representation in the scientific cadre; while CEL shows a considerable gender disparity.

Comparative Analysis of Gender Distribution in DST, DBT, & DSIR Institutes:

In Table 5, the average values have been derived by consolidating institutes of DST, DBT, and DSIR for a representative and holistic average providing a synthesized overview of gender distribution trends. The information on DSIR (as stated above) is partially based on old data, especially on CSIR.

Table 5: Gender distribution in DST, DBT, and DSIR Institutes

Autonomous Institutes	% Females	% Males
DST	20	80
DBT	23	77
DSIR*	17	83

As seen from above, DBT has a slightly higher percentage of females (23%) than DST and DSIR. DSIR institutes exhibit the lowest female representation (17%).

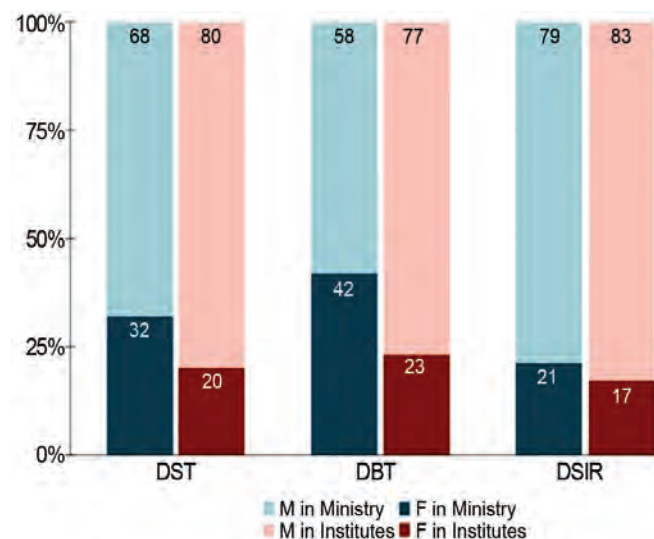


Figure 7: Gender representation in Ministries and their Institutes

Figure 7 provides a comprehensive overview of gender distribution across three ministries, i.e. DST, DBT, and DSIR, and their respective autonomous institutes. This visual representation offers a holistic snapshot of the scientific workforce, gender-wise within these organizations, allowing for a clearer understanding of the gender dynamics in the scientific and industrial sectors.

Gender representation Geographically:

The distribution analysis of the autonomous institutes under DST and DBT was also carried out based on the geographical location of the institutes and is presented in Table 6.

Table 6: Geographical locations of Institutes under DST and DBT

Region	DST institutes		DBT institutes	
	No. of Institutes	% Female S&T	No. of Institutes	% Female S&T
North	6	18	8	21
South	6	25	4	28
East	3	14	3	18
West	1	12	1	29

DST autonomous Institutes in the Northern and Southern regions of India are 6 each while 3 are in the East and only one in the West. The female representation in these locations is, 18%, 25%, 14%, and 12% respectively showing that the institutes located in the southern region have a better gender inclusivity.

Eight autonomous Institutes of DBT are in the North, 4 in the South, 3 in the East, and only 1 in the West. The southern institutes under DBT also have a better female representation. The West with only 1 institute exhibits the highest percentage of females at 29%.

Funding patterns in DBT and DST

The study delves into a comparative analysis of the funding trends of projects for male and female Principal Investigators (PIs) of DST and DBT. The data was acquired from the annual reports of these agencies for the last three years and five years respectively and compiled as shown in table 7 for DST and table 8 & 9 for DBT.

Table 7: Projects funded by DST during 2019-2021 (Tabulation by authors)

Year	2018-19	2019-20	2020-21
Total projects	3249	2900	2155
Male PIs (nos)	2339	2216	1717
Female PIs (nos.)	909	683	437
Male PIs (%)	72	76	80
Female PIs (%)	28	24	20
Total Approved amount (INR lakh)	12,428.5.8	137549.3	119026.49
Amount to Male PIs (INR Lakh)	93558.65	108238.48	96621.21
Amount to Female PIs (INR Lakh)	30617.64	29163.14	19656.14
Amount to Male PIs (%)	75	79	81
Amount to Female PIs (%)	25	21	17

Source: <https://dst.gov.in/scientific-programmes/scientific-engineering-research/national-science-technology-management-information-system-nstmis>

Table 8: Projects funded by DBT during 2019-2024

Year	2019-20	2020-21	2021-22	2022-23	2023-24*
Total projects (nos)	1161	244	409	254	117
Male PIs (nos)	1561	334	615	307	169
Female PIs (nos.)	500	100	171	97	47
Male PIs (%)	76	77	78	72	78
Female PIs (%)	24	23	22	24	22
No. of projects (only male PIs)	743	164	270	174	80
No. of projects (only female PIs)	214	38	68	54	20
Total Approved amount (INR lakh)	187259	37788	77485	29372	13962.3
Amount to Male PIs (INR Lakh)	143788.7	29029	62829	22976.7	10351
Amount to Female PIs (INR Lakh)	43470.4	8759	14656	6395	3611
Amount to Male PIs (%)	77	77	81	78	74
Amount to Female PIs (%)	23	23	19	22	26

*partial

Source: <https://prsindia.org/budgets/parliament/demand-for-grants-2022-23-analysis-science-and-technology>

The funding patterns of DBT during the five years from 2019-2024 and that of DST during 2018-2021 have been analysed. The following trend has been observed:

1. Funding Allocation: Over the years, DST has reduced the project fundings, but the % of male PIs acquiring funds have risen. DBT on the other hand, has maintained its funding percentage genderwise, although the approved amount to female PIs has shown a rise in the last 2-3 years.

2. Gender Imbalance: Both DST and DBT data have shown gender imbalance in the representation of PIs in their projects with male PIs outnumbering their female counterparts by more than 3:1 ratio. This trend is more pronounced in DST.

3. Total Approved Amount: The percentage of funds allocated by DBT to female PIs has been improving in last few years.

Table 9: DBT Project Information during 2017-2022

Indicator	2017-18	2018-19	2019-20	2020-21	2021-22*
Ongoing Projects	2,165	2,460	2,405	2,081	2,143
Projects Sanctioned	831	847	594	259	161
Scientists Supported (PI/Co-PI)	5,121	5,553	4,521	2,364	-
Conferences	92	83	96	8	16
Technologies Generated	75	82	119	-	-
Publications	1,904	3,478	3,758	-	-
Patents Filed	102	93	76	-	-

INSPIRE Scheme¹

Innovation in Science Pursuit for Inspired Research (INSPIRE) is a flagship scheme of the DST which aims to attract meritorious youth to study science and technology and expand the R&D base of the country. The details of the scheme are provided in **Appendix 3**.

For the study, data from DST- National Science and Technology Management Information System (NSTMIS) publications for three years 2018-21 was analysed to get insights on the proportion of male and female students for three components of the scheme. The scholarship component of the INSPIRE scheme has revealed a mixed picture see (figure 8). There has been a gradual increase in the number of female scholarship recipients from 51% in the year 2019-20 to 54% in the year 2022-23. However, this rise has not been consistent with a drop in female scholarship recipients to 45% in the year 2020-21 followed by a gradual rise to 47% in the year 2021-22. We can also observe that the scholarship component has always remained in second position in terms of female enrollment compared to fellowship and faculty fellowship. Overall upward trend suggests a positive shift towards gender equality for women in research scholarship in India. However, there is a need for more consistent efforts to ensure these gains continue and become more substantial.

¹. <https://dst.gov.in/inspire-scheme-innovation-science-pursuit-inspired-research>

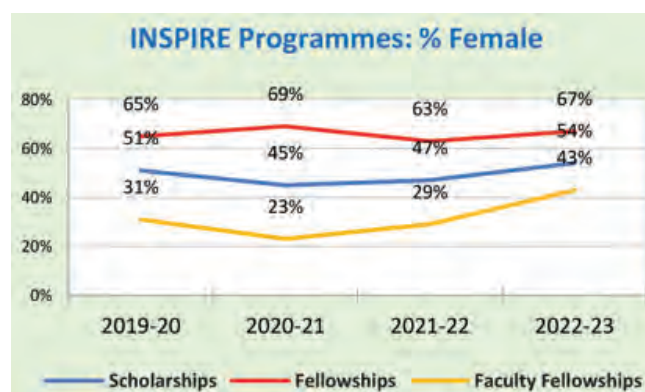


Figure 8: % women under INSPIRE Programme from 2019-2023

Source: Computed by Authors

The fellowship component of the INSPIRE scheme presents a more challenging scenario. There was an increase in the number of female fellowship recipients from 65% in 2019 to 69% in 2020, but it significantly dipped to 63% in 2021-22 followed by a gradual increase to 67% in 2022-23. These fluctuations in the percentage of female fellowship recipients over the years underscore the need to correct gender imbalances in research fellowships. We can also observe that the fellowship component has always remained at the top position in terms of female enrollment compared to scholarship and faculty fellowship.

The faculty fellowship component of the INSPIRE scheme demonstrates the most significant variations.

In the year 2019-20, only 31% of faculty fellowships were awarded to women, which dropped to 23% in 2020-21, but subsequently improved to 29% in 2021-22 and further to 43% in 2022-23. Though this increase in enrollment of female faculty fellowships from 31% to 43% is commendable, maintaining a consistent gender equity in faculty fellowships remains a challenge.

It is observed that the INSPIRE Scheme aligns with the government's vision of expanding the R&D base of the country. This analysis underscores the importance of ongoing efforts to address gender disparities in research and the need for institutions and policymakers to implement policies that promote equality.

All India Survey on Higher Education

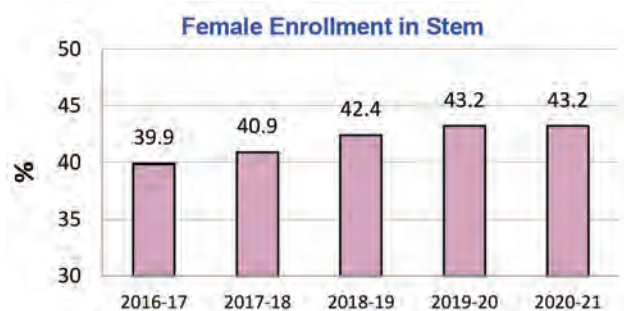


Figure 9: Gender-wise STEM Enrolment between 2016-17 to 2020-21

Information on STEM enrollment at graduation level was studied to validate the claim that more girls opt for STEM studies. The AISHE data procured from the report offers valuable insights into the enrollment dynamics of female students in Science and Engineering disciplines from 2016-17 to 2020-21 (See figure 9 & 10). The enrollment patterns of female students in Science and Engineering & Technology programs exhibit distinct trajectories.

Enrollment in Science:

- Female enrollment in Science programs has demonstrated a consistent upward trend.
- Starting at 49.01% in 2016-17, the percentage of female students pursuing Science has steadily increased, reaching 53.11% in 2020-21.

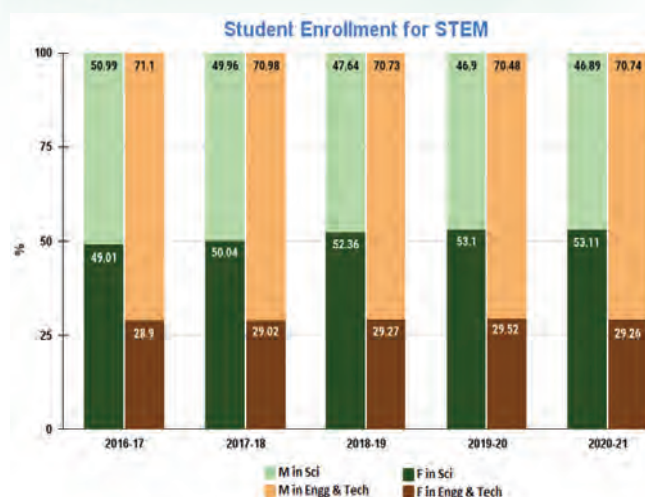


Figure 10: Gender-wise STEM Enrolment during 2016-21

- A noteworthy growth of over 4% during the specified period, highlights a significant shift towards gender inclusivity in scientific disciplines.

Enrollment in Engineering & Technology:

- Female enrollment in Engineering & Technology programs has shown a comparatively slower growth trajectory.
- Despite incremental increases, the growth rate in female enrollment has been modest over the five years.
- In 2016-17, female enrollment stood at 28.9%, experiencing a slight increase before reaching 29.26% in 2020-21.
- The data indicates a persistent but gradual effort towards narrowing the gender gap in engineering education.

Female enrollment in science in 2020-21 was 53.11% and 29.26% in engineering and technology fields. Female enrollment in engineering & technology has also been increasing, but at a slower pace than in science. These trends are encouraging, as they suggest that more young women are interested in pursuing education in science and engineering.

Also, the enrollment information in various streams like Engineering & Technology, Science, Medical Science, IT & Computer, Agriculture, Paramedical

Table 10: Enrolment at Undergraduate Level in Major Disciplines (Source: AISHE data)

S.No.	Years	2018-19	2019-20	2020-21	2021-22
	Discipline	% Female	% Female	% Female	% Female
1	Engineering & Technology	28.9	29.2	29	29.1
2	Science	51	51.7	52	50.8
3	Medical Science	60.7	59.5	58.6	57.6
4	IT & Computer	41	40.1	39.2	37.6
5	Agriculture	29.4	29	29.9	29.4
6	Paramedical Science	55.4	47.3	46.9	46.8
7	Veterinary & Animal Sciences	38.6	39.2	39.8	40.5
8	Fisheries Science	46	48	47.5	46.1
9	Marine Science / Oceanography	9.4	9.6	16.9	12
	Average	43	43.6	43.8	43

Veterinary & Animal Sciences, Fisheries Science, and Marine Science / Oceanography was analysed for four years from 2018-19 to 2021-22 procured from annual reports of AISHE and are given in table 10.

Primary survey results

A Questionnaire (henceforth mentioned as questionnaire 1) was designed for women S&T of the autonomous institutes under DST, DBT, and for CEL and NRDC under DSIR. It was aimed to get information on quantitative and qualitative attributes related to education, career, and challenges faced. Their interests and duties in the STEM journey, project implementation, achievements, etc. were also used from their responses through the survey. It also tried to address a few common problems that they could have faced at their workplaces. The questionnaire, consisting of 31 questions, was designed to capture the diverse experiences of these women professionals in the field. The respondents held a spectrum of roles, ranging from Scientist B to Senior Research Professor, encompassing a wide array of scientific disciplines. To ensure a standardised assessment of their positions, normalised their designations into seven scientific grade levels, aligning with the corresponding Pay Levels from Scientist B (Pay Level 10) to Scientist H (Pay Level 15), based on information extracted from organisation

websites. We got hold of valuable insights from 156 female respondents individual women working in STEM representing various scientific designations.

The other Questionnaire (henceforth mentioned as questionnaire 2) was administered to the Heads of Departments in the Ministries and the Directors of the autonomous institutes.

The findings, which are expected to contribute to the development of policies and initiatives promoting gender equality in these institutions, explored key topics such as personal experiences, career milestones, work-life balance, institutional support, access to resources, and awareness of government initiatives promoting women in STEM.

Overview of Survey Responses

Responses from women in DST & DBT autonomous Institutes: The data from the survey (Questionnaire 1) conducted reveals a significant level of participation from women employed in the STEM field within the autonomous institutes. A total of 157 responses were collected, with the DST having the highest number of participants with 97 responses (56.7%), followed by the DBT with 58 responses (57.4%). The DSIR had the lowest response rate with 3 participants (30%).

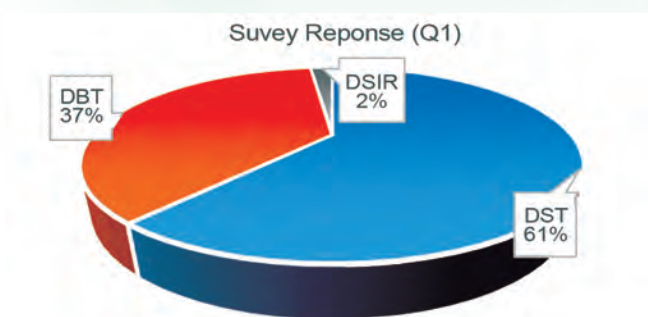


Figure 11: Representation in Survey (Questionnaire 1)

The DST demonstrated strong engagement with a 56.7% response rate, contributing more than 61% of all responses. Similarly, the DBT achieved a high response rate of 57.4%, contributing about 37% of the responses to our questionnaire. However, the DSIR showed a lower response rate of 30%, resulting in a minimal contribution of 1.91% to the overall responses.

Table 11: Representation of respondents in Questionnaire 1

Ministry	Sent to	% response rate
DST	171	56.7
DBT	101	57.4
DSIR	10	30
Total	282	

The DST has 17 autonomous institutes across India. To understand workforce dynamics and inclusivity, Questionnaire 1 surveyed women researchers across DST-affiliated institutes (Figure 12). The analysis of 97 responses offers valuable insights into the participation of women across different institutes, shedding light on the gender landscape within these scientific and research institutions.

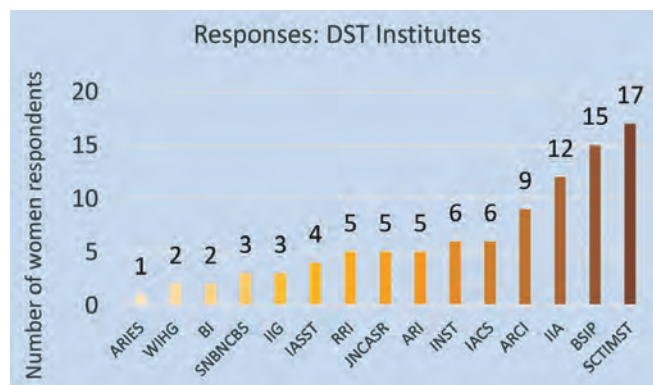


Figure 12: Number of women respondents in DST Institutes

The DBT oversees 16 institutes spread across the country, each contributing significantly to scientific progress (Figure 13). Understanding the workforce dynamics and inclusivity within these institutes is crucial for fostering a conducive environment for research and development.

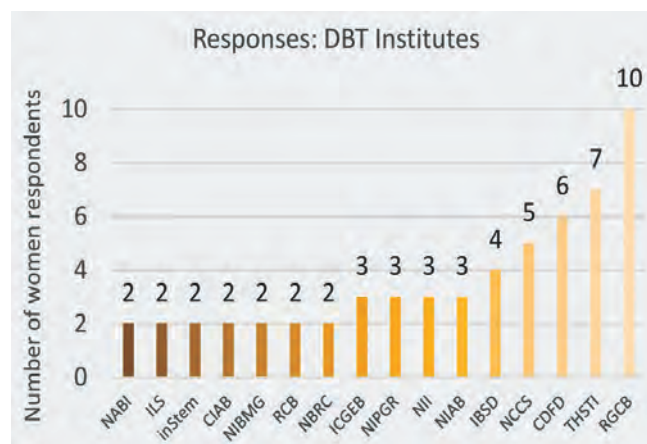


Figure 13: Number of women respondents in DBT Institutes

The DSIR plays a pivotal role in promoting industrial research and development in India. While the survey for CSIR was not included in this study (as it was covered during the previous study analysis), data from other DSIR-affiliated institutes shed light on the gender landscape within these institutions. Table 12 provides a detailed breakdown of the number of women actively engaged in research activities within DSIR institutes, along with the count of women respondents from each institute.

Table 12: Women respondents in DSIR

DSIR	Sent to	No. of respondents	response rate (%)
NRDC	8	3	37.5
CEL	1	0	
CSIR* (on July 2020)	1077	248	23

Survey Response from Heads of Divisions and Institutes

The data from the survey (Questionnaire 2) conducted tries to identify obstacles hindering women's advancement and formulate policy recommendations

for cultivating a more supportive and inclusive workplace environment.

Table 13: Representation of respondents in Questionnaire 2

Org	Sent to	% response	% of Total
DST	25	20	56
DBT	27	14.8	44
Total	52	17.3	100

Profile of respondents: The analysis of survey data has provided valuable insights into the experiences and perspectives of women working in STEM fields within government organisations. By systematically examining the responses gathered from individual women in STEM roles (Questionnaire 1) and heads of ministries and scientific organisations (Questionnaire 2), common themes, challenges, and opportunities have been identified. This information is essential for understanding the current status of gender equality within these institutions and identifying the gaps and development of targeted policies and initiatives. Through the data analysis, patterns, and trends have been identified across different departments and levels of leadership. By comparing responses between departments such as DBT, DST, and DSIR, it is discerned any variations in experiences or levels of institutional support. Similarly, analysing responses from individual women and heads of organisations provide a comprehensive understanding of both grassroots perspectives and top-down approaches to promoting gender equality in STEM.

Overall, data analysis plays a vital role in transforming raw survey data into actionable insights and recommendations. By systematically examining and interpreting the data, valuable information is uncovered which can drive positive change and contribute to the advancement of gender equality in STEM fields within government organisations.

Individual respondents: The description of the respondents for the questionnaire to individual women scientists has been categorized based on their designation, age, highest degree obtained, and the nature of duties.

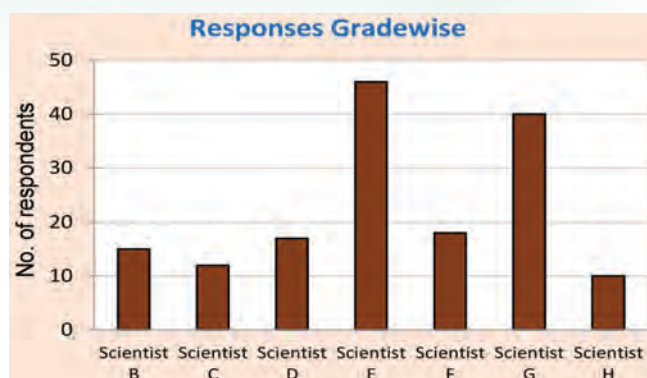


Figure 14: Distribution of respondents by designation

Designation: It was observed that the respondents' designations were based on the nature of duties, i.e. Teaching, Research, or Management of science. Hence to arrive at a homogenous level (for uniformity in analysing some data), they were categorised based on the various scientific grading as per the pay levels (Figure 14).

Highest Degree: The analysis of educational qualifications from the Questionnaire administered to individual women working at DST, DBT, and DSIR, underscores a prevailing trend towards advanced academic credentials in STEM fields. Notably, 62.7% of respondents hold post-doctoral qualifications, indicative of a strong emphasis on specialised research expertise within the cohort. Additionally, 31% possess doctoral degrees, reflecting a significant proportion of individuals with advanced research training and scholarly achievement. This distribution highlights the rigorous academic standards and elevated educational attainment characterising the women STEM workforce (Figure 15).

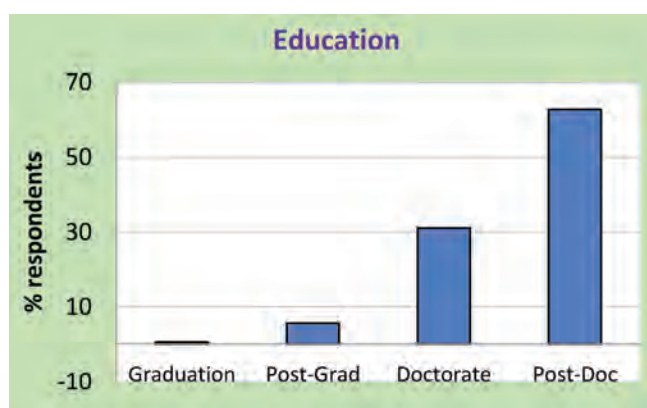


Figure 15: Distribution of respondents by education

Age: The age distribution among respondents provides insights into the demographic makeup of individual respondents in STEM roles. Notably, the majority of respondents lie within the age range of 35 to 50 years, comprising 58% of the total sample (Figure 16). This suggests a significant presence of mid-career professionals within the STEM field. Moreover, individuals above 50 years old represent a substantial portion, constituting 37% of respondents. Conversely, respondents below 35 years old make up only 5% of the sample, indicating a relatively smaller representation of younger professionals in STEM roles. Overall, this breakdown offers valuable insights into the age diversity within the STEM workforce, reflecting varying stages of career progression and experience levels.

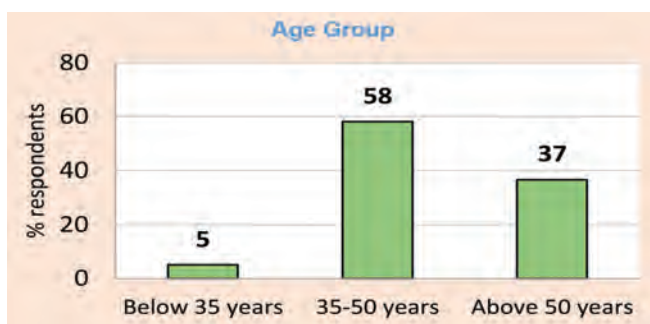


Figure 16: Age-wise distribution of respondents

Table 14: Age distribution of respondents at various scientific levels

Grade	Age Bracket		
	Below 35	35-50	Above 50
Scientist B	5	10	0
Scientist C	0	12	0
Scientist D	0	14	3
Scientist E	3	34	9
Scientist F	0	8	10
Scientist G	0	14	26
Scientist H	0	0	10

Table 14 illustrates the age distribution of respondents across different Scientist Grades, categorised into age brackets: Below 35, 35-50, and Above 50. Notably, Scientist E has a diverse distribution, with 3 individuals below 35, 34 aged between 35-50, and 9 above 50. Scientist F shows a concentrated

distribution with 8 individuals aged 35-50 and 10 above 50. Scientist G exhibits a similar trend with 14 individuals in the 35-50 age bracket and 26 above 50. Scientist D has a considerable number in the 35-50 age range, while Scientist B has a mix of respondents below 35 and between 35-50. Scientist C have more respondents in the 35-50 age bracket, demonstrating the varied demographics of women in STEM across different career stages.

Duties: Respondents were asked about the nature of duties they were required to perform. Several respondents were multitasking and opted for more than one task while responding. The analysis thus reveals a diverse spectrum of roles within STEM fields. Notably, 35% are engaged in both research and teaching, indicating a blend of academic inquiry and educational involvement. Additionally, 28% undertake a combination of research, science management, and teaching responsibilities, showcasing multifaceted roles encompassing leadership, research oversight, and education. Moreover, 27% primarily focus on research activities, reflecting the prevalence of scholarly inquiry within the cohort. Smaller percentages are involved in research alongside science management duties (7%) or solely science management (3%). This distribution underscores the varied responsibilities shouldered by women in STEM, spanning research, teaching, management, and their intersections.

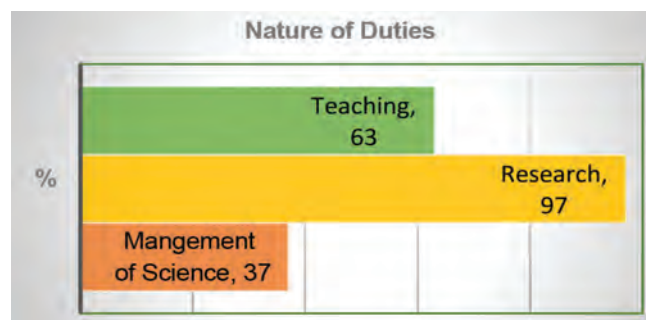


Figure 17: Distribution by nature of duties

S&T Productivity

Research productivity is a prized possession of a researcher, especially in S&T. Several respondents highlighted their achievements in terms of publications, patents to their credits, and awards they received. Other achievements are also featured in the responses. However, it may be noted that not all respondents

specified the numbers in these achievements. Accordingly, only those respondents who gave detailed responses were considered while analysing the publications, patents, and awards data.

Table 15: Scientists' Achievements

Designation	Ave. Publications/ respondent	Ave. Patents/ respondent	Ave. Awards/ respondent
Scientist B	23.6	2	4.3
Scientist C	18.3	3	1.7
Scientist D	36.5	1	3.8
Scientist E	43.4	3.4	4.8
Scientist F	42.5	7.1	5.8
Scientist G	74.7	10.8	4.4
Scientist H	72.5	8	3.7

The data analysis in Table 15 reveals that as scientists progress to higher pay levels, there is a corresponding increase in their notable achievements, affirming the correlation between career advancement and impactful scientific contributions. Scientist E and Scientist F have an average of about 43 publications. This grade also demonstrates a significant contribution to patents and awards. Scientist G stands out prominently with the highest total publications, averaging about 75, and leading in both patents and awards.

Other Significant Achievements of Women Respondents

1. Fellowships and Awards:

- Ramalingaswami Re-entry Fellowship (2013-2014)
- Vigyan Ratna Award by Government of Haryana
- Fulbright-Nehru Fellowship
- Ramanujan Fellowship
- Fulbright Fellowship
- Ben Barres Spotlight Award
- Walter Kohn Award by ICTP, Trieste
- Annual Medal of IAQMS
- CRSI Bronze Medal
- POWER Fellowship by SERB
- Biomedical Engineering Society Innovation and Career Development Award
- Young Scientist Award by the Govt. of Kerala

- INSA Young Scientist Award
- DST-INSPIRE Faculty Award
- HGK-IYBA Award
- Early Career Scientist Award by IUGG
- Best Presentation Awards

2. Research and Academic Achievements:

- Principal Investigator for India's first robotic telescope project
- Led the establishment of a cutting-edge optics facility at Indian Institute of Astrophysics for the India-TMT project
- Research focuses on investigating DNA integrity mechanisms and molecular functions of chromatin regulators
- Pioneer in quantitative tree-ring reconstructions globally
- Active member of the International Astronomical Union (IAU)
- Regular publications in esteemed journals
- Invited/keynote speaker at various conferences and events
- Publication record in prestigious scientific journals
- Guided PhD students to receive awards for their presentations
- Supervised and guided research scholars
- Developed vaccines and conducted research on bamboo and medicinal plants
- Acknowledged for pioneering research on helium abundance in giants

3. Professional Memberships and Editorial Roles:

- Co-opted Council Member, Human Genome Organization (HUGO)
- Review Editor for Frontiers in Cancer Genetics
- Member of the Society, Biomedical Genomics Center
- Member of the Technical Expert Committee on Genomic Technologies, DBT, India
- Member of the Governing Board of the International Association of Breast Cancer Research (IABCR)
- Member of STAG Knowledge Generation and Discovery Research, New tools and technologies
- Invited to serve on the editorial board of Europhysics Letters

8. Member of the American Chemical Society and Royal Society of Chemistry
9. Editorial Board Memberships in major international physical chemistry journals
10. Acknowledged as Editorial Board Member for ACS Energy Letters

4. Technology Transfer and Patents:

- a. Successfully transfer of several technologies to industries
- b. Holder of over 5 patents (one of the respondent)

5. International Collaboration and Recognition:

- a. Recognized as Women in Nanoscience by the Royal Society of Chemistry
- b. Enlisted in books 'Lilawati's Daughters' and 'Vigyan Vidushi'
- c. Acknowledged as a wetland expert by Chhattisgarh State Wetland Authority
- d. Acknowledged with TWAS and the Indian Academy of Sciences fellowships
- e. Acknowledged with NASI-SCOPUS Young Scientist Award
- f. Acknowledged with TWOWS Award for Young Scientists in the Asia-Pacific region

6. Miscellaneous Achievements:

- a. Recognitions from the Royal Society of Chemistry (RSC)
- b. Citations: 1800+
- c. Led 4 Papers in High Impact Factor Journals
- d. JSPS Postdoctoral fellow, Fellow of Telangana Academy of Sciences
- e. Associate Editor of Royal Society Open Science
- f. Authored 6 book chapters
- g. Academic mentorship: Guided 6 students to earn their PhD
- h. Postdoctoral mentorship: Mentored 4 post-doctoral researchers
- i. Received CSIR Fellowships: CSIR-SRF and RA (Research Associate) awards
- j. Member of various professional societies and editorial boards
- k. Recognized with numerous awards for contributions to science and technology

- l. Invited to serve on various committees and task forces
- m. Supervised and guided research scholars
- n. Contributed to the development and commercialization of products and technologies
- o. Elected as Vice President of INQUA CMP Commission
- p. Received the Parvez Guzdar Young Scientist Award
- q. Acknowledged for extensive international collaboration and visits
- r. Developed vaccines and conducted research on bamboo and medicinal plants
- s. Received Gold Medal for Scientific Excellence

Gender Sensitization

One of the important objectives of this study was to assess the level of gender sensitivity existing in the work environment. This was accomplished through the experience of women employees in discharging their professional roles as Chairpersons or members of various committees, working with male colleagues, the incidence of sexual harassment at the workplace, mentorship, etc. Information regarding the working of statutory committees against sexual harassment in the institutions under study was collected from the Heads of the organisations. Inputs were also obtained from women respondents directly at an individual level.

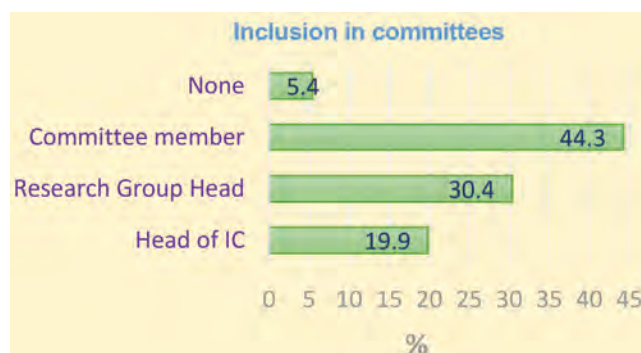


Figure 18: Representation in committees

Representation in various institutional committees:

As seen in Figure 18, many women scientists have headed various committees, with 30.4% as Research Group Heads, 19.9% as Heads of Internal Committees (IC), and 44.3% as Committee Representatives/members. Only a small percentage (5.4%) reported no such roles.

Sexual harassment at the workplace: The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013, has widened the definition of the workplace and covered even the unorganized sector, including domestic workers in its purview. Popularly known as the POSH Act, it provides protection to all workers in the public and private sectors including health, sports, education, or government institutions, and any place visited by the employee during her employment, including transportation.



Figure 19: Sexual Harassment in the workplace

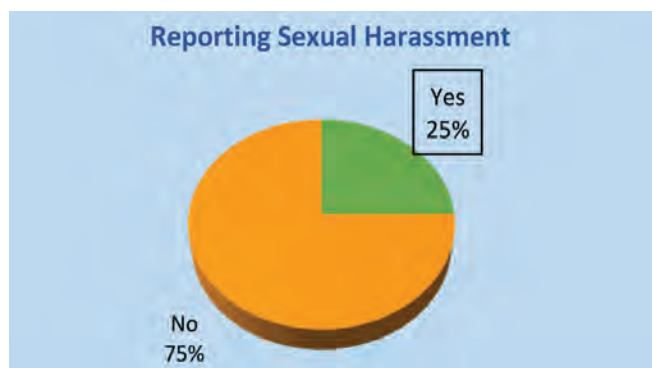


Figure 20: Reporting sexual harassment

Among the women respondents, about 9% reported experiencing sexual harassment in the workplace (Figure 19). This highlights the prevalence of sexual harassment as an issue in the workplace, though with a lower incidence rate among the surveyed women.

Of those who reported experiencing sexual harassment at work, only 25% have indicated reporting the issue to a higher authority (Figure 20).

This suggests that while some incidents are reported, a significant portion of cases may go unreported, highlighting potential challenges in addressing and resolving issues of sexual harassment in the workplace.

Thus awareness is required to be spread on the matter among all the employees. Hence the Heads of the organisations/ministries through the questionnaire were asked about the awareness efforts they have made. The responses from the Heads reveal that 88% of organisations or divisions have made efforts to create awareness of the POSH Act. They have created awareness, as reported by them, through:

- Awareness, posters, seminars, Posh Act-based competitions, HeForShe discussions
- The Internal Complaints Committee conducts programs for gender sensitization for new people.
- Talks by eminent people on these issues.
- Providing course content for all students.
- All the employees are mandatorily requested to attend an online workshop on iGOT.

Quality of Work Life (QWL) Various studies have pointed to the challenges women have to face due to the roles and responsibilities at work and family which are often conflicting. Familial obligations such as child-care, home-making, care-work for the old and sick, single parenting, etc., have been found to have a significant impact on the career graph of women, irrespective of their professional status.

During the survey, information was sought from women scientists on the quality of work life such as skill utilization, job satisfaction, promotions, funding opportunities, and reward systems, and discussed in the following section. Problems encountered by women respondents while travelling for work in other cities, or the pressure to quit work due to reasons like marriage have also been presented.

Skill utilization: Most of the women respondents felt that their skills had been utilized productively in their jobs (Figure 21).

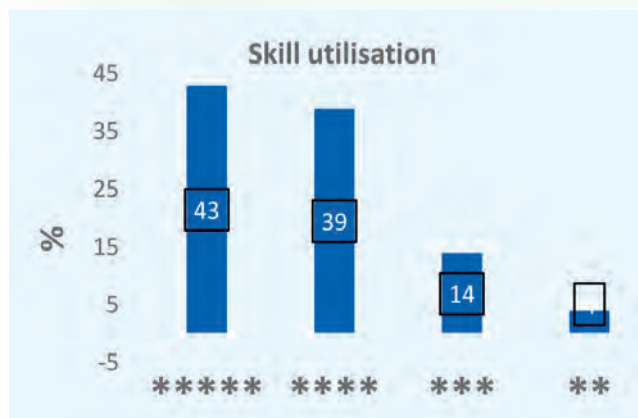


Figure 21: Opinion on skill utilisation

The majority (43%) rated their profession with the highest rating of five stars, indicating a high level of alignment between their skills and job requirements. Additionally, 39% rated it with four stars, signifying a strong perception of productive skill utilisation. Overall, the majority of respondents indicated that their profession allows them to effectively utilise their skills and abilities.



Figure 22: Opinion on workplace gender neutrality

Gender neutrality and Job satisfaction:

Respondents' opinion on the gender equality status in their organisations reveals a fair amount of progress toward promoting inclusivity (Figure 22). The analysis reveals a majority (58%) view their institutions positively. However, one in four respondents rate their institutions on gender inclusivity based on their experiences as average (3) and another 17% feel that concerted efforts to address disparities and promote inclusivity are required.



Figure 23: Job satisfaction

Given the gendered nature of the workplace and a gender imbalance prevailing in the organisations as observed above, the respondents were asked to rate the level of job satisfaction in their current job. Overall, the majority of respondents reported positive sentiments towards their job or assignment, with 32.9% being highly satisfied and another 52.5% being fairly satisfied. Meanwhile, 11.4% reported a feeling of neutrality (Figure 23).

Perception of respondents: Women S&T staff were required to state their opinion related to their jobs based on many indicators, like being denied promotions, missing grants due to lower networking, working harder than male colleagues, or even not being rewarded enough.

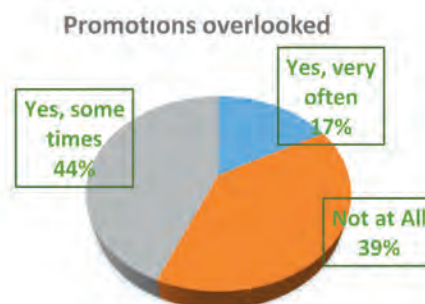


Figure 24: Opinion on promotions overlooked despite eligibility

A notable 44% of respondents reported sometimes being overlooked for promotion despite eligibility, while 39% did not feel so (Figure 24).

A significant portion of 39% of women respondents reported sometimes not being properly rewarded compared to their male colleagues, with 23% experiencing this very often. However, 38% stated they hadn't encountered such disparities at all. (Figure 25)



Figure 25: Perception on the reward systems in comparison to male colleagues

When enquired about having to work harder to prove parity with male colleagues, respondents provided varied responses. A notable portion (40%) reported sometimes having to exert additional effort, while 32% indicated experiencing this very often. Conversely, 28% stated they did not feel the need to work harder to prove their parity (Figure 26).



Figure 26: Working harder compared to male colleagues

Networking is important for enhancing the output, especially in the field of research. In comparison to male researchers, female researchers may not be good at networking due to various reasons. A significant number of women respondents (41%) reported sometimes missing out on grants due to less networking or awareness compared to their male colleagues, and another 21% of respondents indicated experiencing this very often (Figure 27). Conversely, 39% stated they had not missed such opportunities at all. This underscores the prevalence of perceived networking and awareness disparities among women in STEM, impacting their access to funding opportunities.

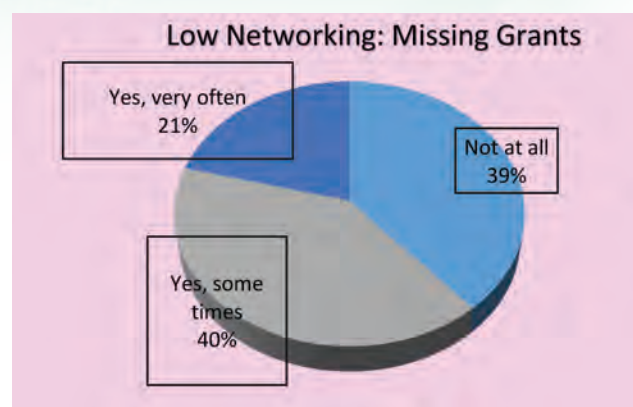


Figure 27: Experience on networking

Change of job by compulsion: Based on the inputs of respondents, the survey revealed that about three-fourths of the women had no compulsion to quit their previous jobs for any reason. (Figure 28)

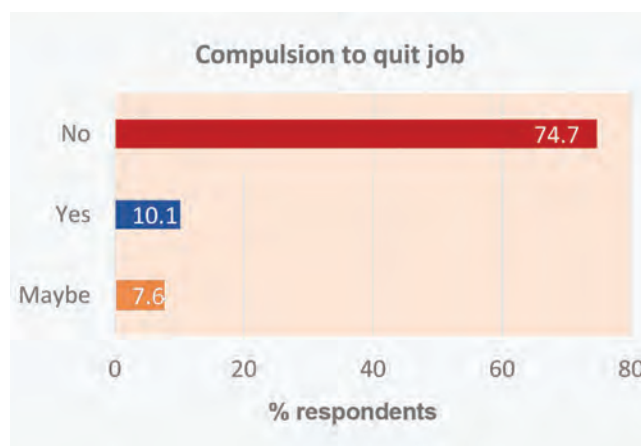


Figure 28: Obligated to quit job

Support for taking care of children: In the tussle for working mothers leaving children in safe custody, it was felt necessary to find the various options available to them for taking care of their children. Information was collected to find out what support for child care was available to the women respondents in the absence of a daycare facility at the workplace. Figure 29 shows diverse sources of support for daycare, with the most common being from their husbands (29%), followed by house-help (28%), parents (25%), and in-laws (18%). This highlights the multifaceted support network utilised by women in managing childcare responsibilities while pursuing careers their careers.

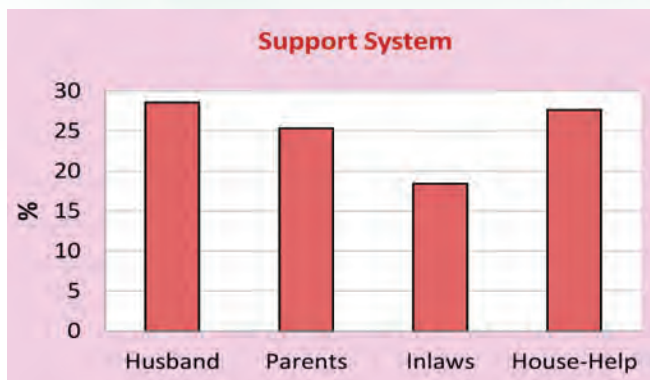


Figure 29: Support system for looking after children

Responsibility towards family: Women sometimes have added responsibilities of taking care of old parents, in-laws, or even siblings. A significant majority of respondents (81.65%), more than four-fifths, reported being required to take care of old parents, in-laws, or siblings, highlighting the caregiving responsibilities that many women in this field have to undertake showing the diverse familial obligations faced by women working. Conversely, a smaller proportion (18.35%) stated they were not required to fulfill such caregiving duties. Thus a large proportion of women respondents had to oscillate between family and workplace, with contradictory roles.

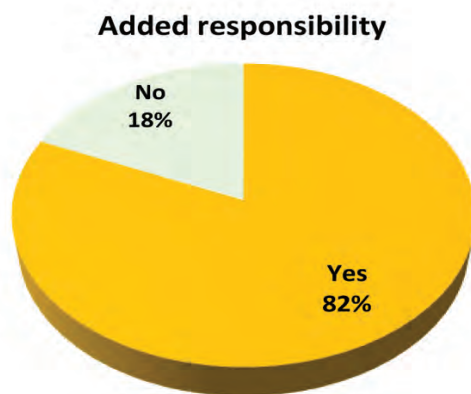


Figure 30: Responsibility of family

Work-related stress: With the incidence of rise in stress levels for all ages, all cultures, and all domains, it was felt that it was important to study the stress that women scientists could have due to their workload and familial pressures. Also, regarding the current culture (post-COVID) of work-from-home (WFH), respondents were asked about their requirement of working from home and if they experienced stress at work.

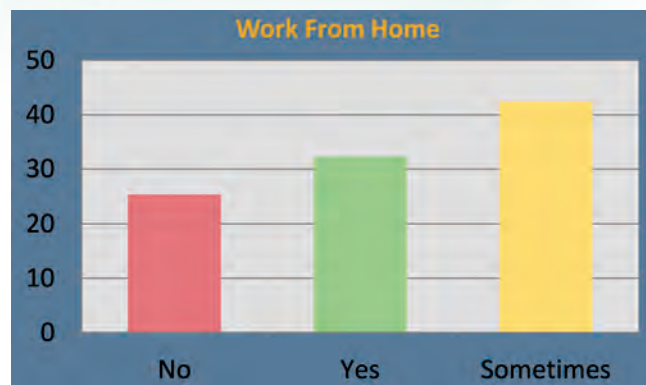


Figure 31: Working from home

As seen in figure 31, about one in three women respondents are required to work from home, while only one in four did not have to work from home at all. The others indicated WFH 'sometimes'. This highlights the flexibility and adaptability of work arrangements among women scientists, with a significant portion engaging in WFH practices either regularly or intermittently.

The results (as seen in Figure 32) reveal that the majority/ more than three-fourths, (78%), indicated experiencing stress 'Sometimes' at work. Meanwhile, only 16% of respondents experienced no stress at all. These findings highlight that stress is prevalent among women scientists.

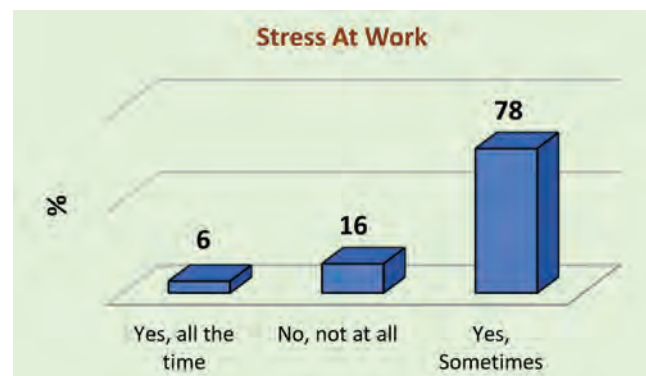


Figure 32: Stress at work

It is important to understand that with the growing stress, there should be various programmes for managing and reducing stress. Figure 33 shows that the majority of respondents had no access to stress management programmes while only 24% of respondents reported having such access. Based on the findings it could be mentioned that there is a potential gap in support services for stress



Figure 33: Access to stress reducing programmes

management. However, all the employees have access to such programme through the iGOT portal launched by the government of India. The study thus would like to highlight the need for awareness among all.

Experience during official work in other cities:

The various activities involved in a career of scientists are travelling to other places, attending conferences, training programmes, collection of data, etc. Hence, the experience of women respondents while traveling to other cities for official work was gathered through the survey. This was gauged from their feedback in getting travel grants, arranging for accommodation, and commuting while on deputation. Their experiences were predominantly positive with 39% having a "very good" experience followed by 36% as "good," and 20% as "satisfactory". Overall, the data indicates a favourable outlook regarding accommodation arrangements for official purposes among the respondents (Fig.34).

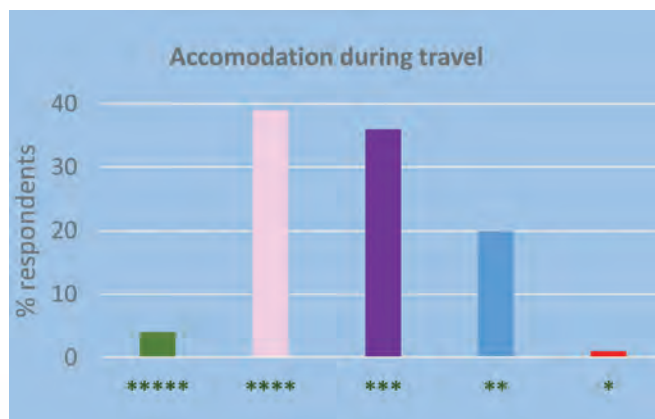


Figure 34: Accommodation during travel

Securing travel grants for official purposes was also found to be positive as respondents expressed varying levels of satisfaction (see Figure 35). These diverse responses indicate differing perceptions of the ease and effectiveness of obtaining travel grants for official purposes among the surveyed individuals.



Figure 35: Travel grant procurement experience

Looking at the safety aspects especially for women, while commuting in other cities for official purposes, more than four-fifths of the respondents had a "Good" or even better experience (see Figure 36) while about 18% found their experience to be "Satisfactory".

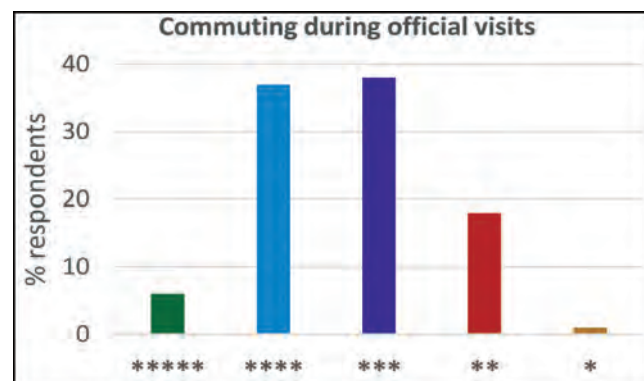


Figure 36: Experience while commuting in other places

Facilities for working mothers: As mentioned in this report's introductory discussion, gender-friendly workplace policies include various gender-specific facilities, promoting work-life balance for women employees. With this backdrop, information was sought from women on facilities at the workplace that are of concern to working mothers. Figures 37 and 38 show that only about 14% of the respondents had a feeding facility at their workplace and about a third of the women had access to day care facilities respectively.

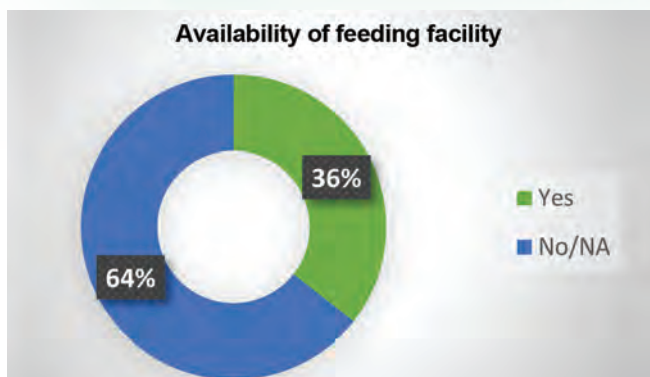


Figure 37: Availability of feeding facility at workplace

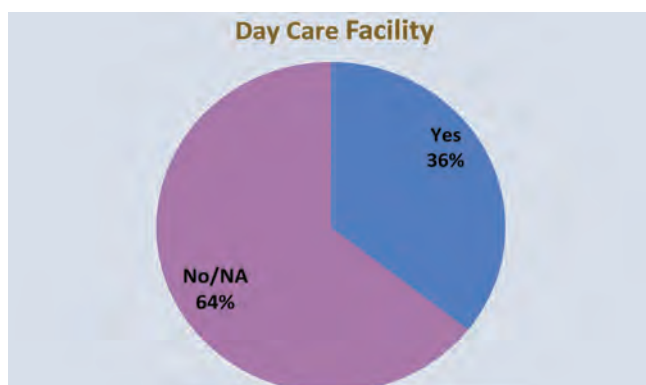


Figure 38: Access to day care facility in the organisation

This indicates that a significant portion of women working in STEM may face challenges in accessing childcare support within their organisations. Further, it was found that of those having daycare facilities, less than/ about 60% of them could use this facility.

Further, the study tried to probe into the better scientific organisations within the two ministries, viz., DST and DBT in providing these facilities. Table 16 shows that the availability of feeding rooms and daycare facilities to women respondents of both these were almost the same.

Table 16: Facilities available to % women respondents in DST and DBT institutes

Facilities	DST institutes	DBT institutes
Day Care	35	38
Feeding	15	13

The availability of Childcare Leave (CCL) in India is only for women, unlike a country like Norway where both parents can avail it for a specific duration. About 42% of the respondents availed the facility as seen in figure 39.

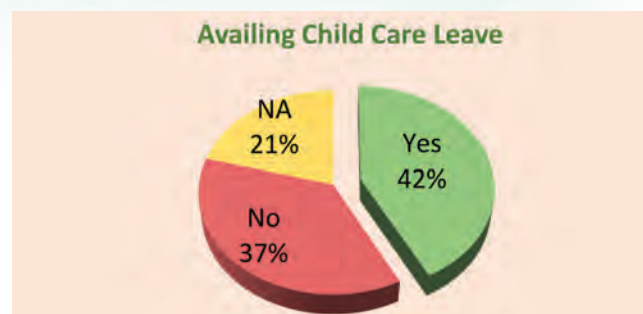


Figure 39: Availing CCL

However, the respondents' experiences with getting CCL sanctioned were always good for 78% of them. Meanwhile, 18% found it "Difficult Sometimes," and a smaller portion, 3%, described it as "Extremely Bad All the Time" as seen in Figure 40.

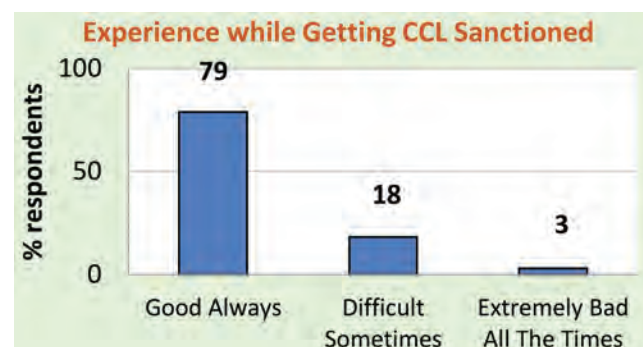


Figure 40: Experience while availing of CCL

To find the need-based availing of CCL, the overwhelming majority of respondents (92%) indicated they have always taken CCL genuinely. A small percentage reported that they could have avoided the leave. This suggests a strong sense of authenticity in the utilisation of CCL among the surveyed women in STEM fields.



Figure 41: Judicious CCL application (opinion of heads)

Further, when the Heads/Directors were asked about their opinion on employees taking undue advantage of their gender-specific privileges, almost two-thirds opined that they did not come across anything of this sort. However, one-third felt, that maybe a few could have taken advantage of it, which they felt could have hampered the output of the organisation as a whole. One response specified that “Though gender-related issues are less and many of the people overcome it by finding ways to perform, but people try to take the whole of the Child Care Leave as an entitlement rather than weighing on the need to complete the essential work even if there is a support structure available at home. This puts a lot of pressure on the system but we are helpless as they are permitted to take these leave.”

The opinion of the Heads on the CCL facility being used by employees judiciously, Figure 41 has varied responses, and Figure 42 shows how they sanction it.



Figure 42: Sanctioning of CCL by Heads

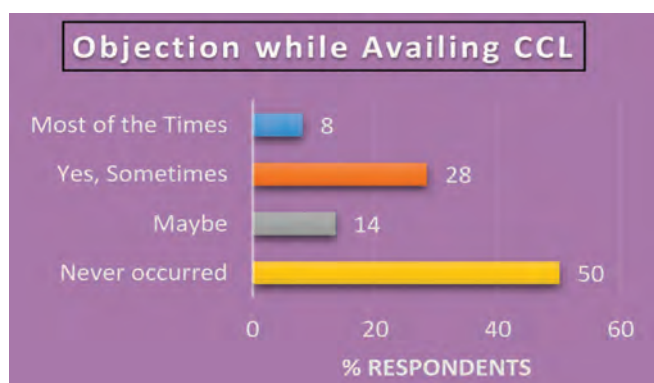


Figure 43: Availing CCL: Perception of women

Further, the women respondents, when asked about their male colleagues' reactions to them availing CCL, the majority, 50%, indicated that their male colleagues "Never" had objections (Figure 43). However, 28%

reported experiencing objections "Sometimes," while 14% thought it could be possible. A smaller group, comprising 8%, felt that their male colleagues objected "Most of the Times" to them availing the leave. These reveal diverse attitudes of male colleagues towards women availing CCL.

Facilitating Factors

Since gender disparity has prevailed worldwide, especially in S&T, an effort was made to find the factors that encourage or facilitate young women to take up studies or careers in S&T. Further, it is interesting to know what motivates these women to pursue a doctorate or even post-doctorate or a career.

Encouragement: The motivation for choosing science during their education and further choosing it for their careers was felt necessary to be studied to understand the primary source of inspiration for these women scientists. Encouragement to pursue science stems primarily from personal motivation, with 51% of respondents citing self-motivation as the driving force (Figure 44). However, family support also plays a significant role, with 26% of respondents acknowledging the encouragement received from their families. Teachers contribute to inspiring students as well, with 20% of respondents crediting their teachers for motivating them. Additionally, a smaller percentage of respondents attribute their motivation to other sources (2%) or peer pressure (1%). This highlights the diverse influences that contribute to fostering interest and enthusiasm for S&T disciplines among individuals.

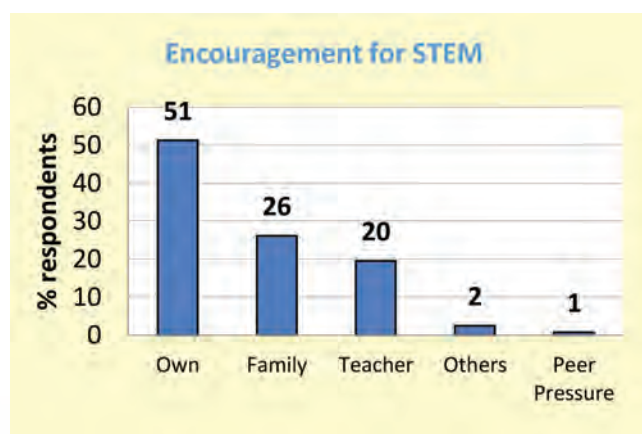


Figure 44: Encouragement to pursue STEM

Pursuing doctorate: Information was sought on whether support was received from the family while the decision was taken to pursue PhD. The results as depicted in Figure 45 show that most women respondents (81.6%) reported receiving support from their families during their Ph.D. studies, emphasising the significant role of familial support in facilitating women's academic pursuits in STEM. A minority (5.1%) indicated a lack of family support, while 13.3% did not respond.

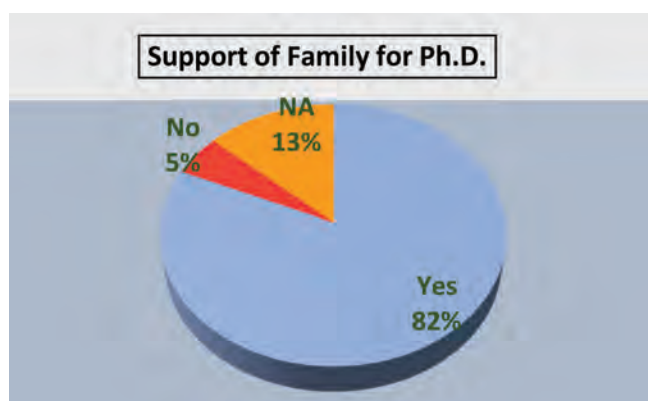


Figure 45: Support received from family for pursuing doctorate.

Reason for taking up the current job: Several respondents had more than one reason for taking up the current assignment/job. 'Passion' for the assignment/job emerged as the most prominent reason showcasing their intrinsic motivation and dedication as evident from Figure 46. Few felt it was the convenience or compelled to take up their roles.

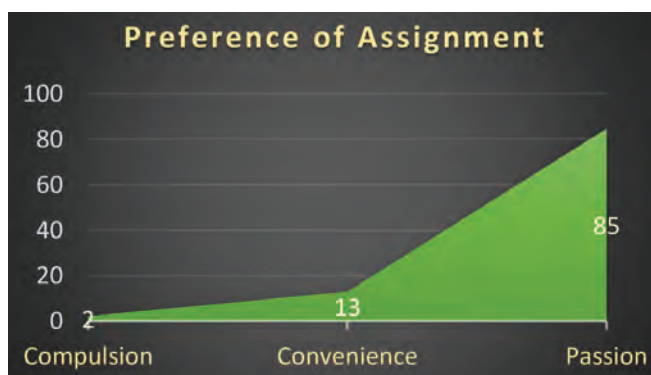


Figure 46: Reasons for taking up present job or assignment

Awareness and Career Recommendation:

It is very important to be aware of various government schemes aimed at promoting women in STEM, 73% of respondents reported being aware of such initiatives, while 27% indicated they were not (Figure 47). This suggests a substantial level of awareness among women in STEM regarding government efforts to support and encourage their participation in these fields.

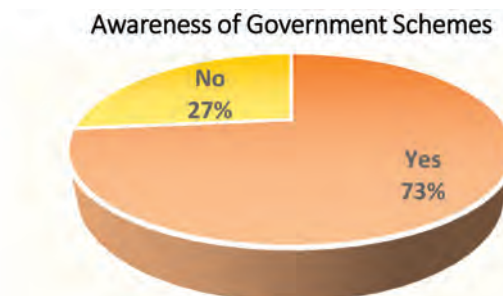


Figure 47: Awareness regarding Government schemes for promoting women in STEM

Opinion of women was sought on whether they had availed or recommended government schemes aimed at promoting women in STEM to themselves or others, 53.3% reported actively engaging with government schemes aimed at promoting women in STEM fields (figure 48), indicating a significant level of participation and utilisation of these initiatives. On the other hand, 46.7% indicated no engagement with such schemes.

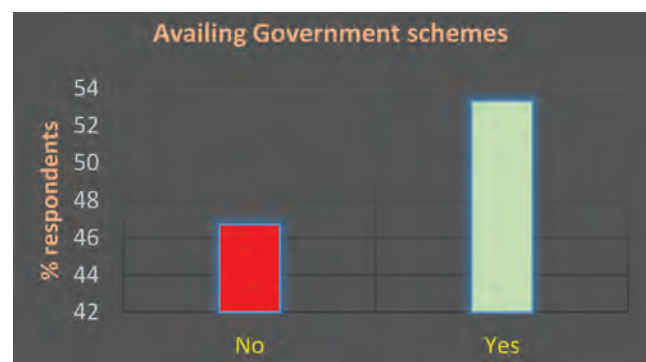


Figure 48: Recommendation on government schemes

86.7% of respondents highly recommend other women to opt for a career in STEM (Figure 49), while 11.4% expressed a slight recommendation. These responses indicate a strong endorsement for women

pursuing careers in STEM fields, underscoring the perceived value and opportunities within the industry.

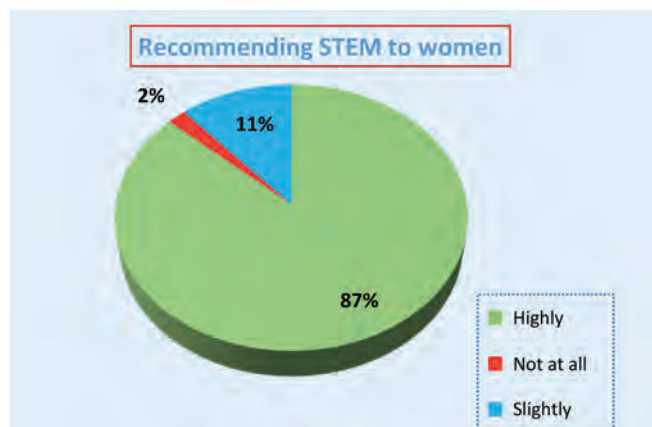


Figure 49: Suggesting women to undertake a career in S&T

Comparative analysis of CSIR study with the current study

A comparative analysis of the findings from the previous CSIR-based study and the present study are as follows-

- Both the studies substantiate a dearth of female leadership at ministerial and institutional levels within all the scientific establishments,
- Women's representation in the S&T cadre is the lowest in CSIR. Sexual harassment of women has been observed within the surveyed group. Of the women who face sexual harassment, only 25% of cases were reported in both the studies.
- Women are 'Passionate' about taking STEM careers & remain the predominant driving force. Self-motivation is the prime factor for taking up STEM in both studies.
- In the CSIR study, more women were required to change their place of work.
- Higher patent numbers to women respondents was observed in the present study.
- More women in the current study reported of not being promoted despite eligibility than those of women in CSIR.
- There is a persistent challenge for women on networking which affects them in accessing funding opportunities.
- A general sentiment among women persists that they have to work harder than men to prove their capabilities.
- More women in DST and DBT institutes have shown their concern about disparities in recognition and rewards within their professional environments than CSIR women.
- Women in all S&T establishments feel that their skills are being used productively.
- About four-fifths of the women in S&T have the added responsibility of taking care of old parents, in-laws, or siblings.
- Both studies show that women have a lot of stress and need to have access to stress management programmes.
- Not more than a fifth of the mothers have an essential facility of feeding room at their workplace.
- More women scientists have a daycare facility at DST, DBT than in CSIR.
- 'Not so easy' experience in getting travel grants for official purposes was observed for women scientists in DST, DBT affiliated institutes.
- Commuting in other cities has been easy and safe for most of the women scientists while on official work.
- More women scientists during the present study found arranging accommodation in other cities easier during official visits.
- Atleast three-fourths of the women scientists 'highly recommend' other women to take up STEM as a career.
- Both studies show that most women are 'fairly' or 'highly' satisfied with their jobs.

6. Discussion and Conclusion

The study has been a rigorous one trying to dive deeper into the many efforts of the government and other agencies for promoting women in S&T for bringing in gender parity.

The assessment of the select scientific organization of India through the various initiatives and the primary survey conducted especially during this study has helped in evaluating these organisations and to some extent recommending policies, that if implemented, can improve the gender ratio in S&T, which in turn, will accelerate the progress of the nation. The gender representation in DST and DBT is above the national average, which is a good indication of bringing gender parity to S&T in the country. However, it is important to look into the other S&T organisations of the country and the private R&D institutions where this ratio could be much lower resulting in the national average of women in S&T below 20%.

It is important to check the attrition and encourage girls to enhance from the enrolment level to opt for a scientific career. It is vital to disseminate awareness about STEM to women, encouraging them to come into and continue in STEM. Various studies have highlighted several recommendations for addressing the leaky pipeline in STEM. These primarily include leadership roles, mentorships, role models and female peers. Others are mostly those that should be addressed at the educational levels like the engagement of parents and parents' influence for encouragement to take up STEM including those activities that will cultivate an interest in STEM like visits to science museums, parks, camps, etc. The awareness of parents and teachers on various schemes and financial support provided by schools, government organisations, and the private sector will prove to be very helpful in combating the leaky pipeline effect and narrowing the gender gap in STEM.

Meaningful intervention at the level of policy change is obligatory to bring gender parity. It is important to overcome the internal and external factors to address the issue of continuous loss of female workforce from enrolment level (49%) to graduation level (43%) to workforce level (less than 20%).

Encouragement to female students to choose STEM and continue their education through graduation, post-

graduation, and further to pursue a doctorate is much needed through various efforts, some already being implemented by various government and private bodies and have been highlighted in this study. The % of females receiving INSPIRE Fellowships is about two-thirds over the past few years, indicating a positive step toward achieving gender parity in the coming years. The INSPIRE fellowships, etc. need to be continued with emphasis on scholarships to girls, increasing the number of fellowships and faculty fellowships with fair chance to women candidates. Girl students in engineering have been low with a very incremental growth. Incentives, awareness, and encouragement are required to improve this number.

Despite showing perseverance in completing the highest degree in STEM, only a few women manage to find a suitable professional employment opportunity. Things worsen at this stage in a woman's life because of child-bearing and child-rearing responsibilities. Thus the major problem faced by the Indian science establishment lies not in educating and training women but in recruiting and retaining them in jobs. So, providing multiple measures to get past these concerns and creating systems to keep track of their implementation appears to be a major concrete option.

Several studies have emphasized the need for constant efforts to encourage gender equity and the formation of an accommodating work setting for women in STEM. It is suggested that there can be an increase in awareness in tier 2 and tier 3 cities along with rural areas.

Monitoring and evaluating various roles of both men and women within the organisation will help narrow the Gender parity gap. Adequate strategies targeting capacity building among women to strengthen their role in STEM are urgently required. Organizations need to empower women in S&T through training, skilling, and providing an enabling environment. It is necessary to have further initiatives and programs at the government as well as the private level for attracting, encouraging and retaining women in STEM fields.

Policy interventions are pivotal in achieving gender parity, aiming to place more women in influential positions within the science and technology domain.

Women in leadership roles have been on the rise. It was observed that “there has been a lot of receptiveness and acceptance of women in leadership roles however, the sensitization about role and responsibilities at organization level should be provided to new entrants/scientists”. There should be ‘Age relaxation for women in leadership positions’ as suggest by some heads through the survey.

“The best thing would be for the States and Union Government to help in bringing together the institutions and organizations to create common facilities which can be effective; one example is provided day care facility near institutions.”

Gender representation in leadership positions might have seen a rising trend in the last few years but there is a long way to go. At the ministerial level, there have been very few women secretaries and few women directors at the institute level, which can be looked into. There is a fairly good representation of women in the ministries at S&T fields which is a positive inclusivity sign for India’s growth. The same can be emphasized for the women S&T workforce in several of the autonomous institutes of DST and DBT having above national average representation. Institutes in the Southern part of the country have the best women representation.

The gender representation in research roles as PIs and Co-PIs has shown that women are lesser than their representation in DST and DBT institutes. Although the funding is not restricted to these institutes, women scientists need encouragement at various levels to apply for funding and have their project ideas selected without bias. Issues faced by scientists and engineers in the current tight financial climate pose even more serious challenges for women, due to the drying up of funding sources and economic incentives.

Increased participation of women in science must include more women occupying critical roles in the science and technology community. More women should be encouraged and given responsibilities at every stage, including prominent positions such as key speakers at conferences, deputation assignments, editors of reputed journals, institutional committees, etc., especially in the S&T arena.

A fair number of Women scientists have been handling teaching and management of science apart from their research activities portraying their multi-tasking abilities. Their research activities involve, other than publications, fellowships of various bodies, Professional Memberships and Editorial Roles, Technology Transfer and Patenting, International Collaborations and various Recognitions, etc.

Comprehensive studies in India to examine organisational gender dynamics, including men’s roles in fostering equality, is imperative for progress Gupta’s (2019). Overcoming internal and external obstacles is key to combating the continuous decline of female representation from enrollment to graduation and, ultimately, the workforce, countering the detrimental leaky pipeline effect.

The quality of work-life is an important concern for working women for the best productivity. Their roles and responsibilities at work and family are often conflicting, having to oscillate between family and workplace, with contradictory roles. The study revealed a strong perception of productive skill utilization, the majority of them have had a ‘good & above average’ experience with gender neutrality experiences in their organisations showing that the S&T arena is moving towards gender inclusivity. However, there is still scope for improvement. Although, a positive sentiment towards their job or assignment, about 44% of respondents reported sometimes being overlooked for promotions despite eligibility, 39% were ‘sometimes not being properly rewarded’ compared to their male colleagues, about three-fourths reported sometimes/ very often having to exert additional effort to prove parity with male colleagues. More than three-fifths of the respondents felt that they had missed out on the grants due to lack of networking which raises a concern of the strategies that could be adopted to overcome this.

Several women face challenges for accessing childcare support within their organizations. Women’s role as mothers requires facilities that can help them manage work better, like daycare and feeding facilities. All these factors could lead to Stress which was found to be prevalent among women scientists with not many having access to stress management. Access to stress management programme highlights an area that may require attention and improvement; as the lack of stress management programs may be a potential gap in support services among women in STEM. Also, childcare leaves might make their jobs easy but the utilization has to be judicious as found from the 2nd questionnaire, i.e. heads of the organisations.

- *Creation of videos for selection committees for sensitization, such as questions that should not be asked to women.*
- *Information on Ms. or Mr. should not be mandatory.*
- *PoSH workshops should be made mandatory for all, in every organization, periodically.*
- *Conducting gender sensitization programmes for new entrants in the organisation.*

Workplaces need to be gender neutral where women can work without fear of harassment, especially of a sexual nature. The study has shown a prevalence of sexual harassment as an issue in the workplace, though with a lower incidence rate among the surveyed women. Also, of those who reported

experiencing sexual harassment at work, only 25% have indicated reporting the issue to a higher authority which was also found in the earlier studies of the authors. This is required to be addressed seriously and awareness be created.

The prevention of sexual harassment of women needs special attention and specific policies. Providing confidence and support to women is of utmost importance so that they can report any harassment they face, especially that which can be categorised as sexual. The iGOT modules like Stress Management and Sexual Harassment Training should be promoted to foster a supportive work environment.

Women have been mostly 'passionate' about their careers and taking up STEM assignments. Similarly, they highly recommend other women to take up S&T as a career choice. However, not many women are aware of the various facilities and schemes that the government provides to women scientists, and it is therefore felt that there have to be ways and means by which this awareness levels increase and more and more women avail of the schemes for the progression in their careers. Disseminating information about STEM to women and encouraging women to enter this field should be an important policy goal (Cheryan et. al., 2011; Shapiro and Williams, 2012). To conclude, institutions should be ranked and rewarded based on their performance in gender equity and policy to promote inclusivity. Its encouraging that for the empowerment of women special programs are being organised at various levels, Government as well as by the Private sector. One such example is the Tata group's initiatives to empower women in Tata Steel, "Tejaswini" a pioneering empowerment programme for office girls willing to operate heavy motor equipment." With these initiatives, we can expect enhanced empowerment of women in Science and Technology.

7. Recommendations

Some of the recommendations however from the present study are:

- Recalibration/inclusive policies are required.
- Increase in the budget for better outreach
- Outreach can be initiated through programmes like Maan ki baat, etc. for awareness.
- Not just the number but also the role of women should be enhanced!
- Academic age should be relaxed for women at entry levels to careers
- Exposure Visit to Nordic and other countries to understand gender equality.
- Recalibrating the system
- Initiation of an Equal Responsibility Program.
- Flexi time/work-from-home options for women,
- Creation of/Providing facilities for working mothers like feeding rooms and daycare near institutions.
- Collaboration for creating common facilities between States, Union governments, institutions, and organisations.
- Financial and spatial viability challenges for small organisations.
- Prevention and efficient punitive actions ensuring a safe environment for women at work.
- Exit interviews should be made mandatory for women leaving the organisations to know the circumstances in which they want to quit so that appropriate steps can be taken by the organisation.
- Increased awareness in Tier 2 & Tier 3 cities along with rural areas.
- Age relaxation of women in leadership roles.
- Focus on quality of work life with a proper work life balance.
- Stress Management & Sexual Harassment training should be mandated to promote a supportive work environment.
- Information dissemination on various government scheme for promoting STEM careers among women.
- Workshops should be organized on:
 - a. Roles and Responsibility at the Organisation level,
 - b. Work-life Balance,
 - c. Leadership Roles, etc.

Scope for further study: This study has covered three major ministries. The issues and policy concerns might vary for the medical and agricultural sciences. India's major economy is reliant on the agriculture sector even today. There are several institutes under the ICMR and ICAR spread across the country whose issues and concerns for women might be completely different and must be addressed. Hence it is worthwhile to extend the study for these sectors. It has been realized during the present study that all the information available on gender in STEM needs consolidation and popularization. Many women students and scientists are not aware of the schemes and the benefits available to them. It has been very specifically highlighted in the Anusandhan Act that "a central repository will be created to collect and analyze research data, informing policy decisions and advising the government". The data gathered in this study, thus, could provide a valuable resource for future research and policy initiatives to achieve gender parity in STEM fields.

References and Suggested Readings:

1. Aggarwal R., Wakdikar S., & Sharma P., “Women in STEM: A CSIR survey towards Gender Parity”, ISBN 978-81-7236-371-0 <https://niscpr.res.in/includes/images/eresources/women-in-STEM.pdf>
2. Aggarwal, R., Wakdikar S., & Sharma P. (2022b). Mainstreaming Gender at Workplace: CSIR-NIScPR evaluates Women in STEM. *Science Reporter*. 2022 March; 59(3): 54-5.
3. Aggarwal, R., Wakdikar S., & Sharma P. (2022c). *Women in STEM: A CSIR study for Gender equality*. CSIR-NIScPR. CSIR-NIScPR Policy Bulletin/April-2022/04.
4. Aguinis, H., Ji, Y. H., & Joo, H. (2018). Gender productivity gap among star performers in STEM and other scientific fields. *Journal of Applied Psychology*, 103(12), 1283-1306. doi:10.1037/apl0000331
5. AISHE report 2021–22, <https://aishe.gov.in/aishe/viewDocument.action>
6. Aiston, S. J., & Jung, J. (2015). Women academics and research productivity: An international comparison. *Gender and Education*, 27(3), 205-220. doi:10.1080/09540253.2015.1024617
7. Amirtham N. S., Kumar A. (2021). Gender parity in STEM higher education in India: a trend analysis. *International Journal of Science Education*, 43:12, 1950-1964, DOI: [10.1080/09500693.2021.1946867](https://doi.org/10.1080/09500693.2021.1946867)
8. Atwater, L. E., Tringale, A.M., Sturm, R. E., Taylor, S.N., & Braddy, P.W. (2019). Looking Ahead: How What We Know About Sexual Harassment Now Informs Us of the Future, *Organizational Dynamics*, 48 (4), 100677, ISSN 0090-2616.
9. Awards to Women in STEM https://www.ias.ac.in/Initiatives/Women_in_Science/Women_Achievers
10. Bal V., The many kinds of underprivileging: women’s lives matter, from root to STEM, *Confluence Science, Scientists and Society*, August 2020.
11. Bal V., Why women scientists in India need affirmative action, *Nature India*, 2008, <https://www.natureasia.com/en/nindia/article/10.1038/nindia.2008.322>
12. Ceci, S. J., Ginther, D. K., Kahn, S., & Williams, W. M. (2014). Women in academic science: A changing landscape. *Psychological Science in the Public Interest, Supplement*, 15(3), 75-141. doi:10.1177/1529100614541236
13. Chakravarty, R. (1986). Productivity of Indian Women Scientists. *Productivity* ; 27(3): 259-69 in Kumar eds. *Women and Science in India: A reader*, 2009
14. Cole J.R. (1987). ‘Women in Science’, in D.N. Jackson and J.P. Rushton (eds.), *Origins and Assessment*. Newbury Park, CA: Sage Publications, 359-75.
15. Desai, B. & Jameel S. (2017). Women Of Science, *The Indian Express*, 9 October 2017, <https://indianexpress.com/article/opinion/columns/scientific-research-in-india-women-scientists-women-of-science-4881037/>
16. Domínguez M. B., Rivo-López E. & Villar M.V. (2019). The glass ceiling’: Myth or Reality? An expatriation perspective. *Organizational Dynamics*, 48 (4), 100706, ISSN 0090-2616,
17. DST, Research and Development Statistics at a Glance 2019–20, Department of Science and Technology, India.
18. DST, Ministry of Science & Technology, Government of India. (2023). *Research & Development Statistics at a Glance* (p.9).
19. Fathima, F.N., Awor, P., Yen, Y.-C., Gnanaselvam, N.A., Zakham, F. (2020). Challenges and coping strategies faced by female scientists—A multicentric cross sectional study. *PLoS ONE*, 15 , art. no. e0238635
20. Ghiasi G, Larivière V, Sugimoto CR (2015) On the Compliance of Women Engineers with a Gendered Scientific System. *PLoS ONE* 10(12): e0145931. <https://doi.org/10.1371/journal.pone.0145931>

21. Gould P. (1997). 'Women and the Culture of University Physics in Late Nineteenth-Century Cambridge', *British Journal of History of Science*, 30 (105): 127-50.
22. Grau-Sarabia, M., Fuster-Morell, M. Gender approaches in the study of the digital economy: a systematic literature review (2021) *Humanities and Social Sciences Communications*, 8 (1), art. no. 201
23. Gupta N. (2015). Rethinking the relationship between gender and technology: a study of the Indian example *Work Employment and Society*, 29(4) , 661-672
24. Gupta N. (2016). Perceptions of the Work Environment: The Issue of Gender in Indian Scientific Research Institutes. *Indian Journal of Gender Studies*. 23(3), 437–466. <https://doi.org/10.1177/0971521516656079>
25. Gupta N. (2019) Analysing Gender gap in Science: Government of India initiatives, *Current Science*, Vol. 116, No. 11, June 2019,
26. Gupta N., (2020) Rationalising gender inequality at scientific research organizations: A reproduction of the Indian socio-cultural context, [Equality, Diversity and Inclusion](https://doi.org/10.1007/978-981-13-8444-4_10), ISSN: 2040-7149
27. Gupta, B. M., Kumar S., and Aggarwal, B. S., (1999) A Comparison of Productivity of Male and Female Scientists of CSIR, *Scientometrics*, Vol. 45, No. 2, 269-289
28. Hancock, K. J., Baum, M. A., & Breuning, M. (2013). Women and pre-tenure scholarly productivity in international studies: An investigation into the leaky career pipeline. *International Studies Perspectives*, 14(4), 507-527. doi:10.1111/insp.12002
29. Hasan S. A., Sharma M. K., Khilnani S, and Luthra R, Research Productivity Of Female Research Scholars And Their Migration Pattern In Pursuit Of Higher Education And Research, *Current Science*, Vol. 103, No. 6, September 2012, 611-12
30. Henningsen L, Eagly AH, Jonas K. Where are the women deans? The importance of gender bias and self-selection processes for the deanship ambition of female and male professors. *Journal of Applied Social Psychology*. June 2021; 52(8)
31. Holman L, Stuart-Fox D, Hauser CE (2018) The gender gap in science: How long until women are equally represented? *PLoS Biol* 16(4):e2004956. <https://doi.org/10.1371/journal.pbio.1004956>
32. Huang, J., Gates, A. J., Sinatra, R., & Barabási, A. (2020). Historical comparison of gender inequality in scientific careers across countries and disciplines. *Proceedings of the National Academy of Sciences of the United States of America*, 117(9), 4609-4616. doi:10.1073/pnas.1914221117
33. Kaushik, N., Sharma, A. and Kumar Kaushik, V. (2014), "Equality in the workplace: a study of gender issues in Indian organisations", *Journal of Management Development*, Vol. 33 No. 2, pp. 90-106.
34. Kulkarni, A., Mishra, M. (2021) Aspects of Women's Leadership in the Organisation: Systematic Literature Review. *South Asian Journal of Human Resources Management*, Vol 9 (1)
35. Kumar N. Gender and Stratification in Science: An Empirical Study in the Indian Setting. *Indian Journal of Gender Studies*. 2001;8(1):51-67. doi:[10.1177/097152150100800103](https://doi.org/10.1177/097152150100800103)
36. Kumar N. Women and Science in India: A reader, OUP, 2009
37. Kumar N., Gendered equation in science: An organisational Aberration, in Kumar N. eds. Women and Science in India: A reader, OUP, 2009
38. Kumar S. (2018), Scientometric study of Research productivity of ARIES, Nainital, Library Philosophy and Practice, February 2018.
39. Lahiri A.K., Chakraborty L.S., & Bhattacharyya P.N. (2003). Gender Budgeting in India. National Institute of Public Finance and Policy.

40. Leanne E. Atwater, Allison M. Tringale, Rachel E. Sturm, Scott N. Taylor, Phillip W. Braddy, Looking Ahead: How What We Know About Sexual Harassment Now Informs Us of the Future, *Organizational Dynamics*, Vol.48(4), 2019, 100677, ISSN 0090-2616
41. Leon, E. & L. Velho. 1997. 'Gender and Scientific Production'. Proceedings of the Sixth Conference of the International Society for Scientometrics and Informetrics, Jerusalem, Israel.
42. Lewis D., One-third of Indian STEM conferences have no women, *Nature*, 15 November 2023, <https://www.nature.com/articles/d41586-023-03519-z>
43. Mac Namara, S.C., Rauh, A.E., Blum, M.M., Russo, N., Green, M.A., Nangia, S. Peer mentoring for women in STEM (2020) ASEE Annual Conference and Exposition, Conference Proceedings, 2020-June, art. no. 1087
44. Makarem, Y., Wang, J. (2020). Career experiences of women in science, technology, engineering, and mathematics fields: A systematic literature review *Human Resource Development Quarterly*, 31 (1), 91-111.
45. María Bastida Domínguez, Elena Rivo-López, Mónica Villanueva-Villar, 'The glass ceiling': Myth or reality? An expatriation perspective, *Organizational Dynamics*, Volume 48, Issue 4, 2019, 100706, ISSN 0090-2616,
46. Mayya, S.S., Martis, M., Ashok, L., Monteiro, A.D., Mayya, S., Work-Life Balance and Gender Differences: A Study of College and University Teachers From Karnataka (2021) *SAGE Open*, 11 (4).
47. Morales, D. X., Grineski, S. E., & Collins, T. W. (2017). Increasing research productivity in undergraduate research experiences: Exploring predictors of collaborative faculty-student publications. *CBE Life Sciences Education*, 16(3) doi:10.1187/cbe.16-11-0326
48. Moser C. & Moser A., Gender Mainstreaming Since Beijing: A Review of Success and Limitations in International Institutions, *Gender and Development*, July 2005, DOI: 10.1080/13552070512331332283
49. Mukherjee, B. (2022). Evaluating the research performance of women scientists in indian research laboratories based on scopus citation database: A bibliometric analysis. *Malaysian Journal of Library and Information Science*, 27(1), 57-72. doi:10.22452/mjlis.vol27no1.4
50. Munshi, U.M., & Srivastava, D. Gendered Science: Trends and analysis of contributions of Indian Women Scientists, https://www.researchgate.net/publication/28804584_Gendered_Science_Trends_and_analysis_of_contributions_of_Indian_Women_Scientists
51. Nash, M. National Antarctic Program responses to fieldwork sexual harassment (2021) *Antarctic Science*, 33 (5), pp. 560-571.
52. OECD, Bridging The Digital Gender Divide Include, Upskill, Innovate, OECD 2018
53. PIB, GoI, Gender Sensitization, <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1579514>
54. Rain Manjari and Anand Akshay, A Policy Research Framework for Gender-Based Mapping of Research Scholars After Obtaining Fellowships, *Annals of Neurosciences*, 27(1) 5–6, 2020
55. Roberta Phillips (2015), *Reaching the Full Potential of STEM for Women and the U.S. Economy*, *US Chamber of Commerce foundation*, Center for Women in Business.
56. Rosser S. V., Breaking into the Lab: Engineering Progress for Women in Science and Technology, *International Journal of Gender, Science and Technology*, Vol.10, No.2, pp 213-231, 2018.
57. Ruth Eikhof, D. (2012), "A double-edged sword: twenty-first century workplace trends and gender equality", *Gender in Management*, Vol. 27 No. 1, pp. 7-22.
58. Sá, C., Cowley, S., Martinez, M., Kachynska, N., Sabzalieva, E. (2020). Gender gaps in research productivity and recognition among elite scientists in the U.S., Canada, and South Africa. *Plos one*;15(10):e0240903. DOI: 10.1371/journal.pone.0240903. PMID: 33119671; PMCID: PMC7595278.

59. Sangar S., Socio-economic empowerment of women through ‘Science, Technology and Innovation Policy, 2013’ – the missing link? *Current Science*, Vol. 106, No. 8, 2014
60. Schneegans, S. et al. UNESCO Science Report 2021 (2021),
61. Shabir, S., Gani, A. Impact of work-life balance on organizational commitment of women health-care workers: Structural modeling approach (2020) *International Journal of Organizational Analysis*, 28 (4), pp. 917-939.
62. Shapiro, J.R., Williams, A.M. (2012). The Role of Stereotype Threats in Undermining Girls’ and Women’s Performance and Interest in STEM Fields. *Sex Roles*, 66 (3-4), 175-183.
63. Staniscuaski F, Kmetzsch L, Soletti RC, Reichert F, Zandonà E, Ludwig ZMC., ... de Oliveira, L. Gender, race and parenthood impact academic productivity during the COVID-19 pandemic: From survey to action. *Frontiers in Psychology*. 2021; 12. doi:10.3389/fpsyg.2021.663252
64. Stoet, G., Geary, D.C. (2018). The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education. *Psychological Science*, 29 (4), 581-593.
65. Sugimoto Cassidy R. & Larivière Vincent, *Unraveling Gender Disparities In Science: Analysis Of Contributorship And Labor Roles*, 2016, ——— (to find out)
66. Swarup and Dey (2019) *Women in Science and Technology: An Indian scenario*, Preprint-
67. Tao, K.W., Gloria, A.M. Should I Stay or Should I Go? The Role of Impostorism in STEM Persistence (2019) *Psychology of Women Quarterly*, 43 (2), pp. 151-164.
68. Tyagi, S. (2022), “Aligning research trends of NIPERs, India (2010–2021)”, *Library Hi Tech*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/LHT-04-2022-0173>
69. Tyagi, S. (2022), “Unveiling research productivity of premier IIMs of India (2010–2021)”, *Library Hi Tech*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/LHT-05-2022-0262>
70. van den Besselaar, P., & Sandström, U. (2016). Gender differences in research performance and its impact on careers: A longitudinal case study. *Scientometrics*, 106(1), 143-162. doi:10.1007/s11192-015-1775-3
71. Wakdikar, S. & Sharma P. (2023) Gender and Higher Education in AcSIR, *University News*, 61(10), pp 3-8.
72. Wakdikar, S. & Sharma P. (2023). Interventions of CSIR toward Gender Parity. *Journal of Women Empowerment and Studies*, 3(6), 35–45. ISSN:2799-1253,. <https://doi.org/10.55529/jwes.36.35.45>
73. Wakdikar, S., Aggarwal R., & Sharma P. Hurdles and Challenges Perceived by Women Scientists in India, *Journal of Women Empowerment and Studies (JWES)*, Vol: 04, No. 03, pp.27-38, April–May 2024, ISSN: 2799-1253
74. Xie, Y., & Shauman, K. A. (1998). Sex differences in research productivity: New evidence about an old puzzle. *American Sociological Review*, 63(6), 847-870. <https://doi.org/10.2307/2657505>
75. Zaza, N., Ofshteyn, A., Martinez-Quinones, P., Sakran, J., Stein, S.L. (2021). Gender Equity at Surgical Conferences: Quantity and Quality. *Journal of Surgical Research*, 258, 100-104.

Appendix 1 – Overview of DST, DBT & DSIR

Department of Biotechnology

The remarkable march of the country into the world of bio-sciences and technological advances began in 1986 when a separate Department for Biotechnology (DBT), within the Ministry of Science and Technology was created. It was also responsible for fostering programmes and strengthening indigenous capabilities in this newly emerging discipline.

Since then, DBT has been pivotal in shaping the landscape of biotechnology in India. It spearheaded the formation of 16 Autonomous Institutes and 3 Public Sector Undertakings, fostering a robust ecosystem for research and innovation in biotechnology. Notable institutions like the National Institute of Immunology, the National Centre for Cell Science, and others were initiated under its aegis, furthering advancements in the field.

DBT's pursuits extended beyond infrastructure development, delving into collaborations with industries, forging international partnerships, and amplifying efforts in healthcare, food, agriculture, energy, and environmental security. The department's vision revolves around harnessing biotechnology for societal prosperity, focusing on research excellence, industry promotion, human resource development, and biosafety guidelines implementation.

Moreover, DBT is committed to gender inclusivity and empowerment in science. Initiatives such as the GARBH, Janaki Ammal National Women Bioscientist Fellowship, Biotechnology Career Advancement and Re-orientation Programme (BioCARE), and Biotech-Krishi Innovation Science Application Network (BiotechKISAN) underline its dedication to fostering women's leadership in science, addressing critical healthcare concerns, and empowering women in agriculture.

Department of Science and Technology

Established in 1971, the DST spearheads India's scientific efforts, shaping policies, fostering innovation, and funding diverse research. It provides significant extramural R&D support, involving 27 Autonomous Institutions (AIs).

DST focuses on critical sectors like agriculture, healthcare, energy, and the environment, emphasising tech development and entrepreneurship in S&T. It supports labs, cross-sectoral efforts, and research institutions, aiming for inclusive progress.

DST operates through six distinct programme groups, encompassing scientific and engineering research, technology development, international scientific and technology cooperation, S & T for socio-economic programs, Technology mission division, and Women scientist programs, aiming to fortify India's Science, Technology, and Innovation (STI) landscape.

Implementing impactful initiatives, DST empowers women in science through programs like Women in Science and Engineering(WISE) WISE-KIRAN, Vigyan Jyoti, CURIE, SEED, and SERB-POWER. Initiatives, providing fellowships, research grants, and mobility grants to foster diversity and entrepreneurship among women researchers. These initiatives reflect DST's commitment to fostering gender equality and diversity in the field of science.

Within its diverse range of scientific programs, DST focuses on various initiatives, including the Scientific & Engineering Research Programme, Mega Facilities for Basic Research, INSPIRE, R&D Infrastructure enhancement, Yoga and Meditation's Science, Swarnajayanti Fellowships, NSTMIS, SERB, Cognitive Science, and international collaborations like Visiting Advanced Joint Research Faculty Scheme also known as VAJRA.

Furthermore, DST emphasises its International S&T Cooperation programme, fostering collaboration with other countries in science and technology. This includes Bilateral Cooperation with developed and developing nations, engaging in Multilateral & Regional Cooperation, and focusing on Thematic Cooperation to address specific global challenges. Moreover, the department's Women Scientists Programs are dedicated to empowering and supporting

women in science. Initiatives like Gender Advancement for Transforming Institutions (GATI) promote gender equality in research institutions, while the Women Scientists Scheme encourages and nurtures women researchers, reflecting DST's commitment to fostering gender equality and diversity in the scientific community.

Department of Scientific and Industrial Research

The Department of Scientific and Industrial Research (DSIR), operating under the Ministry of Science and Technology in India, was established with a focused mandate on indigenous technology promotion, development, utilisation, and transfer. Since its inception in 1985, DSIR has been pivotal in fostering R&D activities within industries, particularly aiming to empower smaller and medium-sized industrial units to develop cutting-edge, globally competitive technologies with high commercial potential.

DSIR acts as a crucial link between scientific laboratories and industrial establishments, facilitating the transfer of technologies through National Research Development Corporation (NRDC) and facilitates investment in R&D through Central Electronics Limited (CEL). One of its key roles is to catalyse the commercialization of lab-scale research and augment technology-intensive exports within the overall export framework of the country.



Appendix 2: Initiatives of Indian Government for women

Year	Agency	Initiatives
1980s	DST	Women Technology Park (WTP) The objective is to promote research, development and adaptation of technology to improve the quality of life, working conditions for women, to provide new opportunities for gainful employment of women especially in rural areas and to increase the contribution of women scientists to technology based development
2001		● Special reference by the Finance Minister in the Budget speech. ● Study on Gender Related Economic Policy Issues by National Institute of Public Finance and Policy ● The second interim report of the National Institute of Public Finance and Policy analysed the Union Budget 2001-02 from a gender perspective.
2002		● Analysis of Budgets of select States undertaken. ● Expenditure on women was elicited from the Union Budgets in the succeeding years.
2003	Maulana Azad Edu. Foundation	Scheme of “ Begum Hazrat Mahal National Scholarship ” for Meritorious Girl Students belonging to Minority Communities (earlier known as “Maulana Azad National Scholarship”)
2003	DST	"Women Scientists Scheme (WOS)"
2003		Cabinet Secretary GoI, recommended that Ministries/Departments should have a chapter on Gender issues in their Annual Reports. Many Ministries/Departments have since been reporting on the same.
2004		● The Ministry of Finance (MoF) constituted an Expert Group on the classification system of Government transactions “to examine the feasibility of and suggest the general approach to Gender Budgeting and economic classification”. ● The first meeting of the inter-departmental committee, wherein the need for opening Gender Budget Cells (GBCs) in all Ministries/ Departments was deliberated and subsequently a letter was issued to this effect. ● Instructions issued by the Department of Economic Affairs, MoF, to all Ministries/ Departments to establish a GBC.
2005		● Since 2005-06, the Expenditure Division of the MoF has been issuing a note on GB as a part of the Budget Circular every year. ● Part A reflects Women Specific Schemes, i.e. those which have 100% allocation for women. ● Part B reflects Pro Women Schemes, i.e. those where at least 30% of the allocation is for women.
2005-06	UGC	University Grants Commission (UGC) introduced a Post Graduate Indira Gandhi Scholarship for Single Girl Child intending to compensate direct costs of girl education to all levels, especially for such girls who happen to be the only girl child in their family.

2007	UGC	UGC-Post Doctoral Fellowship for Women Candidates launched. The objective of the scheme is to provide an opportunity to unemployed women with Ph.D. degrees, and who intend to pursue post-doctoral research on a full-time basis.
2007	MoF	• A Charter for GBCs issued outlining the composition of GBCs and their functions. • Introduction of a scheme on GB with a view to building capacity and encouraging research, so that a gender perspective was retained at all levels of the planning, budget formulation and implementation processes.
2008	DST	INSPIRE, an innovative programme launched with a long-term foresight to attract talent to the excitement and study of science at an early age, and to help the nation build the required critical resource pool for strengthening and expanding the S&T system and R&D base. INSPIRE-SHE aims to enhance the attachment of talented youth (age group 17-22 yrs) to undertake higher education in science-intensive programmes by providing scholarships and mentorship. The scheme offers 10000 Scholarships every year.
2009	DST	In the year 2008-09, DST took a special initiative, ‘ CURIE ,’ to support women universities for improving R&D infrastructure and enhance research facilities
2011	DBT	BioCARE Programme for women scientists aims to promote women in science and is an attempt to enhance the participation of Women Scientists in Biotechnology Research.
2011-12	CBSE	UDAAN was launched to enable disadvantaged female students to transit from school to post-school professional education, especially in science and mathematics, and for increased access to skills and training in new and emerging fields especially STEM and digital fluency and literacy.
2013	SERB	The SERB Women Excellence Award is given to support basic research in the frontier areas of science and engineering. It is a one-time award and is given to women scientists who are below 40 years of age.
2014	DBT	Garbh-ini (Interdisciplinary Group for Advanced Research on Birth Outcomes)
2014	DST, Anita Borg Institute India, IUSSTF	Women Entrepreneurs Quest (WEQ) is a competition designed to strengthen and build a dynamic and supportive ecosystem for women entrepreneurs in India. The objective of this competition is to encourage, promote and showcase technology start-ups, founded by women entrepreneurs.
2014-15	DST	Knowledge Involvement in Research Advancement through Nurturing (KIRAN) consolidates all women-centric programmes into a holistic scheme that (i) promotes gender equality, (ii) empowers women with S&T inputs to develop and adapt appropriate technology, (iii) enables transfer of proven technologies and demonstration of live technology models and (v) supports /encourages women scientists constrained with a break in their career to return to mainstream science. The ‘Women in Science and Engineering-KIRAN (WISE-KIRAN)’ Division, started a new initiative for senior women scientists named as WIDUSHI (Women’s Instinct for Developing and Ushering in Scientific Heights & Innovation) to harness their knowledge and potential for betterment of Science and Society.

2014-15	MHRD AICTE	“Pragati Scholarship” launched by the MHRD and implemented by All India Council for Technical Education (AICTE). It is a scholarship for girls income of the family should be less than 8 lakh per annum.
2015	WCD	Beti Bachao Beti Padhao scheme to address declining Child Sex Ratio and related issues of empowerment of girls and women over a life cycle continuum.
2015	UNESCO	STEM and Gender Advancement (SAGA) project is a global UNESCO project launched to strengthen UNESCO’s work in support of gender equality in Science, Technology and Innovation (STI).
2016	IIT D	The Women Entrepreneurship and Empowerment
2016	NITI Aayog	ATAL Innovation MISSION was launched to address Woman Centric Challenges. These include driving women hygiene through innovation, innovations to improve women’s safety, professional networking opportunities for women, innovations that make working mothers’ life better, and easing the life of Rural Women.
2016	DST	“DISHA” programme encourages women scientists and researchers to work on projects addressing societal challenges and humanitarian issues through STEM innovations.
2016-17	DST	Mobility Scheme is aimed to provide an opportunity to women scientists who are facing difficulties in their present job due to relocation (marriage, transfer of husband to any other location within the country, attending ailing parents, and accompanying children studying in different cities).
2017-18	DST & IUSSTF	“Indo US. Fellowship for Women In STEMM (WISTEMM)” aims to provide opportunities to Indian Women Scientists, Engineers & Technologists within the age bracket of 21 to 50 years to undertake international collaborative research in premier institutions in the U.S.A, to enhance their research capacities and capabilities.
2018	MOES	The MOES initiated a special award called the “National Award for Woman Scientist” which is conferred to one woman scientist each year.
2019	DBT	DBT-UMMID initiative has objectives of establishing Genetic Diagnostic Units called National Inherited Diseases Administration (NIDAN) Kendras in Government Hospitals, producing skilled clinicians in the area of Human Genetics (Biochemical Genetics, Cytogenetics, Molecular Genetics, Clinical Genetics and Comprehensive Clinical Care), and screening of pregnant women and newborn babies for diagnosis of inherited genetic diseases in aspirational districts to provide comprehensive clinical care.
2020	DST	Vigyan Jyoti scheme has been introduced at the school level wherein meritorious girl students of Class 9-12 are being encouraged to pursue higher education and career in STEM field.
2020	SERB	SERB - POWER (Promoting Opportunities for Women in Exploratory Research) programme aims to mitigate gender disparity in science and engineering research funding in various S&T programs in Indian academic institutions and R&D laboratories.
2020	SERB	SERB -POWER Translational verticals is envisaged to encourage women researchers to translate their innovative ideas, discoveries and inventions in turn to catalyse the spirit of entrepreneurship among women researchers from tier I and tier II institutions.

2020	SERB	SERB-POWER Mobility Grant under the POWER Scheme aims to provide opportunities to Indian Women Scientists, Engineers, and Technologists to undertake collaborative research and gain exposure to excellent research facilities at the international level.
2020	DST	Gender Advancement for Transforming Institutions (GATI)
2020	MoEdu	National Policy on Education (NEP) 2020 in India includes several provisions and initiatives to promote women's education and empowerment to create a more inclusive and gender-sensitive educational system. (details in Annexure)
2020		Rukhmabai grants and short film grants on women in STEM launched in honour of one of India's first practising female doctors. It mandates to work towards recognising and improving the presence of Indian women in STEM.
2020	DST	Women Scientists and Entrepreneurs' Conclave is a unique platform to discuss the challenges the women scientists and entrepreneurs are facing in their lives and career.
2020	AICTE	Lilavati Awards given to institutions approved by the AICTE for promoting scientific education and career development for women.
2021	DST	The Women's Involvement in Science & Engineering Research (WISER) programme is a joint initiative of Indo-German Science & Technology Centre under DST, and the Federal Ministry of Education and Research (BMBF), Government of Germany which invites applications from women researchers in India/Germany to participate and collaborate in an ongoing R&D&I project without applying for fresh project grant in partnering countries.
2021	U.S.- India Alliance	India Million Women Mentors Initiative is an initiative of STEMconnector(R), and supports the engagement of one million STEM mentors (male and female) to increase the interest and confidence of girls and women to persist and succeed in STEM programs and careers.
2021	IITs	Supernumerary seats for women at the IITs created to improve female enrolment in the Undergraduate Programmes in IITs.
2022	DST	Women in Engineering, Science, and Technology (WEST) , a new I-STEM (Indian Science Technology and Engineering facilities Map) initiative provides a separate platform to scientifically inclined women researchers, scientists, and technologists for pursuing research in basic or applied sciences in frontier areas of science and engineering.
2023	CSIR	An exclusive women's portal for research grants and funds.
2023	IIT B	IIT-Bombay's outreach initiative, WISE (Women in Science Engineering from Rural Parts of India) , aims to rectify gender disparity in STEM fields by focusing on women from rural India. It emphasises hands-on engagement to encourage more participation of women in science and engineering. The initiative aims to introduce STEM courses and includes a periodical mentorship structure through which student volunteers at IIT Bombay will follow up with the girls.

	DST	Mobility Scheme is aimed to provide an opportunity to women scientists who are facing difficulties in their present job due to relocation (marriage, transfer of husband to any other location within the country, attending ailing parents, and accompanying children studying in different city) and will act as filler while searching other career option at new place.
	DST	(WTP has an objective to promote research, development and adaptation of technology to improve the quality of life, working conditions for women, to provide new opportunities for gainful employment of women especially in rural areas and to increase the contribution of women scientists to technology based development.
	DST	WISE Post-Doctoral Fellowship (WISE-PDF) aims to provide opportunity to women scientists and technologists between the age group of 27-60 years who want to continue the research as bench-level scientists in basic and applied sciences.
	DSIR	Technology Development and Utilisation Programme for Women provides assistance for projects which are relevant to technology development and utilisation by women with special emphasis to technologies developed by scientific establishments.
2024	IAP	Science for Women: A Technology and Innovation (SWATI) Portal, developed, hosted and maintained by NIPGR, launched as an initiative of the IAP on Women in STEMM which is a public interactive online resource, serving as a gateway to the expertise and contributions of Indian Women in STEMM

Appendix 3: DST Initiatives

DST Programmes

1. **Sophisticated Analytical & Technical Help Institute (SATHI):** Provides shared, professionally managed services and infrastructure to support R&D activities for various institutes and organisations.
2. **Synergistic Training Programme Utilising the Scientific and Technological Infrastructure (STUTI):** Aims to build human resource and knowledge capacity through hands-on training programs and transparent access to S&T facilities.
3. **State Science & Technology Programme (SSTP):** Provides budgetary support to State S&T Councils to strengthen the STI ecosystem in states.
4. **Patent Facilitation Programme:** Aims to create awareness about intellectual property rights (IPR), facilitate patent filing, and provide patent information to support R&D activities.
5. **Policy Research Programme (PRP):** Focuses on promoting STI policy research and gathering evidence-based input for future policy making.
6. **India-ASEAN S&T Cooperation Program:** Facilitates collaborative R&D projects and activities between India and ASEAN countries.
7. **NIDHI-EIR Program:** Supports entrepreneurs-in-residence by providing fellowship, mentoring, and market research opportunities to inspire entrepreneurship.
8. **Women Entrepreneurship Development Programme (WEDP):** Aims to train S&T graduates and diploma holders in entrepreneurship essentials.
9. **Vigyan Jyoti Program:** Encourages meritorious girl students to pursue higher education and careers in STEM fields through various activities and financial assistance.
10. **Bilateral Research Projects and Programs:** Supports industrial R&D collaborations with eight leading countries to develop innovative products and technologies.
11. **National Mission on Nano Science & Nano Technology:** Aims to promote and advance nanotechnology through infrastructure development, research, and human resource enhancement.
12. **Innovation and Entrepreneurship Training Programme:** Funds training programs and projects to promote and strengthen science & technology entrepreneurship.
13. **DISHA Programme:** Encourages women scientists and researchers, to work on STEM innovations addressing societal challenges.

Initiatives of DST

1. **Strengthening, Upscaling & Nurturing Local Innovations for Livelihood (SUNIL) Programme:** Fosters socio-economic progress through technology deployment and capacity building across various sectors.
2. **Technology Interventions for Disabled and Elderly (TIDE):** Promotes inclusiveness and universal accessibility through the development of assistive tools and technologies.
3. **Scheme for Young Scientists and Technologists (SYST):** Motivates young researchers to address socially significant issues with science and technology-based solutions.
4. **Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP):** Empowers SC and ST communities through integrated science and technology inputs for sustainable livelihoods.

5. **S&T for Women:** Promotes gender equality and empowerment through science and technology inputs, benefiting women at grassroots levels.
6. **Scientific Utilisation through Research Augmentation-Prime Products from Indigenous Cow: SUTRA-PIC India:** Supports scientific research on key products derived from indigenous cows.
7. **Community Resilience Resource Centre (CRRC):** Enhances community resilience through science and technology-based interventions, particularly focusing on disaster risk reduction and sustainable livelihoods.
8. **COVID19 Pandemic Related Activities:** Supports knowledge organisations in creating awareness and providing science and technology-based interventions to address challenges related to the pandemic.
9. **Science & Society Setu for Atma Nirbhar Bharat (S³4ANB):** Establishes collaborations and discussions among stakeholders for science and technology-based solutions aligned with AtmaNirbhar Bharat Abhiyan.
10. **NEEV@75 programme:** Azadi ka Amrit Mahotsav: Celebrates the impact of science and technology innovation in empowering communities towards self-reliance, featuring experience sharing and impactful stories.
11. **WEST:** Efforts to promote WEST are crucial for closing the gender gap. Initiatives like I-STEM provide financial assistance, educational upgrades, and career support for women. I-STEM facilitates technical guidance, skill development, and digital platforms. It offers assistance in proposal writing, software access, industry collaboration, and leadership promotion. Specific initiatives include:
 - Launching a dedicated platform for introducing new I-STEM initiatives.
 - Inviting scientifically inclined younger women for support.
 - Arranging skilled development programs for women in R&D labs.
 - Providing catalytic grants for R&D proposals, technical guidance, and expert advice.
 - Establishing a digital consortium for discussing and resolving regional issues. These measures aim to empower women in WEST and contribute to national growth and innovation.

DST Fellowships

1. **DST-STI Policy Fellowship Programme:** This fellowship program, initiated in 2016, focuses on fostering collaboration and knowledge exchange in the Science, Technology, and Innovation (STI) policy domain. It offers opportunities for Senior Policy Fellows, Post-doctoral Fellows, and Young Policy Professionals to work on well-defined research topics within the STI policy domain.
2. **Cognitive Science Research Initiative (CSRI):** Aimed at encouraging interdisciplinary research in cognitive science, CSRI supports various projects, Post-Doctoral Fellowships (PDFs), workshops, conferences, and seminars. It integrates principles and methods from psychology, computer science, linguistics, philosophy, and neuroscience.
3. **Science and Technology of Yoga and Meditation (SATYAM):** This programme aims to foster scientific research on the effects of yoga and meditation on physical and mental health, as well as cognitive functioning, in both patients and healthy individuals.
4. **INSPIRE:** Designed to attract meritorious youth towards basic and natural sciences, INSPIRE offers various components including internship, scholarship, fellowship, and faculty fellowship to encourage research careers in science, engineering, medicine, agriculture, and veterinary sciences.
5. **INSPIRE Awards – MANAK:** Implemented by the Department of Science & Technology (DST), this scheme aims to attract young students to study science and pursue research careers by promoting creative thinking and fostering a culture of innovation. It targets ideas from schools across the country.

6. **Swarna Jayanti Fellowships Scheme:** This fellowship scheme supports outstanding young scientists aged between 30 to 40 years by providing special assistance and support to pursue research in frontier areas of science and technology.
7. **Indo-US Fellowship for Women in STEMM (WISTEMM):** This fellowship offers opportunities to outstanding Indian women researchers, scientists, and engineers in their early or mid-career stages for international collaborative research opportunities in premier institutions of the USA.
8. **Summer Research Fellowship:** Designed to provide students and teachers with the opportunity to engage in research activities during their summer break, these programs aim to enhance scientific research skills and promote collaboration between academia and industry.
9. **Visiting Fellowship program:** Sponsored by organisations like DST, this programme provides researchers, scholars, and professionals with opportunities to spend specific periods at host institutions to engage in collaborative research, share expertise, and contribute to the scientific community.
10. **India Science Research Fellowship (ISRF):** Part of India's initiatives to engage with neighbouring countries in developing S&T partnerships, ISRF offers fellowship opportunities for researchers from Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar, Nepal, Sri Lanka, and Thailand to work in Indian universities and research institutions. It promotes collaboration and exchange of scientific knowledge among neighbouring countries.
11. **SERB Fellowship:** The SERB, a legally constituted entity under the Department of Science and Technology (DST), has implemented a series of notable measures to advance research and development in cutting-edge domains of science and engineering within the nation. The interventions made by the SERB are chiefly directed at broadening the scope of research within the country while upholding research excellence. Nurturing emerging talent, as well as recognizing and providing backing for novel scientific realms, remain central objectives of the Board.

The INSPIRE scheme consists of four components: internship, scholarship, fellowship and faculty fellowship.

Scheme Component	Target Group	Target Age Group (yrs)	Target Number	Aim
INSPIRE Internship	Top 1% students in Class X Boards	16-17	50,000	To expose students to joys of creative science during 5-day camps through lectures by experts, innovative experiments etc.
Scholarship For Higher Education (SHE)	Top 1% students in Class XII Boards + top 10000 performers in IIT-JEE + other national exams	17-22	12,000	To encourage meritorious students to study B.Sc. & M.Sc. (basic and natural sciences) by providing scholarship (Rs. 60,000/- p.a.) and mentorship grant (Rs. 20,000/- p.a.)
INSPIRE Fellowship	INSPIRE-SHE Scholars with 70% marks in M.Sc. + M.Sc. Toppers with min. 70% marks	22-27	1000	To encourage students to pursue Ph.D. in areas of S&T, Medicine, Agriculture, Pharmacy and Veterinary Sciences
INSPIRE Faculty Fellowship	Ph.D.	27-32	100	To encourage young researchers to continue research in areas of S&T, Medicine, Agriculture, Pharmacy, and Veterinary Sciences.

Fellowships under SERB are:

1. **National Postdoctoral Fellowship (NPDF) of SERB:** This fellowship aims to identify motivated young researchers and provide them support for conducting research in frontier areas of science and engineering. Fellows work under a mentor, and the training is expected to help them develop as independent researchers.
2. **SERB POWER Fellowship:** This fellowship is designed to address gender disparity in science and engineering research funding by supporting Indian women scientists engaged in research and development activities. It aims to provide equal access and opportunities for women scientists through structured efforts.
3. **JC BOSE Fellowship:** The JC Bose fellowship recognizes outstanding performance by active scientists. It is scientist-specific and highly selective, aiming to provide support to scientists with exceptional track records.
4. **Ramanujan Fellowship:** This fellowship is intended for brilliant Indian scientists and engineers, both from outside India who want to return and those already in the country. It provides support for them to take up scientific research positions in India, facilitating research in various scientific institutions and universities.
5. **Abdul Kalam TIN fellowship:** Launched by the DST in association with the Indian National Academy of Engineering (INAE), this fellowship aims to promote translational research in engineering by Indian Nationals working in public-funded institutions. It encourages the transfer of fundamental research into viable technological products, devices, components, or processes.
6. **Start up Research Grant Flagship Programme:** This programme aims to provide research support to early-career researchers for pursuing innovative research in frontier areas of science and engineering. It supports a large number of projects from various institutions across the country.

DST SCHEMES FOR WOMEN

1. S&T for Women Scheme:

1. Established by the Department of Science and Technology (DST) to empower women in science and technology fields.
2. Offers financial support, training, mentoring, and opportunities for women researchers and professionals.
3. Aims to create a more inclusive scientific community and promote gender equality in STEM.

2. CURIE (Consolidation of University Research for Innovation & Excellence in Women Universities):

- a. Launched in 2008-09 to enhance research infrastructure in women universities and PG colleges.
- b. Focuses on establishing state-of-the-art research facilities to nurture women scientists in basic and applied sciences.

3. Women Scientist Scheme:

- a. WOS-A: Targets women aged 27-57 to reintegrate into mainstream science as bench-level researchers. Offers opportunities in various disciplines.
- b. WOS-B: Encourages women scientists to tackle societal challenges through S&T solutions and train marginalised sections for livelihood generation.
- c. WOS-C: Provides opportunities in Intellectual Property Rights for women with mid-career breaks, enabling them to pursue careers as IPR professionals and entrepreneurs.

4. WISE-KIRAN:

- a. Aims to address gender disparity in science and engineering by focusing on challenges specific to India, including cultural beliefs and family pressures.

- b. Provides skill development and training opportunities to enhance technical and leadership capabilities of women scientists.

5. GATI:

- a. An innovative pilot project by DST to promote gender equity in science and technology institutions.
- b. Seeks to create an enabling environment for equal participation of women in STEMM disciplines, addressing deep-rooted problems.

6. Mobility Scheme under KIRAN: Addresses the relocation issues faced by women scientists in government organisations, enabling them to work in regular positions without hindrances.

Funding & Awards for Women in Science

Funding Schemes:

1. **Women Scientist Scheme by DST:** Provides opportunities for women scientists and technologists to pursue research in emerging and challenging areas.
2. **Post-Doctoral Fellowship for Women:** Supports women researchers in pursuing postdoctoral research.
3. **Indo-U.S. Fellowship for Women in STEMM:** Facilitates collaboration and exchange of women scientists between India and the United States.
4. **National Post-Doctoral Fellowship:** Offers fellowships for women researchers to undertake advanced research in various fields.

Scholarships:

1. **L'Oréal India For Young Women in Science Scholarships:** Supports young women pursuing studies in science at the graduate level.

Awards and Recognitions:

1. **National Women Bioscientist Award:** Recognizes outstanding contributions of women bioscientists.
2. **SERB Women Excellence Award:** Honours women scientists for their exceptional contributions to research.
3. **Women in Science lectures by EMBO:** Organises lectures to highlight the achievements of women scientists.
4. **Stree Shakti Science Samman Award:** Presented to women scientists for original and impactful contributions to science in India.
5. **Indian National Science Academy (INSA) Fellowships:** Includes categories such as Women Fellows and Women Young Scientists.
6. **Indian National Academy Of Engineering (INAE) Awards:** Recognizes women engineers for their contributions to engineering.
7. **National Academy Of Sciences (NASI) - DST Awards:** Acknowledges women scientists for their research achievements.
8. **TWAS, The Academy Of Sciences for The Developing World - CSIR Awards:** Recognizes women scientists from developing countries for their contributions to science.
9. **CSIR Award For S&T Innovations for Rural Development:** Honours women scientists for innovations benefiting rural communities.

Women-Related DST Initiatives

1. WTP: Facilitates technology adoption by rural women for micro-enterprises.
2. KIRAN: Aims for gender parity in S&T through exclusive schemes.
3. Vigyan Jyoti Programme: Encourages girls to pursue STEM education and careers.
4. Women Scientist Scheme (WOS): Supports women scientists re-entering mainstream science.
5. WISTEMM (Women in STEM): Promotes women's participation and leadership in STEM fields.
6. Science and Technology for Women Empowerment: Empowers women socio-economically through S&T.
7. SERB Women Excellence Award: Recognizes outstanding contributions of women scientists.
8. DST-CEFIPRA Women Post-Doctoral Fellowship: Offers postdoc fellowships to women researchers.
9. WEDP: Trains S&T graduates in entrepreneurship.
10. Indo-U.S. Fellowship for Women in STEMM: Promotes collaboration between Indian and U.S. women scientists.
11. WEQ: Supports women entrepreneurs with training and funding.
12. Women Scientists and Entrepreneurs' Conclave: Provides a platform for networking and knowledge sharing.



Appendix 4: DBT Initiatives

PROGRAMMES

1. **Women Scheme DBT:** Biotechnology based Programme for Women
2. **Knowledge Generation, Discovery Research, New Tools and Technologies:** The goal is to conduct research on advanced methods of computer-based information processing for analysing biological molecules' structure/function and to implement education/training programs for users and information scientists.
3. **Building International Cooperation and Partnership:** Foster international collaboration through bilateral and multilateral partnerships, collaborations with international NGOs, and engagements with non-profit organisations. Promote science diplomacy to bridge technological and capacity gaps in natural sciences.
4. **Biotechnology Industry Research Assistance Council (BIRAC):** Facilitate public-private partnerships within the biotech sector. Encourage collaboration, innovation, and support for industry growth.
5. **Biotech Based Programmes for Societal Development:**
 - Biotech KISAN Programme: Improve agriculture productivity for small and marginal farmers, especially women farmers, through scientific intervention.
 - Programmes for North Eastern Region (NER)
 - Science Setu Programme: Build awareness about the importance of science and opportunities in science careers.
 - DBT-HRD programmes encompass postgraduate teaching, doctoral/postdoctoral fellowships, support for women scientists/young investigators, industrial training, finishing schools, scholarships, awards, re-entry grants, innovative schemes like 'STAR college', and infrastructure development.
6. **Training Programmes:**
 - Skill Vigyan State Science and Technology Partnership Programme in Life Science and Biotechnology: Hands-on training in biotech and allied areas.
 - Biotech Industrial Training Programme (BITP): Six-month hands-on training for fresh Biotech graduates.
 - Foldscope Programme: Training workshops on the use of Foldscope.
7. **Outreach Programme:**
 - Genome editing/engineering and nanotechnology applications in Agriculture: Utilise biotech tools for crop improvement.
 - Animal Biotechnology Programme: Develop techniques to enhance livestock production and productivity.
 - Mycobacterial Diseases in Animals network (MyDAN) Programme: Understand TB incidence in livestock and develop control measures.
 - Aquaculture & Marine Biotechnology Programme: Develop products and processes from marine resources.
 - Indo-U.S. Vaccine Action Programme (VAP): Support novel vaccine research and related technologies.
 - Human **Immunology Programme:** Collaborative research on infectious diseases and vaccines.

DBT Fellowships: The Human Resource Development Programme of the DBT is aimed at providing holistic development and support to students, young researchers and scientists working in the multidisciplinary areas of BT.

Domestic Fellowships:

1. **DBT-Junior Research Fellowship (JRF):** Provides fellowships for Indian biotechnology students pursuing doctoral research through a national Biotechnology Eligibility Test (BET).
2. **DBT-Research Associate (RA) Fellowship:** Offers post-doctoral training in life sciences and biotechnology at premier institutions in India, initially for a period of two years.
3. **Janaki Ammal Fellowship:** Recognizes contributions of senior and young women scientists in biology and biotechnology, with two categories: senior and young.
4. **Tata Innovation Fellowship:** Awarded to scientists up to 55 years old with outstanding track records in biological sciences, focusing on finding innovative solutions to major problems in healthcare, agriculture, and other life sciences areas.
5. **DBT Ramalingaswami Re-entry Fellowship (DBT-RRF):** Attracts highly talented Indian researchers working abroad to pursue research interests in India.
6. **MK Bhan Young Researchers Fellowship:** Supports young post-doctoral fellows to continue their research in India after PhD, providing an independent research grant and fellowship for three years.
7. **Distinguished Biotechnology Research Professorship:** Recognizes superannuated distinguished scientists for their significant research contributions and provides support for their continued scientific activity.
8. **S.Ramachandran-National Bioscience Fellowship for Career Development:** Recognizes outstanding contributions of young scientists below 45 years old and provides grants for research career development.
9. **Har Gobind Khorana - Innovative Young Biotechnologist Fellowship (IYBF):** Supports outstanding young scientists below 35 years old with innovative research ideas in biotechnology.

International Fellowships:

1. **Khorana Fellowship:** Provides opportunities for Indian undergraduate and postgraduate students to gain research exposure at laboratories in the USA.
2. **TWAS Fellowship:** Jointly promoted by DBT, India, and TWAS, Italy, this fellowship supports scientists/researchers from developing countries (excluding India) for doctoral and postdoctoral research in India.
3. **IITB-Monash Fellowship:** Offers selected PhD students from IIT Bombay the opportunity to spend a year at Monash University, Australia, for research collaboration and international exposure.

Women Related Programmes

1. DBT has (Biotech-KISAN) programme that empowers farmers, especially women farmers.
2. The Women Scientist Scheme by DBT promotes women's participation in science.
3. Biotechnology-based programs specifically tailored for women.
4. The Biotech KISAN Mission Programme for the NER focuses on providing scientific solutions to local farming issues, benefiting small and marginal farmers, especially women.
5. Establishment of Women Biotech Park to encourage and empower women entrepreneurs.
6. Support for women-led start-ups, with examples such as Niramai Health Analytix, Zumutor Biologics, Codon Biotech, String Bio, and Xcellence in Bio Innovations & Technologies.
7. DBT-funded study in Mizoram aims to empower rural women through sustainable piglet production.

8. Socio-Economic Empowerment of Rural Women through Bakery Entrepreneurship
9. Hands-on training programs in fruit and vegetable preservation and marketing for SC/ST and weaker section farm women.
10. Programme for Women: DBT-funded project on Gujjar and Bakarwal women empowerment through improved managerial practices in livestock rearing and personal health awareness.
11. Innovations in Rice Farming Technologies initiative provides training for women farmers.
12. Sericulture projects for the upliftment of socio-economic conditions of rural women in Assam.
13. Pig farming initiatives for the economic empowerment of rural women in Mizoram.
14. Collaboration with ALEAP to support women entrepreneurship internationally.

Women-Related initiatives

1. **GARBH-Ini:** Investigates variations in birth outcomes to improve care for preterm, small for gestational age, and low birth weight babies.
2. **BioNEST:** Fosters women entrepreneurship in orchid floriculture, providing resources for scaling technologies in Meghalaya.
3. **National Women Bioscientist Award:** Recognizes women's achievements in biosciences, encouraging more participation in the field.
4. **BioCARE:** Promotes women in science through career advancement in biotechnology.
5. **UMMID Initiative:** Establishes genetic testing laboratories and screening centres to improve maternal and child healthcare in underserved districts.

Women Related Research

1. Lactobacillus species from Indian women's reproductive tract show potential as indigenous probiotics.
2. Cervical cancer initiative aims to screen women for HPV infection, histopathology, and genomic data to understand progression.
3. SLE study focuses on autoimmune disease in reproductive-aged women, with global prevalence ranging from 5-10 per 10,000 population.



Appendix 5: Industry Initiatives

List of partnerships with industry focused on promoting women in STEM and supporting initiatives for gender equality in education:

Adobe CodeHers - A women's-only hackathon to celebrate women in STEM. It aims to help identify the brightest women developers and coders in India through a series of algorithmic programming challenges.

Adobe's Women in Tech Scholarship is committed to bringing more gender diversity to the tech industry. It recognizes talented female undergraduate & master's students studying computer science and provides them an opportunity to learn, build, and grow.

American India Foundation's Digital Equaliser Program: STEM for Girls initiative in collaboration with partners, focusing on bridging the gender gap in STEM education. Implementation of Vigyan Jyoti program, science camps, coding workshops, and role model interactions for awareness and encouragement in STEM. Tinkering workshops for capacity building of teachers and supporting Atal Innovation Mission.

Centre for Social Research: Digital Safety Work through (a) Digital Safety Training for women and girls, (b) Cyberbullying Prevention through awareness and education, (c) Policy Advocacy for better regulations to protect women online, (d) Research and Data Analysis on the impact of technology on women's safety, and (e) Helpline and Support for women facing online harassment.

Cisco's Girls Power Tech Initiative: Cisco's Girls Power Tech Initiative provides a unique learning experience for girls, connecting them with mentors to inspire STEM career paths. The global reach ensures that young women worldwide have the opportunity to interact with female leaders in the technology field, fostering a supportive community. Cisco has also been celebrating International Girls in ICT Day which aims to help girls discover opportunities in the information and communications technology (ICT) industry.

Covestro India's STEM Workshops with g4g: Covestro, in collaboration with g4g, the NGO based in Belgium, promotes STEM learning among girls to inspire the next generation of women in STEM by introducing them to hands-on science experiments. The company conducts STEM workshops to stimulate curiosity and interest in science among girls aged 10 to 15.

Dr. Reddy's Foundation Sashakt Scholarship programme for girls from rural areas and economically weaker sections of society, to help them pursue higher education in the sciences.

EY STEM App- a part of the **Global WIT** sponsored EY STEM Program, aims at bridging the gender gap in STEM education and building a talent pool for futuristic careers.

Flipkart Girls Wanna Code: The initiative focuses on empowering women in STEM by providing coding training and placement opportunities.

Hitachi Energy India Women in Technology program: Hitachi Energy, in collaboration with the Shikshana foundation, encourages young female students to enter and thrive in the technology world. They provide scholarships, training, mentorship, and materials to aspiring women engineers from less privileged backgrounds.

Infosys Foundation's STEM Stars Scholarship Program: The aim is to alleviate financial barriers for underprivileged girls aspiring to pursue STEM education.

GE Healthcare Women in Operations: The initiative is part of GE Women's Network, which targets women for technical, manufacturing, and operational roles. It focuses on leadership skills, networking, career opportunities, and knowledge sharing.

Girls Who Code (GWC): Girls Who Code (GWC) organisation provides diverse programs such as summer immersion, campus programs, and after-school clubs. It aims to amplify women's representation in computer science.

Google Women Techmakers Program: Provides visibility, community, and resources for women in tech. It organises events and leadership programs, bringing together over 70,000 women each year.

Google ‘Grow With Google’ for Women in STEM: It is a three-month online course where participants specialise as an Associate Cloud Engineer. The programme includes mentorship from members of the Google Cloud team and trains more than 100 women engineers and engineering students in cloud technology.

HCL SheInspires captures the life stories of women who have excelled in different STEM fields intending to inspire young women and girls to pursue science.

iOPEX Technologies and Bhumi’s STEM Education Programme in Chennai: STEM education for underprivileged students.

IBM’s STEM for Girls Initiative: IBM’s STEM for Girls is a comprehensive CSR programme designed to impart digital literacy and coding skills to girls, preparing them for the digital economy.

Mastercard’s Girls4Tech Program: Mastercard in collaboration with the American India Foundation trains teachers, ensuring that the curriculum reaches a significant number of girls in various cities, fostering interest in STEM subjects.

IBM Department of Research, Diversity, and Inclusion strives to create a conducive and inclusive work environment for women researchers and introduces initiatives that help women address the professional challenges they face.

Intel Protégé Sponsorship Initiative creates development opportunities for select senior technical women employees

Larsen & Toubro Renew: Career Re-entry for Women is one-of-its-kind initiative that only hires women professionals who took career breaks for any significant reason.

Olay Collaboration with vLookUp for Mentorship Programs: Olay collaborates with vLookUp to connect female students in higher education with STEM mentors online. Selected participants engage in four-month mentorship programs facilitated by volunteers from P&G and partner companies, creating meaningful connections between aspiring women in STEM and industry experts.

Olay STEM scholarship: Olay partners with LEAD, India’s premier School EdTech provider to encourage future women in STEM. The collaboration sponsors STEM scholarships for over 250 underprivileged girls across India, providing financial support for STEM education and career development.

Olay STEMTheGap’s Virtual Chat Mentor: Olay introduced a beta version (<https://ai-shu.in/>) of a web-based virtual chat mentor to supplement its mentorship program. Created with successful women in various STEM fields, the chat mentor provides guidance, resources, and encouragement to aspiring girls entering STEM.

Rolls-Royce’s Unnati Scholarship Programme: Empowering women in engineering from underprivileged backgrounds by providing financial support.

Sabre Corporation’s STEM Labs: Sabre Corporation in collaboration with United Way Bengaluru, has established STEM labs in government schools in rural areas, with an aim to improve education for around 1,600 students, specifically focusing on girls, fostering interest and skills in science and technology.

Schindler India Pvt. Ltd.: It has implemented targeted recruitment efforts, with 50% of campus hiring focused on women for entry-level roles and talent mapping for leadership roles.

Syngene International Ltd. and the **Research and Innovation Circle of Hyderabad (RICH)** in collaboration with **Biocon** launched Scholarship and Mentoring for Women in STEM Education and Careers- Women in STEM Caravan. It also involves the **Centre for Civil Society and P&G Shiksha**.

TCS–MWM Joint initiative: A unique initiative to provide valuable mentoring to women in science, and develop a digital platform to showcase best practices, share resources and discuss challenges of gender equity and inclusion.

Tata Creche Facility: Creche facility for women working in the commercial and corporate divisions.

Tata Motors Diversity Council: Works towards increasing gender diversity in the organisation.

TATA SCIP welcomes women who have taken a break back to careers tailored to their availability and flexibility.

Tata Steel Women@Mines: TATA STEEL mines under the flagship programme of Women@Mines widened opportunities for employment of women. Exclusive platforms created: MOSAIC - Diversity & Inclusion (D&I) initiatives, Women of Mettle, Women@Mines, Tejaswini and other programmes.

Tech Saksham Program: Edunet Foundation, sponsored by **Microsoft Corporation India Pvt. Ltd.** and **SAP India Pvt. Ltd.**, has initiated the Tech Saksham Program. It aims to empower women learners from underserved backgrounds in tertiary education, focusing on upskilling in areas such as Artificial Intelligence, Cloud Computing, Web Design, and Digital Marketing. It also provides industry pathways through job support, internships, and entrepreneurship opportunities.

US-India Strategic and Partnership Forum: The US-India STEM collaboration aims to empower women in STEM in India. A public-private initiative with the State Department, USAID, USISPF, and George Washington University, it focuses on overcoming barriers and fostering collaboration to accelerate women's leadership in STEM.

Wipro Women of Wipro (WOW) programme promotes gender equality and equal opportunity within Wipro to support the career ambitions of women in technology and create leadership positions for them.



Appendix 6: Startup India

Department	Benefits of the scheme
DST	This initiative primarily aimed at providing opportunities to women scientists and technologists between the age group of 27-57 years who had a break in their career but desired to return to the mainstream. Under this scheme, women scientists are being encouraged to pursue research in frontier areas of science and engineering, on problems of societal relevance and to take up S&T-based internships followed by self-employment. The following three categories of fellowships, with research grants, are available for Indian citizen: • Women Scientist Scheme-A(WOS-A): Research in Basic/Applied Science • Women Scientist Scheme-B (WOS-B): S&T interventions for Societal Benefit • Women Scientist Scheme-C (WOS-C): Internship in Intellectual Property Rights (IPRs) for the Self-Employment • This scheme will provide a research grant for a well-defined project proposal (under WOS-A and WOS-B) for a period of a maximum three years.
DBT	15 selected women entrepreneurs will receive seed funding of INR 5 lakhs each; access of expert mentor network of TiE and BIRAC, one year membership of TiE Delhi NCR, showcase opportunities at TiE, Access to TiE Startup Accelerator programme, opportunity to go through an intensive accelerator programme.
DBT	• Mining and assessment of Techno-commercial resource pool in East & North East Region • Roadshows on essentials of Techno-Entrepreneurship • Capacity building training programs for rural women entrepreneurs • North East Immersion Program • North East showcase Event • Design Workshop • Incubation Practice School

Startup India

States/Regions with startup policies for women

Andaman & Nicobar Islands	The state offers monthly allowances to women led startups, wherein a women founder/co-founder with at least 50 per cent equity in the Startup entity and meeting other criteria as prescribed in the Notification for Startup Funding & Incentives would be eligible.
Andhra Pradesh	The state offers permission for women to work in multiple shifts, subsidy on power bills, subsidy on lease rentals, reimbursements for setting stalls in notified national/ international exhibitions, investment subsidy on fixed capital amongst other incentives to women entrepreneurs.
Assam	The state offers a special one-time incentive of Rs. 5,000 per woman candidate hired subject to an upper limit of Rs. 1 lakh per startup for a period of 3 years
Bihar	The state offers grants/exemptions/subsidies to women entrepreneurs.
Jammu and Kashmir	The state offers monthly allowance and assistance for research and development, marketing and publicity to startups with women founders post meeting the eligibility criteria.
Odisha	The state offers monthly allowance at ideation/ prototype stage and after the idea gets commercialised to women entrepreneurs post meeting the eligibility criteria.
Uttarakhand	The state offers allowance for marketing assistance to women entrepreneurs post meeting the eligibility criteria.
Chhattisgarh	The state offers a separate corpus out of Innovation Fund, Leap of Faith Revolving Fund and Venture capital Fund of more than Rs. 100 crores will be earmarked for women innovators in order to motivate and empower women entrepreneurs in the state.

Goa	The state offers rental/lease reimbursement to all new and existing units having 30 percent women employees in the venture.
Gujarat	The state offers monthly sustenance allowance to women founders post meeting the eligibility criteria.
Haryana	The state offers permission for women to work in multiple shifts in startups amongst other things.
Himachal Pradesh	The state offers launching a programme to send startups, college and school students and faculty to leading Startup destinations in the country and abroad for getting exposure as well as an opportunity to meet and converse with industry leaders, thinkers and innovators. The state offers provision to ensure 1/3rd representation of women entrepreneurs, students and teachers etc
Jharkhand	The state offers reimbursement on lease rentals, amount paid to Internet Service Providers, electricity dis-coms, amongst other incentives to women entrepreneurs post meeting the eligibility criteria.
Karnataka	The state shall mandate all Government supported incubators to allocate minimum 10% seats for Startups with women co-Founders on preferential basis.
Kerala	Kerala Startup Mission (KSUM) supports women Startups with a soft loan scheme for an amount limited to Rs.15 Lakhs as working capital for implementing works and projects received from the Govt. departments and Public Sector Undertakings in Kerala. For young (18 to 45 years) Women and SC/ST entrepreneurs, the assistance is 20% up to INR 30 lakhs.
Maharashtra	The state offers Incentive Fund for Top-rated Startup, creation of Investment Fund, Reimbursement of internet and electricity charges, Reimbursement of expenditure towards hosting infrastructure, Reimbursement of State GST, Reimbursement of exhibition/global event participation fee, Incubation Space for accelerators and Startups, FinTech Corpus Fund to early stage and fintech startups with women founders.
Manipur	The state offers neighbourhood hand holding and mentoring support for rural Startups and Startups by women entrepreneurs through Facilitation Centres. Startups should be registered with the state government.
Nagaland	The state shall dedicate 25 per cent of total funds for startups to women led startups, registered with the state.
Puducherry	The state offers monthly allowance to startups by women entrepreneurs.
Punjab	The state aims at dedicating 25 percent of the total startup funds to promote Startups by Women entrepreneurs. The state shall also provide interest subsidy to women entrepreneurs in the state basis fulfilment of necessary criteria.
Rajasthan	The state offers dedicated funds of INR 100 Crore out of the INR 500 crore Bhamashah Techno funds for Startups.
Tamil Nadu	The state offers training and sensitization programmes, support for product development and marketing/ publicity/participation in fairs and exhibitions, priority in allotment of industrial plots in industrial estates to women led startups.
Telangana	The Government of Telangana has launched WE Hub- First of its kind initiative to promote & foster women entrepreneurship in the state. The organisation supports women through Business Incubation, facilitating access to Government, and building forward & backward linkage in the innovation ecosystem at ZERO Cost.

West Bengal	The state offers special Neighbourhood handholding and mentoring support to rural Startups and Startup by women entrepreneurs through MSME Facilitation Centres (MFC).
Dadra and Nagar Haveli, Daman and Diu	The union territory aims to offer Specific training courses, subsidy schemes and preference in industrial plot allotment to women entrepreneurs.
Tripura	The state aims to earmark 50 percent of funds for women entrepreneurs in the Venture Capital Funds being set-up by the state government as well as 50 percent reservation for women in government market stalls and shopping complexes.
Ladakh	The union territory offers monthly allowance to startups having women founders/ co-founders post meeting the eligibility criteria.



Appendix 7: Incubation centers

S.No.	Name of Host Institute	Name of the Incubator, Location	Technology Thrust Area
1	Indian Institute of Management, Ahmedabad (IIMA)	CIIE Initiatives	Deep-tech solutions, Tech-enabled inclusive solutions Past program:- Project 'Her&Now'- for women entrepreneurs in Rajasthan
2	National Institute of Design - Ahmedabad	National Design Business Incubator, Ahmedabad	Design, Healthcare, Education
3	Gujarat Foundation for Entrepreneurial Excellence (GFEE)-i create, Ahmedabad, Gujarat		Information Technology, Electronics, Biotechnology, NanoTechnology, Robotics, Non-conventional Energy - Green, Bio-medical Equipment & Devices, Agro & Food Processing
4	Gujarat University Startup and Entrepreneurship Council (GUSEC), Ahmedabad, Gujarat		Sector agnostic, with inclination to pharmaceuticals and healthcare
5	Ahmedabad University Support Foundation	Venture Studio	Healthcare, Education, Waste Management/Environment
6	Entrepreneurship Development Institute of India (EDII)	CrAdLE (Centre for Advancing and Launching Enterprises), Gandhinagar, Gujarat	Manufacturing, Healthcare, Food & Agriculture Event: IWN Gujarat Annual Summit #SheRise: event, to celebrate the success stories of working women and give them an opportunity to share their expertise and experiences in the sector of entrepreneurship, startups, social enterprises and education. Event : Entrepreneurship Development Institute of India & CrAdLE – Centre for Advancing and Launching Enterprises is organizing an exclusive event, EDII Ahmedabad organized a physical event on Entrepreneurial Women On The Field.
7	Indian Institute of Public Health Gandhinagar- NIDHI TBI, Gandhinagar, Gujarat		HealthCare Technology Solutions, Primary and community public health, Water Air Food Hygiene
8	National Innovation Foundation India (NIF) Incubation and Entrepreneurship Council, Gandhinagar, Gujarat		Technological innovations, grassroots innovations, agricultural machinery
9	NSIC- Technical Services Centre AJI Industrial Estate, Rajkot, Gujarat		Energy & Pumps
10	Sardar Vallabhbhai National Institute of Technology, Surat	Association for Harnessing Innovation and Entrepreneurship - SVNIT, Surat	Manufacturing, Diamond & Textile, Energy and environment
11	Indian Red Cross Society [IRCS], Bengaluru	ARTILAB FOUNDATION	Assistive and Rehabilitation Technologies and Healthcare

12	ICAR-Indian Institute of Horticultural Research	BESST-HORT (Business Entrepreneurship Startup Support through Technologies in Horticulture), Bengaluru, Karnataka	Plant Health Management Technologies, Post Harvest & Value Addition Technologies, Biotechnological Products & Services
13	Dayananda Sagar College of Engineering Dayananda Sagar Entrepreneurship Research and Business Incubation (DERBI) Foundation, Bengaluru, Karnataka		ICT, IOT, Healthcare Elevate Women Tech Acceleration Programme is a women lead tech entrepreneur programme for late-stage startups in Agritech, Edutech, Fintech, Foodtech, Retailtech, Healthtech and other areas. It is supported by the Government of Karnataka, KITS.
14	IKP Knowledge Park	IKP EDEN NIDHI TBI, Bengaluru, Karnataka	Hardware, IoT, Medical Devices
15	Jain (Deemed-to-be-University)	Jain university incubation centre, Bengaluru, Karnataka	Agriculture, Computational and Connected Technologies
16	Narayana Hrudayalaya - Mazumdar Shaw Foundation	Mazumdar Shaw Medical Foundation, Bengaluru, Karnataka	Healthcare, social entrepreneurship, nano technology, Indian holistic medicine
17	National Institute of Design - Bangalore National Design Business Incubator, Bengaluru, Karnataka		Automobile, Medical-aid, Lifestyle Products
18	E-Health TBI	E-Health TBI - PES School of Engineering, Bengaluru, Karnataka	Bio-pharma, Medical Devices and Healthcare
19	Foundation for Innovation and Social Entrepreneurship, Social Alpha, Bengaluru, Karnataka		Innovative Technologies/products Driving Social Impact across all sectors Act for women
20	National Institute of Technology Surathkal	NITK-STEP, Mangalore, Karnataka	
21	Basaveshwar Engineering College	BVVS BEC STEP, Bagalkot, Karnataka	Food, Biotechnology, Bioenergy
22	KLE Technological University	KLE-CTIE, Hubli, Karnataka	ESDM, BioTech, Agri-Tech
23	Manipal Academy of Higher Education	Manipal University Technology Business Incubator, Manipal, Karnataka	Healthcare, Information & Technology, Energy
24	Sri Jayachamarajendra College of Engineering –Science & Technology Entrepreneurs Park	SJCE-STEP, JSS Technical Institutions Campus, Mysuru, Karnataka	Electronics/IOT, IT/ITES, Manufacturing, Health Area, Agri
25	Despande Startups	Foundations for Sandbox Startup Initiatives - Despande Startups, Hubballi, Karnataka	AgriTech , Medtech , Products centric Startups
26	Indian Institute of Management- Kozhikode	IIMK LIVE (Laboratory for Innovation, Venturing and Entrepreneurship), Kozhikode, Kerala	Social Sector enterprises, Environment, High Technology Firms

27	NIT- Calicut	TBI- NIT Calicut, Kozhikode, Kerala	IT/ITES, Nana Biotechnology, Renewable Energy
28	College of Engineering Trivandrum	CET TBI, Thiruvananthapuram, Kerala	Sustainable Technology Renewable Energy Deep Learning Electric mobility
29	Government of Kerala Technopark Technology Business Incubator (Kerala Startup Mission), Thiruvananthapuram, Kerala		IT/ITES, Emerging Technologies, Healthtech Women Scheme: 1.Soft Loan Scheme for Women Entrepreneurs, 2. Seed Fund for Women Entrepreneurs, 3. Soft Loan against PO for Women Entrepreneurs, 4. Technology Commercialisation Support Events: 1. Women startup summit 2. She loves tech
30	Sree Chitra Tirunal Institute for Medical Sciences and Technology	SCTIMST-TIMed, Trivandrum, Kerala	Medical Devices, Healthcare, Biomaterials
31	Amrita Vishwa Vidya Peetham	Amrita Technology Business Incubator, Kollam, Kerala	Information Technology, NextGen, E-learning
32	Startup Village - SV.co - Indian Telecom Innovation Hub - Technology Business Incubator, Kochi, Kerala		Information Technology
33	IIIT Delhi	IIITD Innovation & Incubation Center	AI, Technology in Healthcare, Robotics
34	Indian Society of Agribusiness Professionals (ISAP)	Indigram Labs Foundation, Delhi	Agri & Food-tech, Clean Tech, Rural healthcare
35	Indira Gandhi Technical University for Women– Anveshan Foundation, Delhi		Women Entrepreneurs Upliftment and empowerment of women in the society by promoting and assisting Women Entrepreneurs and Enterprises
36	Indian Agricultural Research Institute (ICAR-IARI), PUSA- Pusa Technique Se Vyavsay (PUSA TAKSAY) - PUSA KRISHI , Delhi		Agriculture focused businesses
37	Shri Ram Institute of Industrial Research-TBI, Delhi		Manufacturing Sector of Specialty Chemicals, Waste Management, Rubber and Plastics
38	College of Engineering Pune (COEP's) Bhau Institute of Innovation Entrepreneurship and Leadership, Pune , Maharashtra		IoT, Healthcare Technologies, Artificial Intelligence
39	CSIR-National Chemical Laboratory	Entrepreneurship Development Center - Venture Center, Pune , Maharashtra	Inventive Enterprises, Biotech/Biomed/ Healthcare/Agro, Energy/environment sustainability

40	MITCON Consultancy & Engineering Services Ltd	MITCON Technology Business Incubator, Pune , Maharashtra	Agriculture, Biotechnology, Food Processing
41	Symbiosis International (Deemed University)	Symbiosis Centre for Entrepreneurship and Innovation, Pune, Maharashtra	Health-Tech, Artificial Intelligence, Internet of Things.
42	Veermata Jijabai Technological Institute	VJTI Technology Business Incubator, Mumbai, Maharashtra	Energy, Cleantech and EV
43	Somaiya Vidyavihar	Research Innovation Incubation Design Laboratory Foundation, Mumbai, Maharashtra	SMAC (Social, Mobile, Analytics, Cloud); Electronics & Embedded Systems; Healthcare
44	DKTE Textile & Engineering Institute	DKTE Technology Business Incubation, Kolhapur, Maharashtra	Garment & Textile Technology
45	G H Raisoni College of Engineering, Nagpur	G H Raisoni Technology Business Incubator Foundation, Nagpur, Maharashtra	1. Agritech 2. Health 3. Information and Communication Technology
46	Indian Institute of Technology Madras	IITMS Rural Technology and Business Incubator (RTBI), Chennai, Tamil Nadu	Focus on innovative technology benefiting rural areas in education, energy, health and income generation segments
47	Indian Institute of Information Technology Design and Manufacturing, Kancheepuram	MaDeIT Innovation Foundation, Chennai, Tamil Nadu	Smart Manufacturing, Healthcare, Med Tech
48	Sathyabama Institute of Science and Technology	Society of Sathyabama University - Technology Business Incubator, Chennai, Tamil Nadu	Marine Bioresource Utilization, Enineering & Technologies and Waste Management
49	Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology	Vel Tech Technology Incubator, Chennai, Tamil Nadu	Manufacturing, Digital Enterprises & E waste and plastic waste management.
50	Villgro Innovations Foundation, IITM Research Park	Villgro Innovations Foundation, Chennai, Tamil Nadu	Social enterprises in Healthcare, Energy, and Agribusiness
51	Nehru Group of Institutions	Nehru Group of Institutions Technology Business Incubator, Coimbatore, Tamil Nadu	Healthcare and Internet of Things
52	Tamil Nadu Agricultural University	ABIS-Technology Business Incubator, Coimbatore, Tamil Nadu	Agriculture and allied - Farming, Food Processing, Hi-Tech Agriculture
53	PSG College of Technology	PSG CT - Science and Technology Entrepreneurial Park (PSG STEP), Coimbatore, Tamil Nadu	Advance Technologies
54	PSG College of Technology	Nanotechnology Research, Innovation and Incubation Centre (NRIIC), Coimbatore, Tamil Nadu	Advance Technologies - Smart Textiles, Plastic Electronics, Energy &Health Care
55	NIT, Trichy	Tiruchirappalli Regional Engineering College - Science and Technology Entrepreneurs Park - NIT Tirchy, Tirchy, Tamil Nadu	Manufacturing, Energy & Environment

56	Vellore Institute of Technology-Technology Business Incubator (VITTBI), Vellore, Tamil Nadu		ICT, Biotechnology and Healthcare
57	Bannari Amman Institute of Technology (BIT)- Technology Business incubator (BIT-TBI), Sathyamangalam, Tamil Nadu		BIOTECHNOLOGY - AGRICULTURE - ENGINEERING
58	Periyar Maniammai Institute of Science & Technology	Periyar Technology Business Incubator, Thanjavur, Tamil Nadu	herbal, food, bio technologies
59	Thiagarajar College of Engineering	TCE- Technology Business Incubator (TCE-TBI), Madurai, Tamil Nadu	Advanced materials and manufacturing, Automation, Internet of Things, Wireless technologies
60	ICAR- National Academy of Agricultural Research Management (ICAR-NAARM)	a-IDEA (Association for Innovation and Development of Entrepreneurship in Agriculture, Hyderabad, Telangana	Agriculture
61	Indian Institute of Millets Research (IIMR)	NIDHI- Technology Business Incubator (TBI) - “Nesting Incubation and Entrepreneurship for Leveraging Agri-innovations in Nutricereals (NIELAN)”, Hyderabad, Telangana	Agri-Food Processing Seed Management Farm Mechanisation Agronomy, Soil & Agri Health Services Supply chain Management Internet of Things (IoT) & Information and Communication Technology (ICT) in Agriculture
62	University of Hyderabad	ASPIRE- Technology Business Incubator - University of Hyderabad, Hyderabad, Telangana	Pharma, Biotech, Renewable energy & Material Sciences
63	BITS Pilani, Hyderabad Campus	BITS Pilani, Hyderabad Campus TBI Society, Hyderabad, Telangana	MEMS , Pharma , IoT
64	IKP Knowledge Park IKP Life Science Incubator (IKP-LSI)	IKP Knowledge ParkIKP Life Science Incubator (IKP-LSI), Hyderabad, Telangana	Pharmaceuticals, Biopharma and Medtech
65	IIT Hyderabad	i-TIC Foundation IIT Hyderabad, Sangareddy, Telangana	Energy, Bio-Medical, Robotics
66	Indian School Of Business (ISB)	DLabs Incubator Association, Gachibowli, Hyderabad, Telangana	Agri-Tech, Deep Tech, Health Tech.
67	IIM Calcutta	IIM Calcutta, Innovation Park, Kolkata, West Bengal	Agritech, Edutech, Healthtech
68	Maulana Abdul Kalam Azad University of Technology, WB	EKTA Incubation Centre -Maulana Abdul Kalam Azad University of Technology, Kolkata, West Bengal	ICT, Biotechnology, Environment
69	Indian Institute of Technology, Kharagpur	Science and Technology Entrepreneurs' Park - IIT Kharagpur, Kharagpur, West Bengal	Big data analytics & IoT, Advanced manufacturing and Health-care bio-product development

70	Indian Institute of Technology, Kharagpur	Technology Incubation and Entrepreneurship Training Society, Kharagpur, West Bengal	Big data analytics & IoT, Advanced manufacturing and Health-care bio-product development
71	Indian Institute of Engineering, Science and Technology, Shibpur	Tagore Centre for Green Technology Business Incubation, Howrah, West Bengal	Disciplines of science and engineering into products, processes and services
72	Shree Vishnu Engineering College for Women	Vishnu Foundation, Bhimavaram, Andhra Pradesh	Assistive Technology
73	Aditya Global Business School	Aditya Global Business Incubator, Kakinada, Andhra Pradesh	Agriculture, IT
74	Siddharth Institute of Engineering & Technology	Society for Siddharth International Incubation Center, Puttur, Andhra Pradesh	Apps Development, Software, Information & Communication Technology and Agriculture & Allied Products.
75	Sri Padmavati Mahila Visvavidyalayam	Society for Innovation Incubation Entrepreneurship - SSIE-SPMVV, Tirupati, Andhra Pradesh	Internet of Things (IoT), Eco-Technologies
76	IIM Udaipur Incubation Centre, Udaipur, Rajasthan		Healthtech, Edutech and Fintech Program:-Women-In-Tech Startup Accelerator Program PAST EVENT: <u>Women's Startup Program</u>
77	Birla Institute of Technology and Sciences, Pilani- Pilani Innovation and Entrepreneurship Development Society, Pilani, Rajasthan		Information Technology/IoT, Deep Tech (AI/ML/AR/VR, Robotics, Block chain), Data Science solving problems in any of the following themes: Healthcare, Education, Agriculture, Fintech, SaaS, B2B, hyperlocal businesses, Remote working, Collaboration, Crypto currency.
78	Startup Oasis	Startup Oasis, Jaipur, Rajasthan	FinTech, AgriTech and EduTech
79	NIT Rourkela	Foundation for Technology and Business Incubation, Rourkela, Odisha	Electronics and Allied Domains, Agriculture technology, Clean Energy
80	KIIT University KIIT Technology Business Incubator, Bhubaneswar, Odisha		Digital Healthcare, Agritech, MedTech
81	Indian Institute of Technology, Kanpur	Foundation for Innovation and Research in Science and Technology, Kanpur, Uttar Pradesh	HealthTech/ MedTech, Agritech, AI
82	IIM Lucknow	L-Incubator, IIM Lucknow, Noida, Uttar Pradesh	IML EIC: Women Incubation Program
83	Indian Institute of Technology (Banaras Hindu University) Varanasi	Malaviya Centre for Innovation, Incubation & Entrepreneurship - IIT BHU, Varanasi, Uttar Pradesh	Biotechnology, ICT, Agriculture
84	Indian Institute of Management Kashipur	FIED - IIM Kashipur, Kundeshwari, Uttarakhand	Agri-Tech, Fin-Tech
85	IIT Roorkee	TIEDS - IIT Roorkee, Roorkee, Uttarakhand	Engineering, IOT, Life Science

86	Padre Conceicao College of Engineering (PCCE), Goa	Centre for Incubation and Business Acceleration (CIBA), Verna, Goa	Product Development & Design, Food Processing & ITES
87	Don Bosco College of Engineering	Forum for Innovation Incubation Research and Entrepreneurship, Margao, Goa	Product development, Agritech, IT The business Diva -the event is a business idea competition for women and mainly focuses on innovative solutions to women - centric issues and problems.
88	CSIR-Indian Institute of Integrative Medicine (IIIM)	IIIM-Technology Business Incubator (TBI), Jammu, Jammu & Kashmir	1) Discovery & development of phyto-pharmaceutical drugs & cGMP Pilot Plant for extraction, formulation and packaging of botanical/herbal medicines. 2) Fermentation Technology 3) Quality Control & Quality Assurance
89	Shri Mata Vaishno Devi University	Shri Mata Vaishno Devi University - Technology Business Incubation Center, Katra, Jammu & Kashmir	Engineering, Biology, Services
90	IISER, Mohali Society for Technology Business Incubator, Mohali, Punjab		1. Biotechnology (Healthcare, Therapeutic and Industrial Biomolecules and BioEnergy); 2. New materials and Devices(including nanomaterials derived from chemical, physical, biological or material sciences)
91	Thapar Institute of Engineering & Technology, Patiala STEP, TIET, Patiala, Punjab		Biotechnology, IOT, Social Entrepreneurship
92	IIT Mandi	IIT Mandi Catalyst, Mandi, Himachal Pradesh	cleantech, Agrotech, Healthtech
93	IISER, Bhopal	Innovation and Incubation Centre for Entrepreneurship (IICE), Bhopal, Madhya Pradesh	Healthcare and Bioengineering, Environment and Agriculture, Internet of Things and Artificial Intelligence, Social and Rural Development and related Technologies Computational Sciences and Information Technology
94	IIT, Patna- Foundation for Innovators in Science and Technology , Patna, Bihar		Agriculture, Manufacturing, Water harvesting
95	Ambala College of Engineering and Applied Research	Entrepreneurship Promotion and Incubation Council, Ambala, Haryana	Scheme: MSME Idea Hackathon 3.0 (Women)



CSIR–National Institute of Science Communication and Policy Research (NIScPR) came into existence with the merger of two internationally acclaimed CSIR institutions namely CSIR–National Institute of Science Communication and Information Resources (CSIR–NISCAIR) and National Institute of Science, Technology and Development Studies (CSIR–NISTADS). CSIR–NIScPR has made significant progress in fostering ST&I (Science, Technology and Innovation) Policy Research, Science Communication, and serving as a bridge between Science, Technology, Industry and Society.

MISSION

To promote STI policy studies and science communications among diverse stakeholders and act as a bridge at the interface of science, technology, industry and society which is essential to a robust S&T ecosystem in the country.

VISION

To become a globally respected think-tank and resource center for undertaking Science Technology and Innovation Policy Research and Science Communication.

Printed and published by

CSIR–National Institute of Science Communication and Policy Research (NIScPR),
Dr KS Krishnan Marg, Pusa, New Delhi-110012

Visit us: www.niscpr.res.in

Contact: director@niscpr.res.in or sandhyaw@niscpr.res.in