

Draft 5th Science Technology and Innovation Policy

A Snapshot of Major Recommendations



Dr Akhilesh Gupta

Scientist-G & Head, STIP-2020 Secretariat
Department of Science and Technology
Government of India

akhilesh.g@nic.in , india-stip@gov.in

Presentation Outline

- ◆ Contextual Referencing of STI Policy of India
- ◆ Formulation Process
- ◆ Consultations held
- ◆ Summary of Consultations
- ◆ STIP Policy document
- ◆ Major Recommendations from STIP document

Contextual Referencing of STI Policy of India

Scientific Policy Resolution 1958	Sought to “foster, promote and sustain” the <u>“cultivation of science and scientific research in all its aspects”</u> .
Technology Policy Statement 1983	“emphasized the need to attain <u>technological competence</u> and <u>self-reliance</u> ”
Science and Technology Policy 2003	sought to “integrate programmes of <u>socio-economic sectors with the national R&D system</u> and the creation of a <u>national innovation system</u> ”
Science, Technology and Innovation Policy 2013	<i>“<u>Science, Technology and Innovation</u> to focus on faster, sustainable and <u>inclusive development</u> of the people”</i>

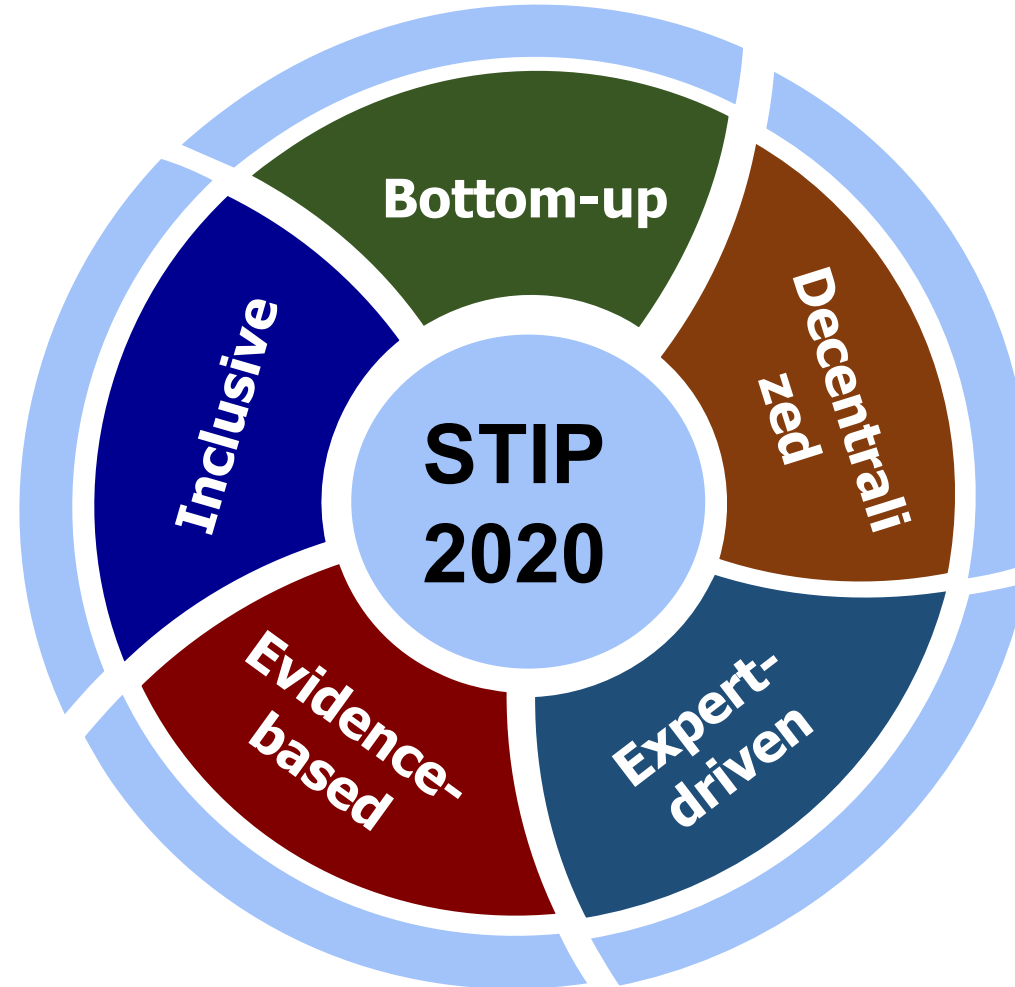
Why India needs a New STI Policy Now?

- ✧ Since 2013 when the last policy was formulated, **India made some unprecedented progress in STI.**
- ✧ STI in India is **undergoing rapid transformation** in recent years in terms of **relevance, scope and scale**
- ✧ **COVID-19** is likely to have short and medium term impact on **STI Resources, Strategies and Priorities**
- ✧ Hon'ble PM gave a clarion call for achieving a "***Atmanirbhar Bharat***" that might need greater focus on development of **indigenous technologies** and encouragement to **grass root level innovation**
- ✧ Rise of **disruptive and impactful technologies and challenges, opportunities**
- ✧ **Strongly connecting S&T to Innovation, Industry and Society**

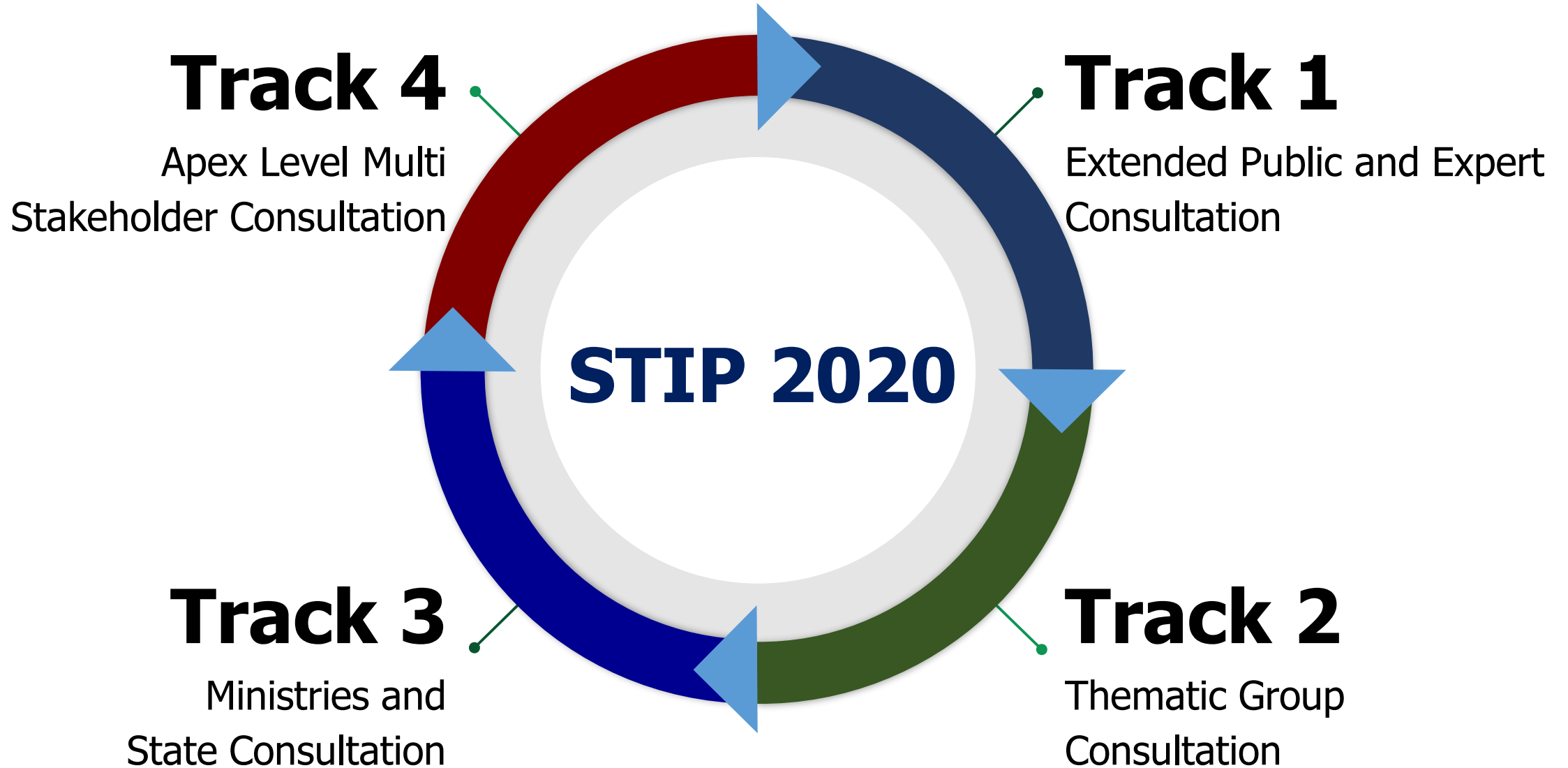
India Made Some Unprecedented Progress in STI areas in Recent Years

- ✧ India's Gross Expenditure on R&D (**GERD**) **increased by more than 3 times during last 10 years**
- ✧ India's **per capita R&D expenditure at PPP got doubled** in last 10 years
- ✧ **3rd Position in terms of no of publications** in SCI journals (5th in 2014)
- ✧ **9th Position in terms of quality** (13th in 2014)
- ✧ **3rd Position in term of no of PhDs**
- ✧ **3rd Largest Higher Education System of the world**
- ✧ **3rd position in terms of No of Startups** (~32,000)
- ✧ **3rd Position in terms of no of UNICORNs** (Huron **Global Unicorn List, 2019**)
- ✧ **9th rank in terms of Resident Patent filing**
- ✧ **48th rank in terms of Global Innovation Index** (from 81st position in 2015)
- ✧ **Women participation** in extramural R&D got **doubled in last 6 years**
- ✧ **3.42 lakh R&D personnel – ~40% increase in last 6 years**
- ✧ **India moved up by 79 places in last 6 years** its **WB Global Ranking in Ease of Doing Business** (from 142nd to 63rd) **contributed thro technology**

Unique Features of Proposed STIP-2020



4-Track Formulation Process



Progress So far: Chronology of Actions

November, 2018	PM chairs meeting of PMSTIAC and gives direction to come up with a National STI Policy
December, 2019	6 Consultative Apex level committees set up
January, 2020	First meeting of Apex Committee held to plan STIP formulation process.
May 2020	<ul style="list-style-type: none"> ✧ STIP-2020 Secretariat was set up with DST officials and STI Policy fellows. ✧ Launch of a 4-track formulation process
June, 2020	<ul style="list-style-type: none"> ✧ Track-II process initiated : discussions in Thematic Groups held ✧ Track-III process initiated : Preliminary consultations with States and Ministries initiated ✧ Track-I process initiated: 6 broad activities
July-Dec ,2020	<ul style="list-style-type: none"> ✧ Wide-ranging Stakeholder consultations held under Tracks-I and III ✧ Hon'ble Minister S&T, ES & H&FW led 3 major consultations with Public, State S&T Ministers and Indian Diaspora ✧ Draft approved by Hon'ble Minister for Public Consultation

Stakeholders Consulted

- ❖ Research students
- ❖ Young scientists
- ❖ State govt Nodal officers /representatives
- ❖ Line ministry focal points
- ❖ VCs & campus ambassadors of universities n colleges
- ❖ Members of National and State level units of Vijnana Bharti (VIBHA)
- ❖ Women scientists from different parts of the country
- ❖ Several individual state governments and ministries
- ❖ Industry captains and leaders
- ❖ Thought leaders, distinguished scientists, experts, policy experts
- ❖ Civil Society Organisations, NGOs
- ❖ Representatives from NE, tribal regions, knowledge institutions
- ❖ Members of Indian diaspora, embassies, etc.
- ❖ Members of 21 Thematic Groups
- ❖ Participants of "In Conversation with series"
- ❖ Participants of "Across the Table" panel discussions
- ❖ Participants of Survey, Podcasts, Ideathons, Open Letters

Consultation Process : Some Statistics

- ◆ **Nearly 300 rounds of consultations**
- ◆ **Nearly 9,000 people participated in one on one consultations**
 - ✧ 1200 Vijnana Bharti members
 - ✧ 2000 university/college faculty/students
 - ✧ 1000 States/ministries representatives
 - ✧ 2000 members from NGOs/CSOs/NE and tribal regions,
 - ✧ 2000 representatives from Industry, Indian Diaspora, Embassies, Knowledge institutions
 - ✧ 1000 thought leaders, leading scientists, experts, policy experts,
- ◆ **Over 34,000 participated in the 6 broad activities as part of extended public consultations under Track-I**
 - ✧ 10000 as part of Thoughts for India through Community radio
 - ✧ 11000 as part of Across the Table panel discussions
 - ✧ 12000 as part of "In conversation with" public interview
 - ✧ 1000 as part of Survey, Ideation and Open letters
- ◆ **About 95,000 participated in the Quiz**
- ◆ **Over 1 lakh suggestions and ideas received**

Key Highlights of Consultation Exercise

- ◆ STIP-2020 has been perhaps one of the **largest, widest, quickest and most intense** exercises ever for any national policy formation in the country. Nearly 300 consultations in 6 months (Average 2 meetings per day) involving over 43000 stakeholders. Received 1 lakh suggestions
- ◆ STIP-2020 may be the **first ever policy which has directly involved States and Indian Diaspora** in the pre-draft consultation process
- ◆ There has been **well distributed participation** in terms of region, age, gender, education, economic status, etc in the exercise.
- ◆ **Gender balance was maintained all through the formulation process including in the Editorial/drafting exercise.** 40% of members were women. **Women dominated** both in the policy input and drafting exercise
- ◆ **A good mix of young and experienced was also ensured.** The youngest member was 25 year old, the oldest was 80+ year old. Youngest participant of Survey/Ideathon was 10 year old, oldest was 85 year old

Draft STI Policy Document

Chapters

1. Open Science
2. Capacity Development
3. Financing STI
4. Research
5. Innovation and Entrepreneurship
6. Technology Development and Indigenisation
7. Equity and Inclusion
8. Science Communication and Public Engagement
9. International STI Engagement
10. STI Governance
11. STI Policy Governance

Chapter-I : OPEN SCIENCE

Open Science

- ◆ A **National STI Observatory** as a central repository for all kinds of data related to and generated from the STI ecosystem
- ◆ **INDSTA (Indian Science and Technology Archive of Research)** – a dedicated portal to provide access to the outputs of all publicly-funded research (including manuscripts, research data, supplementary information, research protocols, review articles, conference proceedings, monographs, book chapters, etc.).
- ◆ **Open Data Policy for Publicly Funded Research** - All data used in and generated from public-funded research will be available to everyone under FAIR (findable, accessible, interoperable and reusable) terms.
- ◆ **Open Access:** Full text of final accepted author versions of manuscripts (postprints and optionally preprints) supported through public funding will be deposited
- ◆ **One Nation, One Subscription:** The Government will negotiate with journal publishers for a “one nation, one subscription” policy whereby, in return for one centrally-negotiated payment, all individuals in India will have access to journal articles.

Chapter 2: Capacity Development

Capacity Development

- ◆ **Research Excellence Framework for HEIs in India (REFI) will be evolved** for research assessment to secure the continuation of a holistic, dynamic and responsive research base across the full academic spectrum within India's higher education ecosystem.
- ◆ **Creation of 'Engaged Universities'** to the needs of the community by conducting interdisciplinary projects involving scientific and technological and social science-based interventions.
- ◆ **Innovation and Entrepreneurship centres** will be established at regional levels in a collaborative approach with the participation of local Academic and R&D institutions, industries, MSMEs, Startups, etc.
- ◆ **Creating Teaching-Learning Centres (TLCs)** in urban and rural areas for upskilling of faculty members, to enhance learning experience and engagement. for effective outcomes.

Capacity Development

- ◆ **Collaborative Research Centres (CRCs)** to bring together industries, MSMEs, startups, R&D institutions and HEIs with the government.
- ◆ **Transforming existing R&D institutions to research universities** to create linkages between research and education and enable effective utilization of research infrastructure.
- ◆ **Establishing independently and professionally managed, self-sustaining equipment infrastructures** across the country. This will provide easy access and assistance on using the Sophisticated and Analytical infrastructure to the Academics, R&D institutions, Industry, MSMEs, NGOs, etc.

Chapter 3: Financing STI

Financing STI

Expansion of the STI Funding Landscape

- ◆ Each department/ministry in the central, the state and the local governments, public sector enterprises, private sector companies and startups to set up **an STI unit with a minimum earmarked budget** to pursue STI activities with the larger goal of uplifting socio-economic conditions of all citizens.
- ◆ **Each State to earmark a percentage of the state allocation for STI-related activities** under a separate budget head.
- ◆ **Foreign Multi-National Companies (MNCs)** - Partnerships and collaborations with domestic private (SMEs and start-ups) and public sectors entities (HEIs and research organizations) to work on projects aligned to national needs and priorities.

Financing STI

Incentivisation for STI investments

- ◆ **Boosting fiscal incentives for industries investing in STI** through incremental R&D based tax incentives, tax credit for investing in facilities for commercialization, tax holidays, tax waivers, target-based tax incentive for specific domains, tax deduction, expatriate tax regimes, remodelling of patent box regime etc.
- ◆ **Enhancing financial support to industry, especially for MSMEs, for pursuing research through innovation support schemes** such as matching grants, small business innovation grants (under fast track mode), innovation vouchers (SMEs), direct innovation grants, risk guarantees, with special focus on high risk projects, revenue-based financing, seed grants, loans, research subsidies, equity, research and IPR credits, open innovation scheme etc.

Financing STI

Governance of STI Financing Landscape

- ◆ **An STI Development Bank** to facilitate a corpus fund for investing in direct long term investments in select strategic areas on various long and medium-term projects, commercial ventures, start-ups, technology diffusion and licensing etc.
- ◆ **Modification of General Financial Rules, for large scale mission mode programmes and projects of national importance.** Certain GFRs to be amended to facilitate ease of doing research.

Chapter 4: Research

Research

- ◆ **Joint appointments** across government, academia and industry at both the national and the international levels will be facilitated to attract the best talent into the research ecosystem.
- ◆ Research solutions should address solutions for different regions/socio-economic strata including a **focus on rural problems** in the country.
- ◆ In addition, a lot of **publicly-funded research is largely invisible to target stakeholders such as the line ministries** who often contract out research that has already been carried out, but of which they are unaware.

Research

Ease of Doing Research

- ◆ To **reduce the administrative burden on the researchers, digital platforms and e-governance will be used** for grant-management - all activities from award, funding and utilisation of grants to measurement of research outputs.
- ◆ **Access and sharing of knowledge and resources will be improved through the use of online platforms such as INDSTA**, implementing open data and open access policy, and by enabling access to journals and databases.
- ◆ **Benchmarks for 'ease of doing research' will be developed** so that research activities are adequately funded, are less bureaucratic and accountability is in both directions i.e. the donor and the receiver.

Chapter 5: Innovation and Entrepreneurship

Innovation and Entrepreneurship

- ◆ **An institutional architecture for integrating traditional knowledge systems (TKS) and grassroots innovation into the overall education, research and innovation system.**
- ◆ Avenues for **collaborations between grassroots innovators and scientists** will be initiated and facilitated through joint research projects, fellowships and scholarships.
- ◆ The **Grassroots innovators will be supported** for registration, claiming the IPR, filing of patent, or any type of legal claim with the help of HEIs.
- ◆ **Theme-based distributed virtual incubators and accelerators** will be created in different parts of the country using cluster-based approach

Chapter 6: Technology Development and Indigenisation

Technology Development and Indigenisation

Indigenous Development of Technology

- ◆ **Increased focus on the indigenous development of technology** - Indigenous technologies will be promoted even if better technologies exist internationally.
- ◆ **Key products or components imported by Indian companies for their manufacturing plants will be identified and a provision will be made to fund such product-based R&D with industry-academia collaborations**
- ◆ Existing mechanisms will be strengthened to bring in Indian industry to help bridge the gap from lab to indigenous manufacturing capacity.

Technology indigenization

- ◆ To strengthen India's local R&D capabilities in the production of technologies that are largely being imported, **infrastructure will be set up and existing mechanisms will be strengthened to adapt existing technologies to suit the local needs.**

Sustainable Technology Push

- ◆ **Policy push for development and deployment of sustainable technologies** to address major socio-economic challenges and changing aspirations of the people

Technology Development and Indigenisation

Strategic Technologies

- ◆ **Set up a Strategic Technology Board (STB)** to act as a connecting bridge between different strategic departments and to monitor and recommend technologies to be bought or indigenously made in the strategic departments or in private sector or in academic institutions in line with self-reliant India.
- ◆ **Set up a Strategic Technology Development Fund (STDF) to encourage the private sector and HEIs to develop strategic technologies.** STDF to be managed by the independent body STB to avoid conflict of interest.
- ◆ **Spin-off Technologies for Civilian Use:** Mission oriented projects and **technologies developed for the strategic sector lead to a lot of spin-off technologies for start-ups** and government to commercialize those. A peer group under the guidance of the Strategic Technology Board (STB) will decide which technologies are suitable for such transfer, possibly with the involvement of the appropriate industry

Chapter 7

Equity and Inclusion

Equity and Inclusion

- ◆ **Mainstreaming Equity and Inclusion** : E&I should be added as a *sub-text* to all STI policies and processes (*existing and upcoming*)
- ◆ **Institutionalising Equity and Inclusion: An Indian Centric E&I Charter will be developed for tackling discriminations in STI, based on gender, caste, geography, language, disability and other exclusions and inequalities.**
 - ✧ There will be **equal opportunity in academics for women along with candidates from rural – remote areas**, marginalised communities, differently abled groups, irrespective of their caste/creed/religion/race.
 - ✧ **Enhanced representation of women, at least 30%** of the total strength, in all decision making bodies including selection and evaluation committees will be mandated.
 - ✧ A specific highlight will remain upon **promoting talented women scientists in leadership positions** across research and science administration to create inspiration for women aspiring to pursue science careers.
 - ✧ **LGBTQ+ community to be included into all the conversations related to gender equity.** Provisions will be made to safeguard their rights and promote their representation and retention in STI.
 - ✧ **Differently-abled individuals, including Divyangjans, will be given special attention.** Institutions are to be mandated to make structural and cultural changes for supporting such excluded groups, in order to pursue and practice STI.

Equity and Inclusion

Recruitment, Retention and Promotion

- ◆ **Ageism-related issues and minimisation of career breaks are to be addressed for effective retention of trained women into the STI workforce.** In this case, all professional career milestones, such as recruitment, awards and funding schemes, age cut-offs will be implemented considering academic age rather than biological/physical age.
- ◆ **Dual recruitment policy will be encouraged** in all governing bodies, funding agencies, so that couples do not face the challenge of 'choosing' a spouse's career over theirs.

Institutional Mechanisms

- ◆ **An institutional mechanism will be created to bring about diversity, equity and inclusion in STI** to remove barriers to participation, promotion and incentivisation and ensure the recruitment, retention and effective engagements of the excluded groups and marginalised communities.

Chapter 8

Science Communication and Public Engagement

Science Communication and Public Engagement

Capacity Building and Research

- ◆ **Creative and cross-disciplinary platforms of Science Communication** will be promoted to enable dialogue and knowledge transfer between researchers, science communicators and the public.
- ◆ **Community-centric programmes and regional science centres will be encouraged to promote science communication in regional languages** with local and hyper-local contexts for last-mile connectivity.
- ◆ **Publicly accessible, constantly updated, and searchable databases** of science communication-related resources and opportunities will be facilitated.

Science Communication and Public Engagement

Outreach

- ◆ In line with the national policy on *Scientific Social Responsibility (SSR 2020)*, **scientists and researchers will be motivated and incentivised to engage in Science Communication** and Public Engagement Activities.
- ◆ Institutes and organizations will be encouraged to earmark a percentage of allocated budget (SSR fund) for science communication and public engagement activities.

Mainstreaming Science Communication

- ◆ Every public-funded institution and department will have a **dedicated wing set-up for science communication** and public engagement in STI-related activities.
- ◆ **Science Media Centres will be established at national and regional levels** as an interface between media persons, scientists and science communicators that can enable mainstream media to increase its coverage of scientific topics.

Chapter 9

International STI Engagement

International STI Engagement

Engagement with Diaspora

- ◆ **Create a fine balance between attracting the best talent back home and creating facilitating channels for the diaspora** to contribute in national development from wherever they are.
- ◆ **Fellowships and internships schemes and research opportunities in India will be expanded and widely promoted across different ministries to attract diaspora.**
- ◆ To promote brain circulation, **appropriate facilitating channels will be created** for the non-returning diaspora to contribute back to the country.
- ◆ An engagement **portal exclusively for Indian scientific diaspora will be created** (e.g, Pravasi Bhartiya Academic and Scientific Sampark- PRABHASS).

International STI Engagement

Proactive STI Diplomacy Strategy

- ◆ In addition to pursuing '**S&T for Diplomacy**', **Diplomacy for S&T** ' will be promoted.
- ◆ **International Knowledge Centres, preferably Virtual, will be established** to promote global knowledge and talent exchange by creating avenues such as visiting fellowships, joint research schemes, training programmes, invited lectures etc.
- ◆ The **number of S&T Counsellors will be increased** and their role will also be revitalised and redefined

Chapter-10: STI Governance

STI Governance

- ✧ **An inter-sectoral, inter-ministerial national level STI Governance mechanism** will be set up at the highest level, for building synergy and improving coordination among various ministries/departments/organizations to strengthen national STI ecosystem
- ✧ **An interlinked, Centre-State, inter-State governance mechanism** will be created at the highest level for better coordination between the Centre and the States and to enhance overall participation of the States in research and innovation.

STI Governance

Research and Innovation Governance

- ◆ A robust Research and Innovation (R&I) governance framework will be set up to link with the proposed '**National Research Foundation**' (NRF) to facilitate, stimulate and coordinate R&D activities across the sectors.
- ◆ Standardized **Research and Innovation Excellence Frameworks (RIEF)**, based on international benchmarks, will be formulated to ensure cohesive and transparent evaluation of all kinds of research and innovation.
- ◆ **A suitable metric will be developed to evaluate and recognize the outcome and impact of research activities with respect to its direct relevance to Indian needs**, while continuing to maintain international comparability.
- ◆ **Lateral recruitment (minimum 25%) of professionals and subject matter experts will be mandated in all scientific ministries**
- ◆ **Capacity development efforts for R&I will be strengthened through the establishment of a Capacity Building Authority** to help in planning, designing, implementing and monitoring of capacity building programmes at the national and state levels.

Chapter-11

STI Policy Governance

STI Policy Governance

Institutional Mechanism

- ◆ An **STI Policy Institute**, with a strong national and international connect, will be established with a mandate to serve all aspects of STI policy governance.
- ◆ **An Inter-operable STI metadata architecture** will be developed and maintained by STI Policy Institute.
- ◆ **Strengthening STI Policy Research**: The STI Policy Institute will conduct and promote nationally and internationally relevant STI policy research, to identify policy gaps and provide evidence for effective policymaking.
- ◆ **Strengthening Science Advice Mechanism** will be developed and strengthened at sub-national, national and international levels by systematically linking the evidence base with the apex-level advisory and governance mechanisms including CCSTI, IS-STIC and NSTIAC.

STIP Overall Vision

- ◆ To achieve technological self-reliance and position India **among the top three scientific superpowers** in the decade to come.
- ◆ To attract, nurture, strengthen and retain critical human capital through a **'people centric' science, technology and innovation** (STI) ecosystem.
- ◆ To double the number of Full-Time Equivalent (FTE) researchers, Gross Domestic Expenditure on R&D (GERD) and private sector contribution to the GERD every 5 years.
- ◆ To build individual and institutional excellence in STI with the aspiration to **achieve the highest level of global recognitions and awards** in the coming decade.

Thank You