



Bharat

6G VISION



Taskforce Report
R&D Finance



सत्यमेव जयते

Government of India
Ministry of Communications
Department of Telecommunications
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6G Taskforce Report: R&D Finance

1. Background

Telecommunication technology products require significantly large funding and long gestation periods for R&D and commercialization. The stages move from ideation, research, incubation, prototyping, lab testing, miniaturization, field testing, hardening, securitization, outdoor readiness, licenses for background IPs, Standardization etc. In the cases of deep tech SoCs (System on Chips) funding needs would go further higher due to multi-layers of prototyping. These are some of the factors which enabled only a few global companies to sustain in the market while continuously investing in R&D withstanding aggressive global competition. In this scenario, standardized open interfaces have enabled emergence of small niche companies to develop products to meet various requirements in both public and private networks.

India is in the cusp of emergence of several small companies, start-ups and academia in these niche areas opening new doors for positioning India on global Digi-com technology landscape. The brimming start-up ecosystem is an added strength to in the 6G technology initiative. The outcome of supply-base assessment carried out by DoT a few years back reflects competencies across industry and academia (indigenous 5G Testbed) to firmly believe that with suitable and sufficient funding, policy handholding will enable Indian players to play an important role in global partnerships in 6G and beyond programs with significant value add in global value chain.

As may be seen in the figure-1, patents filed in communication Technologies at Indian Patent office are relatively small.

Technology ownership and control is transcending over the normative trade principle of just reducing import bill but is gaining strategic importance in view of geo-political relations.

Technology ownership is also being directly related to making affordable technologies across economic verticals for proliferation of technology adoption.

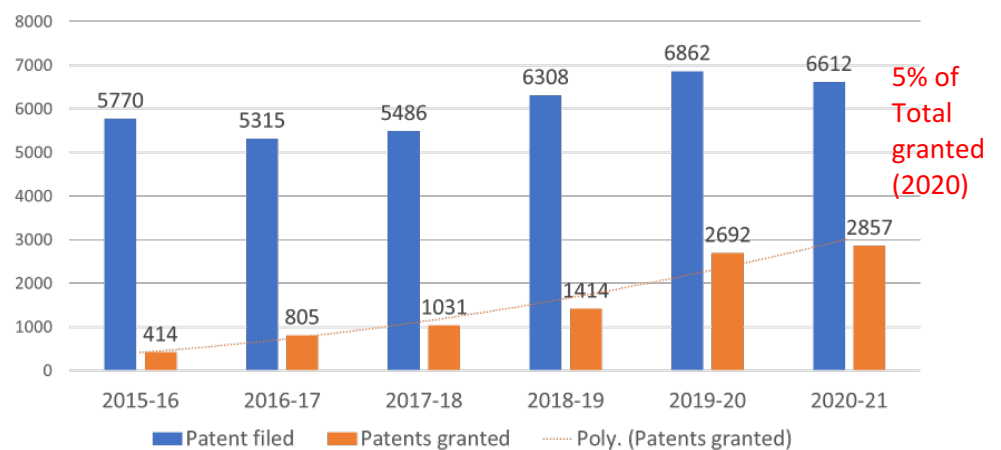


Figure 1: Communication Technology Patents (Indian Patents Office)

The Taskforce on R&D funding is constituted with the following terms of reference to enable Indian R&D ecosystem leapfrog in the 6G activities with concrete outcomes in terms of the development of technologies, contribution to global 6G standards and commercialization of the developed products for domestic and global markets.

1.1. Terms of Reference

- Develop a roadmap for funding R&D, Pre-standardization, Standardization Activities, Development of 6G Technologies, Products and Applications
- Mechanisms for vetting R&D budget proposals under the 6G Mission
- Funding models and modalities of R&D activities and ecosystem – Academia / Industry / industry-Academia joint partnerships, IPR Development, Standards Development, Proof of Concepts, PPP Projects, Testbeds, Setting up CoEs, Pilot Rollouts etc.
- Any other items in the scope of funding of 6G activities including awareness, capacity building, hackathons, and over all deliverables.

Other taskforce's chairs are also part of the R&D funding taskforce (constitution at **Annex 1**) to bring in respective taskforce plans and programs as part of the larger funding proposition and build synergies.

2. Objectives for 6G R&D Funding

- To promote the ecosystem for research, design, prototyping, development, proof of concept testing, IPR creation, field testing, security, certification and manufacturing.
- To develop and establish relevant standards to meet national requirements and enable their standardization in international standardization bodies.
- To enable proliferation of affordable broadband and mobile services; positioning state of the art communication technologies for rural and remote areas to bridge digital divide.
- To create synergies among the Academia, Research Institutes, Start-ups and Industry for capacity building and development of telecom ecosystem through outreach to build relevant technologies and solutions.
- To bridge the gap between R&D and commercialization of products and solutions.
- Commercialization of developed technologies for domestic and global markets.
- To build competency base for beyond 6G communication technologies.

3. Summary of Recommendations

- The programs under 6G to encourage building technology ownership, developing IPRs and SEPs, moving from prototyping to commercialization as part of the project roadmap. CDoT along with other research institutions is envisaged to play a significant collaborative role.
- Funding needs are diverse for academia, industry, research organizations to build capacities and competencies in different stages of R&D for 6G program in the coming ten years. Hence, different funding mechanisms and instruments to be adopted with flexibility and liberal norms.
- Funding to cover different activities under research, design, prototyping, development, proof of concept testing, IPR creation, standardization (Including pre-standardization) standards participation, field testing, security, certification in the R&D process.
- The projects may include Research Testbeds, R&D in products such as network elements, antennas, reflectors, systems, devices, SoCs. At a later stage, they may extend to largescale trials, CoEs for use cases etc. As part of funding, a seed funding for the joint international projects may be explored on bilateral and multilateral platforms.
- Since from inception i.e., research stage, industry participation from technology companies and system integrators should be envisaged to enable scale R&D to higher TRL levels with agility and velocity.

- Apart from technologies which are upgrades of 5G+, several new research projects may be necessary to work on cross-platform projects, that may require significant funding to contribute to IPRs in 6G research.
- A program to identify industry champions to facilitate funding on liberal terms may be initiated. It should also identify “academia clusters” for taking up programs based on competencies in different verticals and ‘system integrators’ for orchestrating new generation products.
- Constitute an Apex Level Advisory board with Indian experts from India and abroad for advising on programs and funding needs. Members from relevant ministries to be included to enable synergies in funding related programs.
- There is a need to create a large corpus of R&D fund to facilitate various funding instruments such as grants, loans, VC fund, fund of funds etc. A pool of Rs. 10,000 CR is envisaged to be created to service these requirements for the next 10 years with eye on R&D and commercialization. Government may take lead in creating this fund considering the budding technology ecosystem in the country to strengthen it for 6G and beyond technologies.
- Two tiers of grants are proposed i.e., up to Rs. 20 Cr to service funding requirements ranging from small to medium. Grants above Rs 20 Cr are envisaged for High Impact projects.
- Administrative set up for vetting R&D projects may include the following depending on the size and scope.
 - Inter-ministerial committee: The mechanism could commence its work in line with other R&D funding schemes like DCIS etc.
 - A Section 8 Company or Society may be envisaged exclusively as a delivery mechanism for 6G, and other telecom related programs or existing agencies of other ministries may also be considered on need basis.
 - Telecom focused VC fund and Fund of funds are envisaged for large size high risk funding needs.
- Entities eligible for R&D funding, indicative process, administrative structure are also indicated to enable early take off of the program.

4. Large capital needs for R&D

The figure 2 presents R&D expenditure of global majors including telecom OEMs. It may be seen the

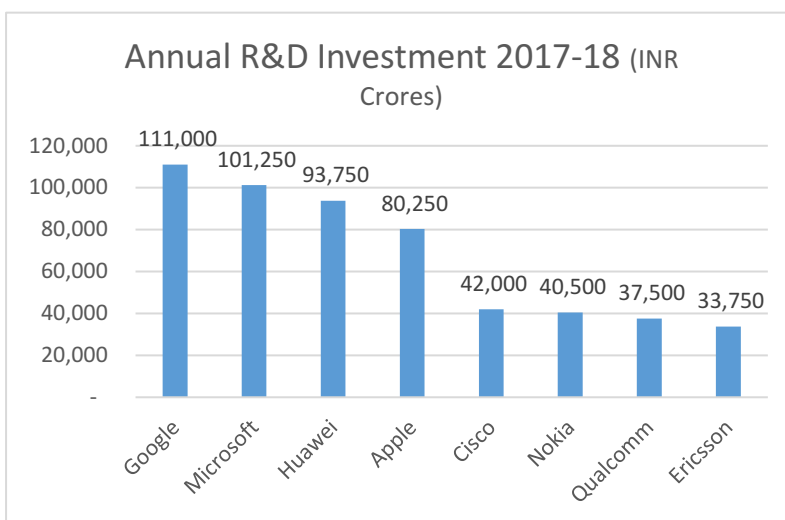
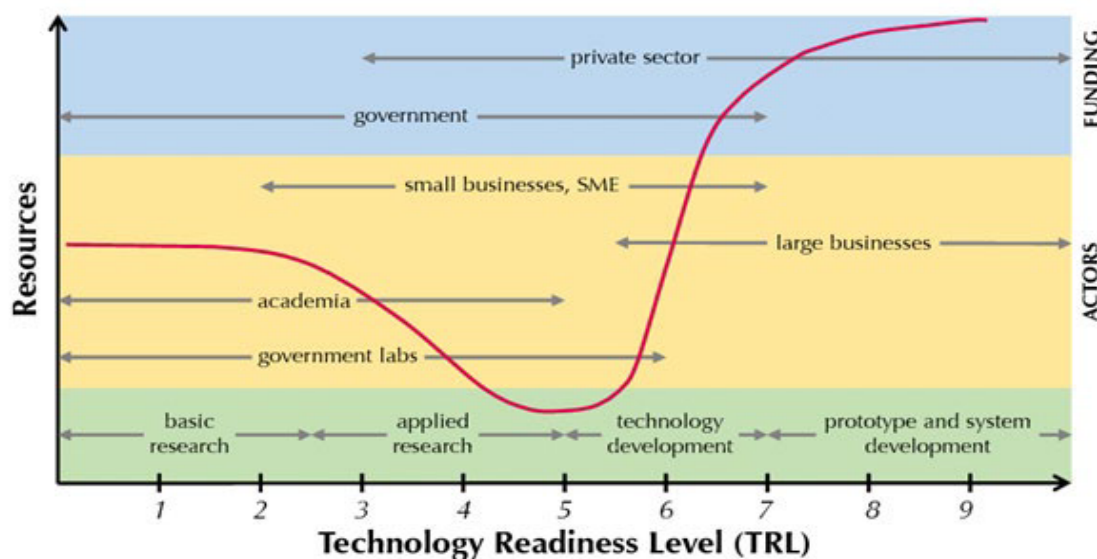


Figure 2 Source: <https://spendmenot.com/blog/top-rd-spenders/>

kind of investments that may have gone into 5G technology development noting the R&D expenditure in communication technology companies.

The figure 3 presents the role of different agencies including government, academia, small and large businesses in different stages of technology

development. In the cases of new technologies development in TRL levels 1-7, the government is envisaged to take a lead role.



Source: Hensen, Jan & Loonen, Roel & Archontiki, Maria & Kanellis, Michalis. (2015). Using building simulation for moving innovations across the "Valley of Death". REHVA Journal. 52. 58-62.

Figure 3 European Commission - EURAXESS

Taking note of strategic and economic needs of technology ownership in Critical and Emerging Technologies (CET), acknowledging the large needs of capital formation for telecom technology R&D and lead role envisaged from government, it is necessary, to create a large pool of capital for R&D in the country, through different financing structures and instruments.

As per the supply base assessment carried out by DoT, there are significant competencies in the country in technology products and platforms cutting across network infrastructure, transport, devices, platforms, SoCs, antenna systems etc. It was also noted many of the technology companies in the strata of SMEs and Start-ups are cash strapped for additional R&D funding despite their demonstrated competencies in 5G technologies. It may also be noted that patents filed by domestic companies is a fraction of total patents filed in telecom technologies.

5. Funding timelines

The following schematic presents a likely unified view of 3GPP, ITU regarding 6G program. While research projects are envisaged to dominate in the initial phases, the middle phase may focus more on standardization, prototyping followed by commercialization beyond 2028.

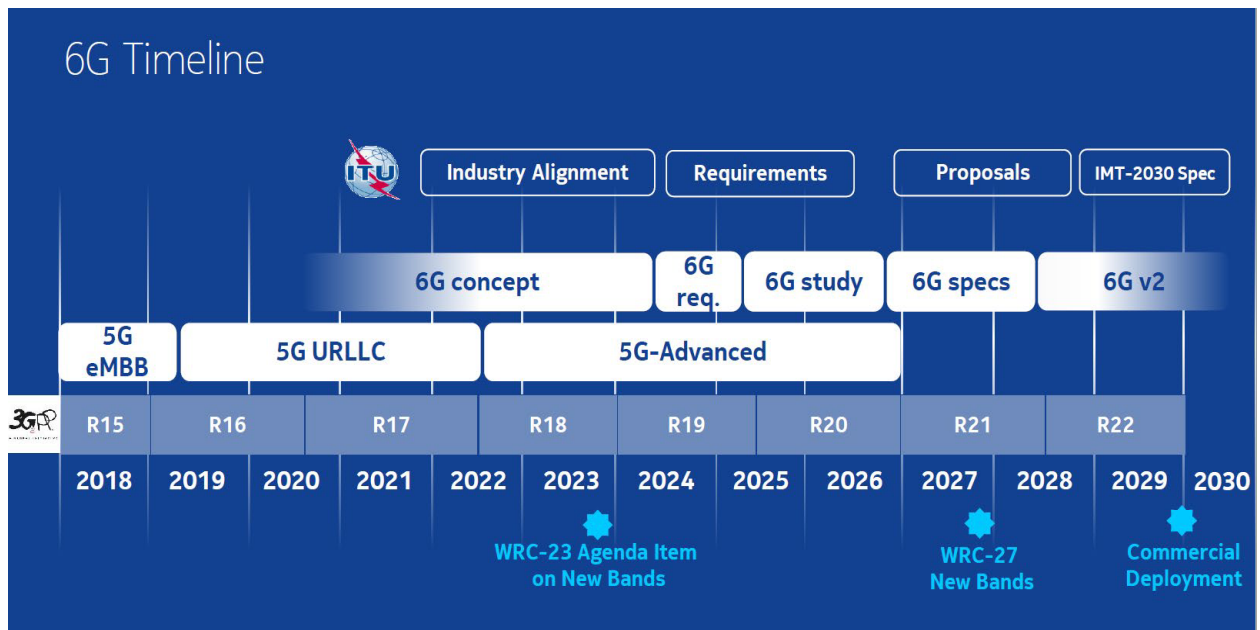


Figure 4 6G Timelines: Source Nokia

So, in line with global timelines, the 6G funding program should synchronize its activities and facilitate R&D stakeholders in a lock stock barrel approach on all fronts.

6. Priorities

6.1 Identifying champions in technology development

As mentioned, funding the industry and academia with focus on start-ups and SMEs who have core strengths and demonstrated capabilities is an important first step before taking a big leap. Considering the limited resource in terms of grants, an exercise to identify champions may be carried out to identify key industry players in terms of individual funding (in the cases of SMEs and Start-ups) and consortium programs (in the cases of academia and system integrators) to avoid thin spread of available funding. A DoT Apex Committee may come out with an expression of interest in a specific format to identify key players in this direction. The facilitation may include waiving the need for bank guarantees, need for collateral etc., for any advances to be paid in technology development and special dispensation under grants and instruments.

- SMEs, Start-ups: IPRs generated in the previous generation technologies, investments made in R&D, TRL levels of products.
- Academia or cluster of academia: IPRs generated in the previous generation technologies, TRL levels of technologies and products.
- The above doesn't preclude any new generation domestic companies emerging in the 6G landscape in applying for necessary funding support.

6.2 System Integration is key

The trend of open interfaces in technology products (e.g., Open RAN) is envisaged to continue triggering several small new companies developing niche products fitting into the technology / product architecture of 6G. These augurs good for Indigenous companies to position their products against competition in global markets.

Cross platform, cross device, cross medium orchestration demands state of the art expertise in system integration of these products from start-ups and SMEs making it a wholesome solution. As successfully demonstrated in the case of BSNL 4G PoC trials, Indian R&D ecosystem needs specialized system integrators in communication technologies to bring different flavours of products and solutions together to frontend, rollout, and support services on ground not only in 5G era but more so in 6G era, especially due to lack of mega technology companies from India, who may bear investments upfront and extend support perpetually during the life cycle of the products.

Building successful partnerships with System Integrators from the beginning in all R&D projects in 6G would reasonably ensure commercialization of technologies.

6.3. Funding in standards participation

In line with INSS (Indian National Strategy for Standardization), funding of experts from industry to enable their full participation in all the standardization process meetings is necessary to build standardization competencies in global platforms to consummate Indian standardization efforts leading to engage in SEP generation from the country.

6.4. Funding through different structure and instruments

Different funding instruments and structures are necessary to realize the objectives set forth under the 6G TIG and these are elaborated in later sections.

6.5. Apex level advisory board for funding direction

It is proposed to have an apex level board with Indian experts from India and abroad under DoT chairmanship to provide guidance and direction to the funding program for largescale projects cutting across ministries.

6.6 Champion initiatives & Programs

The 6G program may initiate champion initiatives taking note of inputs from the taskforce reports. Some of these initiatives include:

- A time-bound 6G Competency assessment program across institutes and industry
- Testbeds for Tera Hz and 5G+
- Advanced IoT Communication Modules and ecosystem
- Quantum Communications and security for 6G
- Fabless design in 6G Communication chipsets
- Photonics based SoCs
- Intelligent Reflector Surfaces
- Spectrum sharing technologies

6.7. Creating mechanisms to sustain R&D in long term

- Ensure flexible and full funding for technology companies through all possible instruments (including grants, loans focused venture capital fund and fund of funds) on flexible and liberate terms
- Incentivize service providers to try domestic technology products ongoingly
- Handhold in access to market for the quality domestic Technology products in Universal Service Obligation Fund (USOF) tenders, public sector procurements in all models

Structure of above programs and initiatives is tabulated in later sections.

7. Global Thoughts on 6G Actions and Funding (Wilson Centre)

The task force explored different funding models in Europe, USA in public and private for global practices especially regarding 6G Technologies.

- Creation of easy-to-use funding mechanisms for research and testbeds to maintain pace within leading countries and secure leadership in 6G technology.
- Driving a 6G eco-system development, leveraging research, industry and university collaboration programs and standardization.
- Incentivize advanced manufacturing in relevant markets, secure integrity of supply chains and decrease concentration of strategic capabilities and dependencies on high-risk countries
- Incentivize operators and vertical industries to adopt 6G.

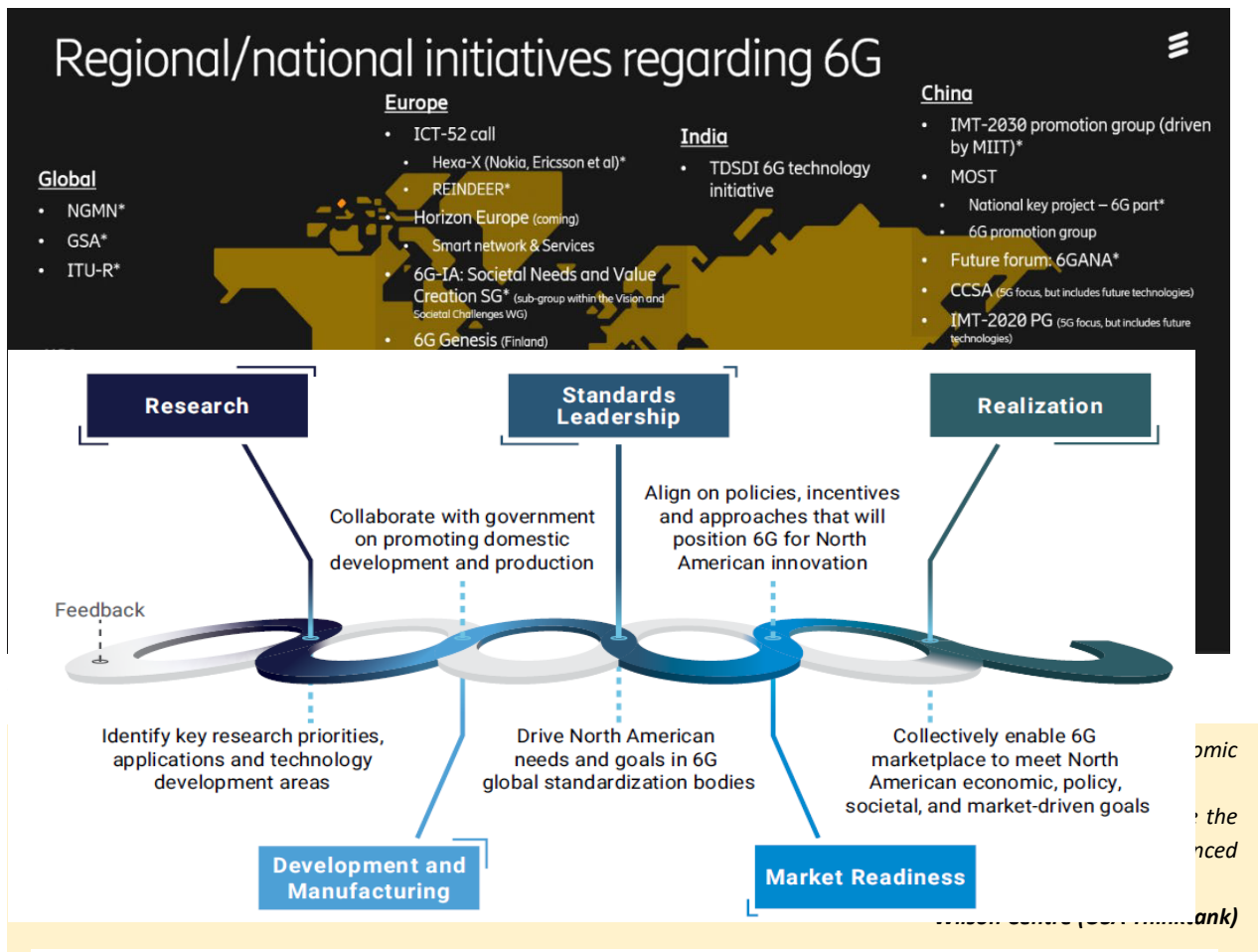


Figure 6 NextG Alliance Roadmap

Some of the specific funding mechanism in EU, USA are presented in Annexure 2, 3.

8. Programs and Funding Models

Phase I: 5-7 Years

- Creation of easy-to-use funding mechanisms for research and testbeds to maintain pace within leading countries and secure leadership in 6G technology.
- Driving a 6G eco-system development, leveraging research, industry and university collaboration programs and standardization.

#	Area	Partners	Remarks
1.0	Workshops and Competency identification exercise	Industry, RI (Research Institutes) and Academia	50 Workshops (over 5 years)
1.1	Research Projects, Prototyping on 6G Technologies	Industry, RI, and Academia	Identify With clarity on IPRs ownership and licensing framework
1.2	International Joint Projects	EU, Japan, Korea, US	Structure & Funding Partnerships (QUAD; EU, Korea, Japan – JWG)
1.3	Testbeds, Prototypes in Industry with Academia Partnership (Lab, City)	Industry, RI, and Academia	Build SEPs and 'Commercialization'
1.4	PoC, Consortium Program of Technology Development	Industry, RI, and Academia	End to end system development and proliferation
1.5	Standards Development & Participation	TEC, TSDSI, Industry, RI, and Academia	Clear objective to build SEPs. Excluding Startup Activities.
1.6	High Impact / Strategic Projects	Industry, RI, Academia	
1.7	Drafting Program architecture	External Agency	Engage Professional Agency
1.8	Drafting of T&C and Agreements	External Agency	Engage professional legal agency
1.9	6G Program Office	In DoT	Staffed with professionals

Phase II (Post 2025)

- Incentivize advanced manufacturing in relevant markets, secure integrity of supply chains and decrease concentration of strategic capabilities and dependencies on high-risk countries
- Incentivize operators and vertical industries to adopt 6G.

#	Area
2.1	PLI, DLI Schemes to promote and proliferate technologies, products developed
2.2	Incentivize operators
2.3	Set up Use case labs
2.4	Hackathons on Use cases
2.5	Experience Centers
2.6	Incentivize vertical industries to adopt 6G

9. Eligibility for Availing Funding under the Program

Any of the following Indian entities which can contribute to the cause of enhanced and affordable rural connectivity is eligible for support from this fund.

- 'Domestic Company(ies)' with focus on telecom research and development.
- Indian Academic institutions.
- R&D institutions, Section 8 companies / Societies with focus on telecom research and development; or
- Collaborative joint / consortium of above entities with Indian or international partners as the case may be.

Definition of above entities is elaborated in the annexure 5.

10. Funding models Proposed

10.1. Grants in aid up to Rs. 20 Cr

- Grant in aid is envisaged to service funding requirements from small to medium projects in the development of technology, products, research, solutions, integrated proposals, hosting workshops / events / conferences, small size international joint projects, standards participation, participation & collaboration in in 6G product events, standardization activities.
- The grants are aimed to service research and development activity in all TRL levels as the case may be considering that 6G activities could be new or upgradation from earlier capabilities as well.

10.2. Grants in aid for High Impact Projects above Rs. 20 Cr

- These are large projects where funding requirements are high to develop cutting edge technologies with end-to-end solution as the focus. They include high impacting R&D projects such as Testbeds, Communication Systems, Development of System on Chips / AI chipsets for Communications, Deep technologies, large size international joint projects, hosting international conference in India etc.
- Consortium projects which require development, hardening, technology demonstration, product integration and extensive interoperability testing to deliver an end-to-end product portfolio would also be considered under this segment. It may include largescale technology trials to make the products carrier grade and ready for market deployment.
- These high impact projects, generally, are envisaged to be driven in collaboration with industry, Academia, or other agencies such as R&D focused Society / Section 8 company / Research Institutions such as C DoT.

10.3. Partial grants and loans

- These are partial grants where funding requirements are high, to develop cutting edge technologies, high impacting R&D including development of System on Chips / AI chipsets for Communications, deep technologies etc.
 - The amount in excess of Rs 20 Cr could be considered as soft loan after commercialization of the technology / product in instalments that are linked to risk-associated milestones. This is in order to facilitate and circulate the available funding for the R&D ecosystem once the products / technologies are successfully commercialized.
 - Soft loans as one of the funding options may be considered on very liberal terms without any collateral to enable the creation of working capital for commencing production, execution of
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purchase orders, commercialization activities, extension of phased programs and expansion of R&D facilities without any collateral.

10.4. VC Funding for industry

In view of the need for risk funding, such modes also to be facilitated through an exclusive VC fund for 6G and fund of funds (further elaborated under section 10).

11. Mechanisms for vetting R&D budget proposals under the 6G Mission

Different mechanisms are considered for the purpose to make funds available through different instruments as envisaged above. Considering the large outlay, flexibility, transparency, quicker outcomes, expert participation, need for a large capital pool, high risk projects etc., the following models may be considered.

- Inter-Ministerial Committee (IMC) in DoT

An IMC with experts and representatives from relevant ministries could be constituted at appropriate level depending on the quantum of funding to vet, approve and implement the programs. The PMU (Program Management Unit) function could be managed by TCoE India, considering the success of its execution under DCIS funding initiative. An indicative administrative structure of IMC is at Annexure5.

- Restructured TCoE India to manage the programs

There is an opportunity to position TCoE India, a society created under DoT, with suitable accountability structures and professional staffing to manage the fund. Expert Governing committees could be formed in TCoE to provide guidance and direction for different 6G initiatives.

- Separate Section 8 company for 6G

In lieu of option 2 above, considering the size of 6G funding and need to efficiently manage it for the next ten years, a separate section 8 company may also be constituted for 6G and for overall R&D and commercialization program under DoT.

- Leverage any section 8 company of other departments

It may also be considered to identify any other established Section 8 company or public agency, with expertise in managing R&D programs in next generation technologies for the purpose in place of option under 3 above. It is also possible that 6G program cuts across platforms, some initiatives of 6G could also be given to other agencies if they have already developed expertise in similar programs to enable synergies and strengthen the created competencies.

11.1. High Risk Funding Instruments

To promote innovation driven high-risk ventures, a Telecom VC Fund and Fund of Funds are also envisaged as below.

- 6G VC Fund

A focused 6G VC fund with corpus in partnership with public entities may be constituted to enable financing instruments including equity with fund life of 10 years (further extendable by two years) taking note of 2035 timeline for risk funding to develop 6G products and commercialization.

With an anchor contribution from DoT, and the rest from identified public VC fund partners could be envisaged in line with successfully executed MeitY VC fund National Fund for Software and IT.

- 'Telecom Fund of Funds for Start-ups, MSMEs'

To enable pooling of larger capital necessary for telecom gear development with focus on Start-ups, MSMEs a Telecom Fund of Funds may be considered inviting partnership from industry and private led VCs with an annual anchor contribution from DoT for five (5) years.

Any Public Financial Institution with a successful track record in Promotion, Financing and Development of the Micro, Small and Medium Enterprise (MSME) sector may be identified as the implementation agency to prepare a blueprint and drive the fund of funds. E.g., Start-up India fund of funds.

While the decisions for structures under options 3, 5, 6 above may take time and procedures involved, the options under 1, 2, 4 may be immediately used to invite the projects for 6G initiative.

Indicative process of evaluation for funding needs is indicated under Annexure 6.

Annexure 1: Funding mechanism under other ministries

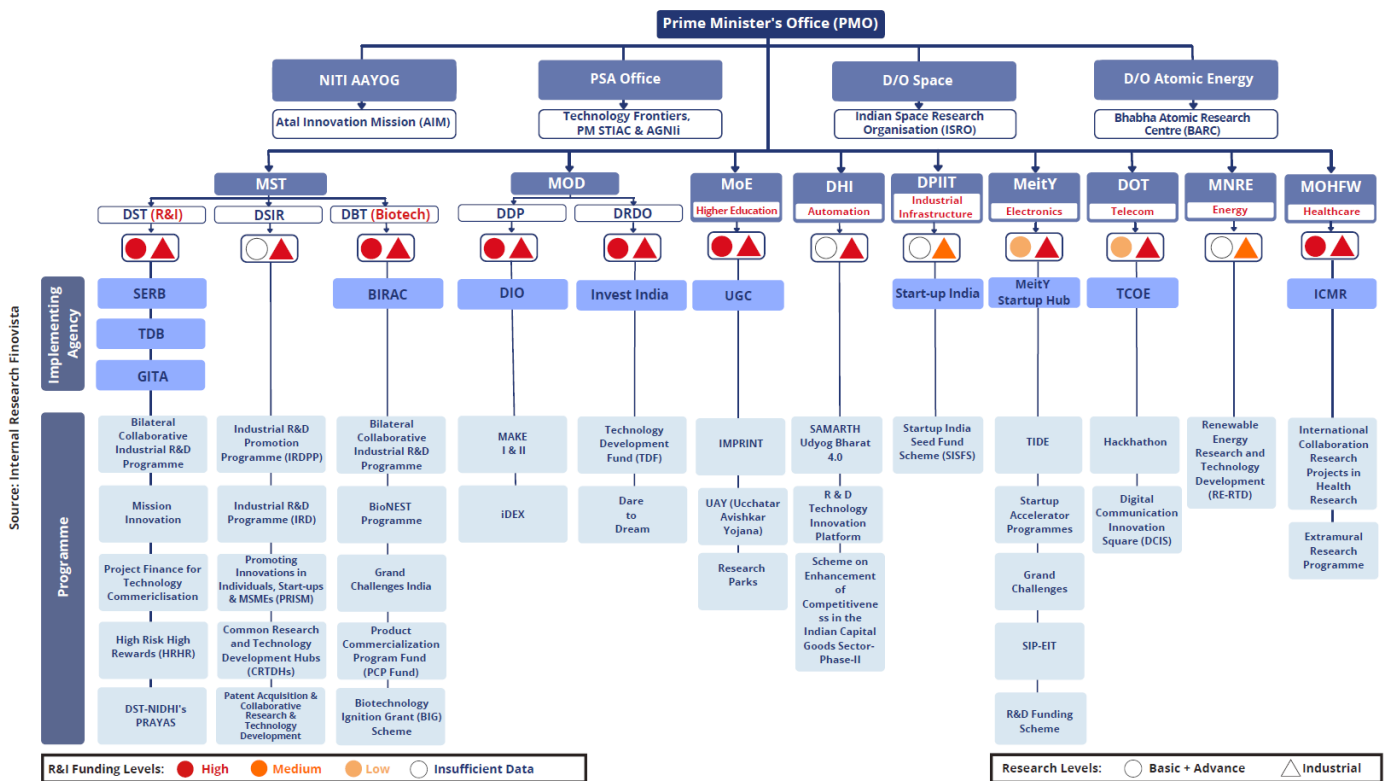


Figure 7: Funding mechanism under different entities

Annexure 2: Europe's first large-scale 6G Research and Innovation Programme

EU created Joint Undertaking on Smart Networks and Services towards 6G (SNS JU) adopted its first Work Programme 2021-2022 with an earmarked public funding of about € 240 million.

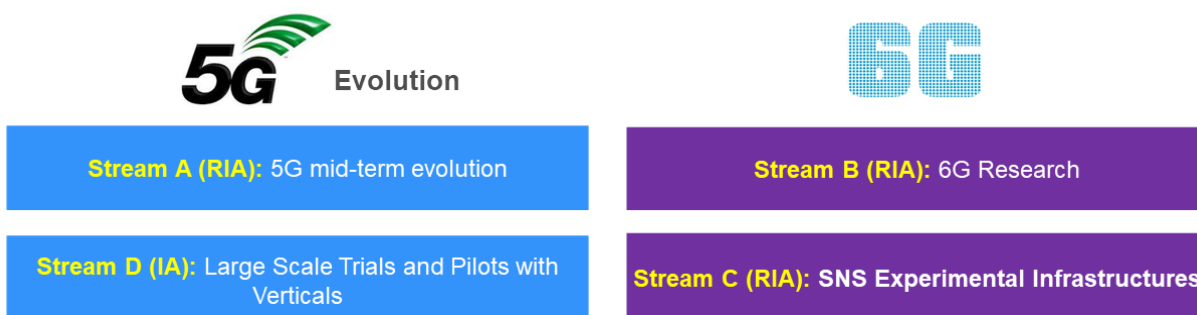
The Work Programme 2021-2022 will fund activities ranging from 5G evolution including large-scale trials and pilots with vertical industries to frontier research towards 6G systems.

The European partnership on [Smart Networks and Services \(SNS\)](#), a Joint Undertaking co-led by industry and the Commission with close involvement of Member States, sets the strategic R&I roadmap for Europe. The initiative builds on an EU contribution of €900 million over the next 7 years to be matched by the private sector with the same amount. The aim is to enable European players to build the R&I capacities for 6G systems and develop lead markets for 5G infrastructure as a basis for the digital and green transformation.

The [SNS Work Programme](#) was adopted by the SNS JU Governing Board and will be the basis for Calls for Proposals to be launched early 2022. It sets out four main complementary work streams:

- Stream A (RIA): Smart communication components, systems, and networks for 5G Evolution systems.
- Stream B (RIA): Research for radical technology advancement (in preparation for 6G and radical advancements of IoT, devices and software).
- Stream C (RIA): SNS Enablers and Proof of Concept (PoCs), including development of experimental infrastructure(s) that could be further used during later phases of SNS.
- Stream D (IA): Large Scale SNS Trials and Pilots with Verticals, including the required infrastructure to explore and demonstrate technologies and advanced applications as well as advanced services in the vertical domains.

These four Streams will be complemented by SNS Support Actions (CSA) to support EU wide synergies and directionality as well as international cooperation.



RIA: Research and Innovation Actions
IA: Innovation Actions

This Work Programme 2021-2022 builds the first phase of the SNS roadmap and will expand the [early wave of European 6G projects](#) launched in January 2021 under the 5G-PPP. The four Streams will

evolve into new frontier research, proof of concept, standardisation, and deployment in subsequent phases or open new opportunities for technology development across the broader supply chain such as microelectronics or cloud-based service provisioning.

The Council Regulation 2021/2085 establishing the SNS JU entered into force. The SNS JU enables the pooling of an EU contribution of €900 million for the period 2021-2027 with industrial resources of at least the same amount. It also fosters alignment with Member States concerning national funding programmes on 5G and 6G. The SNS JU has the ambitious mission for driving the 5G evolution as basis for the digital and green transition and building Europe's technological capacities for 6G systems, which are expected for commercial launch at the end of this decade.

Deep pockets for 6G

The data also suggest that the EU has become more willing to invest in 6G research in recent years. Between 2017 and 2019, Horizon 2020 provided an average of €3.07 million per programme for 6G. In 2020 and 2021, this figure doubled – on average, each initiative received around €6.13 million in funding. However, more money on the table doesn't mean companies have been given financial resources at the same pace. The EU granted an average of €359,754.64 per participant in projects from 2017 through 2019. The figure grew to €443,756.30 for initiatives launched in 2020 and 2021, a 23% increase.

A two-year journey

This event is the culmination of an interesting journey over the last couple of years:

- We started with initial discussions among a handful of like-minded technical experts in industry about the need to energize and coalesce US research efforts on 6G.
- This was followed with individual contacts with NSF, which became a more structured group preparation for a smaller partnership with four companies. One potential partner had to drop out and we were set to proceed with three, and we settled on the themes of the solicitation, namely resilience and enabling technologies.
- There was a surge of interest at what seemed to be the last moment from both industry and government, and we ended up with a much larger partnership, composed of nine industrial partners (Ericsson, Apple, Google, IBM, Intel, Microsoft, Nokia, Qualcomm, and VMware), and three government partners (NSF, Department of Defence and National Institute of Standards and Technology).
- After another round of discussions to further shape the solicitation content with inputs from all the additional partners, we were finally ready to go. The total funding budget is \$40 million, with each project receiving about \$1 million over three years.
- The solicitation went out in April 2021, and over 200 proposals were received. After extensive reviews by NSF panels, and further inputs from industry partners, eventually 37 proposals were selected for funding.

Annexure 3: Resilient & Intelligent NextG Systems (RINGS)

National Science Foundation (USA)

The RINGS program seeks to accelerate research in areas that will potentially have significant impact on emerging Next Generation (NextG) wireless and mobile communication, networking, sensing, and computing systems, along with global-scale services, with a focus on greatly improving the resiliency of such networked systems among other performance metrics. Modern communication devices, systems, and networks are expected to support a broad range of critical and essential services,

incorporating computation, coordination, and intelligent decision making. Resiliency of such systems, which subsumes security, adaptability, and autonomy, will be a key driving factor for future NextG network systems. Resiliency in both design and operations ensures robust network and computing capabilities that exhibit graceful performance- and service-degradation with rapid adaptability under even extreme operating scenarios. The RINGS program seeks innovations to enhance both resiliency as well as performance across the various aspects of NextG communications, networking, and computing systems. This program seeks to go beyond the current research portfolio within the individual participating directorates by simultaneously emphasizing gains in resiliency (through security, adaptability and/or autonomy) across all layers of the networking protocol and computation stacks as well as in throughput, latency, and connection density.

In this program, NSF is partnering with the Office of the Under Secretary of Defence for Research and Engineering (OUSD R&E), the National Institute of Standards and Technology (NIST) and several industry partners shown above. This program seeks to fund collaborative team research that transcends the traditional boundaries of individual disciplines to achieve the program goals.

Annexure 4: Approval structure

i.	Secretary, DoT	Chairperson
ii.	Member (Technology), DCC / Member Finance / Additional Secretary, DoT	Members
iii.	JS Level Representative from NITI Aayog	Member
iv.	JS Level Representative from Ministry of Electronics & IT	Member
v	Executive Director, C-DOT	Member
vi	Director, USoF	Member- Convener
vii	Any other JS level representative(s) from Central Government Ministry/ Department/ Organization may be co-opted with the approval of Chairperson	Members
viii	One Member each from Industry, Academia, and VC to be opted by the Chair	Members

- TCoE India as the PMU, applications may be invited for 6G activities.
- The current DCIS guidelines format may be revised to take note of various activities identified for 6G including standards participation.
- It may further be structured depending on the quantum of project fund.

Annexure 5: Definitions

- Applicant for the program is a legal entity including Private Company, Society, Section 8 Company, Academia, Research Institution etc., making an application for seeking fiscal support under the Scheme.
- Domestic Company is defined as those which are owned by resident Indian citizens as defined in the FDI Circular of 2017. A company is considered as 'Owned' by resident Indian citizens if more than 50% of the capital in it is beneficially owned by resident Indian citizens and / or Indian companies, which are ultimately owned and controlled by resident Indian citizens. Having incorporated in India with DSIR approval as an R&D house, it should hold IP ownership in India and majority of team and R&D should be located in India.
- MSME shall be defined as per the Gazette Notification by Ministry of Micro, Small and Medium Enterprises, dated 1st June 2020 or extant norms.

- Start-up shall be defined as per the DPIIT notification dated 19th February 2019 or extant norms.
- Technology Domains: Hardware, Software, Solution development in Telecom sector. Specific products, inter alia, are elaborated under Section 4.
- TRL Level: Technology Readiness Levels (TRL), as per global standards, are a type of measurement system used to assess the maturity level of a particular technology.

Annexure 6: Indicative Process of Evaluation for funding

1. What is the Selection Process for Funds Allocation?

Step 1: Evaluation Committee to be formed – distinguished committee of experts, who can be further supported by experts in niche areas of research

Step 2: Committee to review the following and provide rating

- Correctness of background data and accuracy
- relevance and appropriateness
- originality / validate newness / against existing patents
- clarity of business case or demonstration of concept for R&D funds
- Sustainability
- Credibility of people, their track record

Step 3: Based on review findings and recommendations, the R&D Technical Evaluation Committee will select the proposals.

2. How do we fund thru the phases of R&D?

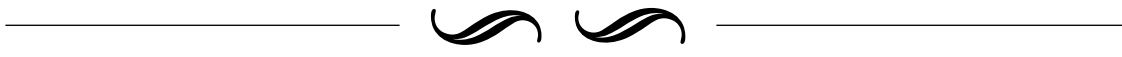
- Allocating funds thru the R&D value chain
 - Idea to Research to Prototype Development to Commercialization
- Agile methodology
 - Phase-wise Backlogs – how are resources expended in the flows between the phase backlogs – idea backlog to research backlog to development backlog to commercialization backlog
- Projects moving to commercialization.

3. How will we monitor the funds utilization?

Implementation and Monitoring can be further digitised based on reports submitted directly in the portal by the grant recipients, augmented by periodic audits facilitated by designated people / sub-committee of the Governance Board.

- Monitoring framework right from inception stage
- Periodic Project performance reports
- Formal mid-term reviews
- Accommodate CRs if it makes sense
- Completion report on project completion to be reviewed and validated against
 - impact created (high speed broadband connectivity)
 - outcomes (affordable and inclusive for rural areas)
 - outputs (quality of services proving at scale)
 - overall Patents/ IPs created.
 - Success of commercialisation.

4. Proposed Grant Management Cycle





सत्यमेव जयते

Ministry of Communications
Department of Telecommunications
Sanchar Bhawan, 20 Ashoka Road
New Delhi - 110001
E-mail: ddgic-dot@gov.in