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B20 India Secretariat

CII

Confederation of Indian Industry

CII Submission: Consultation Paper on Encouraging R&D in Telecom, Broadcasting, and IT (ICT) Sectors

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Background

Encouraging Research and Development (R&D) in the Telecom, Broadcasting, and Information Technology (ICT) sectors holds paramount importance for India's technological and economic progress. These industries are the backbone of a digitally empowered nation, playing pivotal roles in connectivity, information dissemination, and innovation.

Investing in R&D fosters technological advancements, driving the development of cutting-edge solutions and infrastructure. In the Telecom sector, R&D initiatives can lead to the creation of high-speed networks, improving connectivity across urban and rural areas. Enhanced broadcasting technologies can transform how information is disseminated, ensuring wider reach and accessibility. In the ICT sector, research paves the way for innovative solutions, driving efficiency and productivity across various domains.

Moreover, R&D investments cultivate a culture of innovation, attracting skilled professionals and fostering entrepreneurship. This not only fuels economic growth but also positions India as a global hub for technological expertise. Embracing R&D in these sectors aligns with the government's vision of a Digital India, promoting inclusive development and bridging urban-rural divides.

With regard to Consultation Paper No. 19/2023, we have garnered diverse feedback from industry stakeholders. CII the apex body and representative entity for the National Committee on Telecom and Broadband, CII aims to submit our thoroughly vetted inputs on the paper, as reviewed by our internal team.

The consultation paper is divided into 7 categories carrying 38 questions.
1. Education and Training System
2. Science System
3. Regulatory Framework: Policies and Programs
4. Regulatory Framework: IPR Framework
5. Global Leaders in R&D
6. Key Learnings from International Experience
7. Others

Please find our submission accordingly.

121802/2024/TD

S.No.   Questions & Submissions

Section 1: Education and Training System

Q1.   Whether current education system adequately promotes scientific temper and skills among students encouraging them to contribute towards Research and Development activities in ICT sector?
If yes, please indicate what additional measures are needed to make them effective contributors of innovations to the industry. If not, please identify areas which need to be strengthened to orient students towards research and development activities in ICT sector.

Submission:

Education and research, traditionally treated as separate entities, can truly flourish when seamlessly integrated within educational institutions. Post-independence, India has successfully established prestigious higher education institutions such as IITs, IISc, IIITs, and NITs, alongside a network of research institutions like CSIRs. Despite their visionary aspirations, the synergy between education and research has not been fully realized.

Countries like South Korea, Japan, and Israel have demonstrated the success of institutionalizing education and research together. These nations have excelled in both education and research and development activities, particularly in the ICT sector. Drawing inspiration from their models, it is imperative for India to introduce structural changes that facilitate the convergence of education and research within a single institution.

The quality of human resources emerging from educational institutions is intricately linked to the caliber of faculty. Unfortunately, tier-II and tier-III institutions often suffer from a lack of high-quality faculty. This can be attributed to the challenge of attracting talented students to pursue academic careers. Consequently, average students often end up in teaching roles, impacting the overall quality of education.
To address this issue, it is crucial to implement groundbreaking initiatives that attract the most talented students to academic fields. Offering support and incentives to these individuals will help create a pipeline of exceptional faculty, thereby positively influencing the caliber of students they educate.

Attracting good faculty to the Indian education system requires addressing their key concerns. Faculty members seek research support, access to research funds, and a conducive teaching environment. Without a robust research infrastructure and funding, the recruitment of quality faculty remains a challenge. To overcome this, there is a pressing need to incentivize faculty members with ample research opportunities, resources, and research grants. Only by doing so can we ensure the arrival of high-quality educators, consequently enhancing the overall output and employability of our students.

Q2. **What should be done to further strengthen the roots of R&D ecosystem in general and specially in the ICT sector of the country, which allows:**
   a. **Increase in number of post-graduates going for doctoral and post-doctoral programs in institutions other than IITs?**
   b. **Assured career progression opportunities in the field of Research and Development for students graduating from tertiary educational institutions?**
   c. **Researchers to continue entire career in advanced research.**
   d. **Increase in employability and career progression skills of students enrolled in STEM courses?**

Submission:

To fortify the foundations of the Research and Development (R&D) ecosystem in India, especially within the Information and Communication Technology (ICT) sector, several strategic measures can be implemented:

a. **Diversify Doctoral and Post-Doctoral Programs:** Encourage collaborations and partnerships between institutions other than IITs and industries to provide a broader range of opportunities like contract research/joint research, sponsoring PhD etc.. for post-graduates pursuing doctoral and post-doctoral programs. Establishing research centers, both in academic institutions and industry settings, can facilitate interdisciplinary research and attract more students to these programs. This will create a pull for more and more talented students to come into research.

b. **Structured Career Progression Pathways:** Develop clear and structured career progression pathways for students graduating from tertiary educational institutions and entering the field of Research and Development. This involves creating mentorship programs, industry-academia partnerships, and establishing frameworks for continuous skill development to ensure a seamless transition from education to impactful R&D roles.

c. **Long-Term Research Careers:** Introduce initiatives that allow researchers to sustain entire careers in advanced research. This can be achieved through funding mechanisms, industry collaborations, and tenure-track programs in academic institutions, providing stability and resources for researchers committed to long-term, impactful contributions in their respective fields.

d. **Enhanced Employability for STEM Graduates:** Implement industry-oriented curriculum reforms and experiential learning programs to enhance the employability and career progression skills of students enrolled in Science, Technology, Engineering, and Mathematics (STEM) courses. Foster industry internships, practical training, and mentorship programs to bridge the gap between

academic knowledge and industry requirements, ensuring that STEM graduates are well-prepared for R&D roles in the ICT sector.

As an output, we should possibly aim for a substantial increase in Gross Enrollment Ratio (GER) in higher education from the current 27% to 50%. We aspire to see India's 50 STEM (Science, Technology, Engineering, and Mathematics) institutions in the list of QS World University Rankings. There must be a substantial increase in the number of "quality" PhDs in STEM and an improvement in Citation Index.

We would also like to see a significant increase in R&D professionals, say 50 R&D personnel per thousand employed in India along with the support of Government.

Q3. **What measures should be taken pertaining to the tertiary institutions with a focus to encourage students towards advanced R&D at the university level?**

Submission:

Implement the measures mentioned in response to Q2 to cultivate an environment conducive to advanced Research and Development (R&D) at the tertiary/university level.

Section 2: Science System

Q4. **Whether current science system (network of public and private institutions involved in the production and consumption of R&D and innovation) is sufficient to foster R&D and innovation in India in general and ICT in particular? If not, what additional measures are required to strengthen science system of the country and ensure availability of adequate resources for the same? Please support your answer with justification and best practices being followed in India and abroad in this regard.**

Submission:

The current science system in India, encompassing both public and private institutions engaged in Research and Development (R&D) and innovation, has made significant strides. However, there is room for improvement, especially in the Information and Communication Technology (ICT) sector. To further enhance R&D and innovation such as.

a. **Collaborative Ecosystems:** Foster collaborative ecosystems by promoting partnerships between academia, industry, and research institutions. Establishing innovation clusters and research parks can facilitate knowledge exchange and collaborative projects, as observed in successful models abroad.

b. **Industry-Academia Integration:** Strengthen the integration between academia and industry by promoting joint ventures, technology transfer, and industry-

sponsored research. This collaboration can bridge the gap between theoretical knowledge and practical application, fostering a culture of innovation.

c. **Research Infrastructure Enhancement:** Invest in state-of-the-art research infrastructure and laboratories to provide researchers in the ICT sector with cutting-edge tools and facilities. This not only attracts top talent but also facilitates high-impact R&D projects.

d. **Skill Development Programs:** Launch targeted skill development programs to enhance the capabilities of researchers and professionals in the ICT sector. Ensuring a skilled workforce is essential for driving innovation and maintaining a competitive edge in the global arena.

Leveraging successful practices from both domestic and international contexts can contribute to the development of a dynamic and forward-thinking science ecosystem.

Q5. **How can the participation of public sector enterprises involved in R&D be augmented towards a synergized national effort in research, development, and innovation in ICT? Please support your answer with justification and best practices being followed in India and abroad in this regard.**

Submission:

A few Public sector enterprises in India have heavily invested in R&D and have grown to Navaratnas in the past. However, this phenomenon wasn't embraced by other PSEs and we all can see the conditions of many. In fact, PSEs should have been the torchbearers of Industrial R&D and Institutional partnership. Going forward, the following actions could be considered by the PSEs in this regard:

a. PSEs should be tasked to develop critical platform technologies of national priority / security in the respective sectors in time-bound manner.

b. A consortium of national research institutions & educational institutions should be constituted to be the partners in this technology development program.

c. The government should share 50% investments (with balance 50% coming from PSEs) required for these technology development programs.

d. Research institutions will provide researchers and research infrastructure.

Q6. **What should be the prerequisites and key characteristics of an effective next-generation technology testbeds in India? Will defining national-level mission and strategic objectives for ICT help in their effective utilization? Please support your answer with justification and best practices in India and abroad in this regard.**

121802/2024/TD

Submission:

Establishing impactful next-generation technology testbeds for R&D would greatly bolster industry growth, akin to the successful setup of the 100 5G test labs in various institutes.

Defining national-level missions and strategic objectives for Information and Communication Technology (ICT) is essential for effective testbed utilization. Clear objectives guide research priorities, align efforts, and ensure that testbed activities contribute to broader national goals.

Some key considerations involve addressing several prerequisites and defining key characteristics.

a. **Interdisciplinary Collaboration:** Foster collaboration between diverse stakeholders, including academia, industry, and government agencies. Interdisciplinary approaches encourage a holistic understanding of technology applications and facilitate comprehensive testing.

b. **State-of-the-Art Infrastructure:** Invest in cutting-edge infrastructure and facilities for testbeds to ensure they replicate real-world scenarios accurately. Access to advanced equipment and technologies is crucial for meaningful experimentation and validation.

c. **Regulatory Frameworks:** Establish clear regulatory frameworks that balance innovation with safety and ethical considerations. Well-defined regulations provide guidance for testbed users and encourage responsible experimentation.

d. **Open Standards and Interoperability:** Embrace open standards and ensure interoperability to facilitate the integration of diverse technologies. This approach encourages a collaborative ecosystem and prevents siloed development.

e. **Skill Development Programs:** Implement programs to enhance the skills of researchers, engineers, and technicians involved in testbed activities. A skilled workforce is essential for effectively utilizing and maximizing the potential of next-generation technology testbeds.

International examples, such as testbed initiatives in the United States and Europe, demonstrate the significance of these principles in fostering technological advancement.

Q7. **What role do you envisage for the service providers and industry in facilitating indigenous R&D in the ICT sector respectively?**
How can industry participation in R&D in the ICT sector be further improved? Please support your answer with justification and best practices in India and abroad in this regard.

Submission:

Service providers and the ICT industry play crucial roles in facilitating indigenous Research and Development (R&D) in the Information and Communication Technology (ICT) sector. Their roles are intertwined and complementary, contributing to technological innovation, economic growth, and national development. To encourage service providers for effective utilization of the BharatNet infrastructure in provisioning connectivity to institutions, households, and individuals in India, the following steps might be taken:

- There is big usage of the products- routers, switches, FTTH, by service providers. They can promote R&D by procuring equipment from companies having the R&D Base in India.

- Encourage public-private partnerships to leverage private sector expertise and resources for efficient service delivery.

- Provide subsidies or financial incentives to service providers, using domestic products to expand their networks in underserved areas.

- Offer tax incentives or other benefits to service providers for investing in rural connectivity

- Service providers can collaborate with universities, research institutions, and start-ups to jointly fund and conduct R&D projects. These partnerships can lead to innovative solutions, products, and services.

- PSEs should be tasked to develop critical platform technologies of national priority / security in the respective sectors in time-bound manner.

- A consortium of national research institutions & educational institutions should be constituted to be the partners in this technology development program.

Q8. **How Telecom Centres of Excellence (TCOEs) can be made hubs of innovative product delivery to telecom industry? What can be done to further strengthen the TCOEs in order to provide an impetus to innovations in the telecom sector? Please support your answer with justification and best practices in India and abroad in this regard.**

Submission:

Telecom Centres of Excellence (TCOEs) can be transformed into hubs of innovative product delivery to the telecom industry through a combination of strategic initiatives and collaborations. TCOEs are typically research and development centers or institutions that focus on telecommunications technologies and innovation. To achieve

121802/2024/TD

their potential as hubs of innovative product delivery, the following steps could be taken:

- **Strategic Focus and Vision:** Define a clear strategic vision for TCOEs, aligning their activities with the evolving needs and trends of the telecom industry.

- **Partnerships with Industry:** Establish strong partnerships with telecom companies, vendors, and start-ups. Collaborate closely to identify industry needs and co-create innovative solutions.

- **Interdisciplinary Research:** Encourage interdisciplinary research that combines telecom expertise with emerging technologies like AI, IoT, 5G, and cybersecurity. These intersections often lead to breakthrough innovations.

- **Incubation Programs:** Create incubation and acceleration programs within TCOEs to support start-ups and innovators working on telecom-related projects. Provide them with resources, mentorship, and access to industry networks.

- **Technology Transfer:** Establish processes for transferring technologies developed within TCOEs to the industry. This may involve licensing or partnerships with existing companies.

- **Standards and Interoperability:** Ensure that the solutions developed in TCOEs comply with industry standards, fostering interoperability with existing systems and technologies.

- **Training and Skill Development:** Offer training programs, workshops, and courses to equip telecom professionals with the latest knowledge and skills required to work with cutting-edge technologies.

- **Government Support:** Collaborate with government agencies and industry associations to secure funding, grants, and policy support for TCOE initiatives.

Q9. **Is there a need to establish new Centres of Excellence for the broadcasting sector? What can be done to synergize telecom and broadcasting sectors for the objective of convergence? Please support your answer with justification and best practices in India and abroad in this regard.**

Submission:

No comments

Q10. **What are the reasons behind MNCs primary focus on software rather than hardware in India? What measures can be taken to promote basic/applied research by MNCs strengthening the current R&D efforts in software and improving R&D efforts in hardware? Suggest a suitable mechanism to establish a balanced R&D Science System in the country.**

Submission:

Software and Hardware go hand in hand. However, the impact of Multinational Corporations (MNCs) on India's research and development (R&D) ecosystem often goes unnoticed. Initially, there was a prevailing perception that MNCs were merely utilizing Indian talent for technological advancements. They have not only fostered a robust R&D culture within the Indian industry but have also made significant contributions by training local R&D professionals.

Acknowledging these invaluable contributions emphasizes the necessity of actively involving MNCs in addressing both local needs and global challenges. To attract increased investment from MNCs in hardware development, there is a critical need to instill confidence in the protection of intellectual property (IP), especially patents and designs. Establishing this confidence will act as a catalyst for heightened investments in hardware R&D. The overarching goal should focus on doubling foreign investments in R&D infrastructure and promoting collaborative technology development in India. This approach aims to foster a dynamic and mutually beneficial relationship with MNCs.

Q11. What are the steps required to strengthen government-industry-academia linkages in the ICT sector on a long terms basis? Please support your answer with justification and best practices in India and abroad in this regard.

Submission:

Strengthening government-industry-academia linkages in the Information and Communication Technology (ICT) sector on a long-term basis requires a strategic and sustained approach. These linkages foster innovation, research, and skills development, contributing to economic growth and technological advancement. Here are steps, along with justifications and best practices from India and abroad:

For an effective approach and to have an outcome oriented is to apply top down and bottom-up approach.

Steps to Strengthen Government-Industry-Academia Linkages in the ICT Sector:

1. **Formalized Collaboration Agreements:** Establish formal collaboration agreements between government bodies, industry associations, and academic institutions.

2. **Creating Industry-Academia Advisory Boards**

3. **Joint Research Projects:** Encourage academic institutions to undertake research projects in collaboration with industry partners to solve real-world problems and develop solutions with a support in terms of financial grant.

4. **Student Internships and Industry Attachments:**

5. **Curriculum Development and Industry Input:** Industry professionals should actively contribute to curriculum development, ensuring that academic programs are in sync with industry requirements.

6. **Technology Parks and Incubators:** Establish technology parks and incubators that encourage the development of start-ups, offering them access to academic expertise and industry mentorship.

7. Prioritize (in consultation with all stakeholders), 10 technology development programs in ICT sector during next 5 years

Best Practices in India and Abroad:

- **India - National Skill Development Corporation (NSDC):** NSDC partners with various sectors, including IT and IT-enabled services, to promote skill development and entrepreneurship. Industry-academia collaborations are a key component, allowing students to acquire industry-relevant skills.

- **Singapore** - A*STAR and Industry Collaboration: The Agency for Science, Technology, and Research (A*STAR) collaborates with industry players to promote research and development in areas such as AI, cybersecurity, and healthcare. Industry-driven research institutes are established to encourage collaboration.

- **USA** - University-Industry Research Centers: The United States has numerous university-industry research centers, such as the MIT Media Lab and UC Berkeley's CITRIS. These centers facilitate collaborative research between academia and industry on cutting-edge technologies.

- **South Korea** - Ministry of Science and ICT (MSIT): MSIT collaborates with industry to fund R&D projects and support startup incubation programs. It promotes technology transfer and supports joint research.

Section 3: Regulatory Framework: Policies and Programs

Q12. **Whether the current institutional mechanism is adequate to cater to the needs of R&D in ICT sector in India? Is there a need to create a separate agency to coordinate and look after R&D functions specifically in ICT sector? If yes, suggest a suitable framework for the overarching agency. If not, how can synergy between stakeholders be established to ease out processes and monitor timebound R&D outcomes? Please support your answer with justification and best practices being followed in other sectors nationally or internationally.**

Submission:

While the current institutional mechanisms suffice for addressing the R&D needs in the ICT sector, there is a necessity to place greater emphasis on the delivery model, ownership, and a performance review system that aligns with desired outcomes.

Q13. **What steps must be taken to ensure a transparent mechanism for adequate and timely disbursement of funds for R&D programs? What should be indicators for the tracking mechanism for the funds and outcomes of R&D programs? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

Before creating a transparent mechanism for adequate disbursement of funds for R&D program, we first need to define and allocate fund for Research & Development, around 5 - 15% of the total corpus fund to perform research, innovation, standardisation, design, testing, certification, and manufacturing of indigenous telecom equipment.

The following indicative steps can help achieve this goal:

1. **Clear Guidelines and Policies:** Develop clear and well-defined guidelines and policies outlining the eligibility criteria, application process, evaluation criteria, and disbursement procedures for R&D funding programs. Transparency begins with unambiguous documentation.

2. **Centralized Online Portal:** Create a centralized online portal where applicants can submit proposals and track the status of their applications. This portal should provide information about the status of funds, disbursements, and reporting requirements.

3. **Peer Review and Evaluation:** Establish a peer-review process involving experts in the relevant fields to assess the quality and feasibility of R&D proposals. Transparent evaluation criteria and procedures ensure that proposals are evaluated objectively.

4. **Regular Information Updates:** Maintain a transparent and up-to-date communication channel, such as a dedicated website or newsletter, to inform applicants and the public about program progress, disbursement schedules, and evaluation results.

5. **Financial Audits and Accountability:** Conduct regular financial audits to ensure the proper use of funds. Publish audit reports to demonstrate accountability and transparency.

6. **Timely Disbursement Schedules:** Develop and adhere to strict disbursement schedules to ensure that funds are disbursed promptly. Delays can hinder research progress and undermine confidence in the program.

121802/2024/TD

7. **Monitoring and Reporting Requirements:** Implement reporting requirements for recipients of R&D funds, including periodic progress reports and financial statements. This ensures that funds are used for their intended purposes.

8. **Transparency in Decision-Making:** Clearly communicate the decision-making process for fund allocation, including the criteria used for selection and the identity of evaluation panel members. This can help build trust in the fairness of the process.

Q14. **How can participation of private sector in R&D be encouraged? Which incentivization model(s) or combination thereof would produce better results:**
   i. **Tax-break model, or**
   ii. **Product-Linked Incentivization model**
   iii. **Any other model.**
Please provide details of the suggested model(s) in terms of structure, functioning, monitoring, and evaluation.

Submission:

Raising private sector involvement in R&D is a key strategy for cultivating a thriving ecosystem and nurturing global technology leaders. To achieve this, it is crucial to make the environment attractive, incorporating best practices observed globally.

Many nations recognize the significance of R&D investment and product development by offering special incentives to domestic companies. Several countries, including China, Belgium, the United Kingdom, France, the Netherlands, Italy, and Belgium, have implemented innovative measures like the "patent box" to stimulate innovation and bolster domestic manufacturing jobs. The "patent box" involves applying a lower corporate tax rate to income derived from patent ownership, a policy that has gained traction globally since the early 2000s.

Over the past 15-20 years, the telecom services sector has demonstrated robust growth. However, due to the absence of a domestic manufacturing ecosystem, the sector's expansion relied heavily on imports. In the fiscal year 2022, telecom equipment imports amounted to INR 46,785 Cr, significantly contributing to the overall electronics imports in India. By fostering a conducive environment and adopting proven global strategies, we can not only encourage private sector participation in R&D but also reduce dependency on imports, paving the way for a more sustainable and self-reliant growth trajectory in the ICT sector.

To achieve better result please refer the below proposed model.

i. **Tax break model:** Special Support to create global champions in digital technology & communication sector. There is need for push to the Govt. for providing additional 5% Income Tax reduction to Indian Corporates over 2.5% of their turnover on

Research and Development and filing Patents / Design in India. Also, 10 years Tax holiday on sales of products having Intellectual Property (Patents & Design) developed through R&D.

ii. **Product-Linked Incentivization model:** To boost domestic telecom products manufacturing, on similar lines the government has introduced PLI (Product Linked Incentives) scheme to perform Design – led manufacturing to build a strong eco-system.

However, it needs to be revisited, as per TRAI's recommendation the PLI scheme should imbibe local value addition norms in its future-format and higher incentives proportionate to value-addition should be available. Which means the incentive should be linked with value addition done in India. A company doing only 5-10 % should have different incentive which is doing a value addition of 50-60% in India.

e.g. A company who is doing a VA of 10% in India, they are getting an incentive of 5%-6% under PLI scheme. But if a company is doing a value addition of 70% in India, they are getting only 1% additional incentive under PLI scheme. The disability factor for Indian OEM is almost 30% in India. So if we calculate the overall disability of 30% over 60% VA done in India then the disability which Indian OEM has is almost 18% but the company is only getting 1% additional incentive. Therefore, the PLI scheme should be linked to the Value additional done in India.

Q15. Is there a need for a mechanism to promote research, development, and innovation at the state level? Will a ranking mechanism for the states help to promote the spirit of innovation? If yes, please comment on the structure of such a mechanism with key performance indicators.

Submission:

Centrally funded academic and research institutions are located within states, alongside state-funded institutions, their contributions to state development and problem-solving have been suboptimal. To rectify this, it is imperative to mandate these institutions to actively address the state's specific needs, focusing on providing technological solutions and fostering development. Government funding support should be contingent upon their prioritization of state issues. This strategic alignment would not only make these institutions more accountable but also encourage collaboration between the institutions and state governments for comprehensive state development. In such a collaborative scenario, the ranking of states becomes inconsequential, as the emphasis shifts towards mutual growth and problem-solving rather than a competitive comparison.

Section 4: Regulatory Framework: IPR Framework

Q16. How can awareness about IPR be increased among the researchers and industry in ICT sector? Suggest action points for making IPR as a part of

121802/2024/TD

syllabus in graduation /post-graduation level in colleges. Please support your answer with justification and best practices in India and abroad in this regard.

Submission:

Improving the speed and efficiency of the patent approval process for Information and Communication Technology (ICT) in India is crucial for fostering innovation, economic growth and technological advancement.

a. **Engage experts and professionals:** Invite experts and IPR professionals to guest lecture at colleges and share practical insights.

b. Encourage industry professionals to mentor students and promote IPR awareness. Collaboration with industry experts ensures practical relevance and industry-specific insights.

c. **Provide resources:** Develop and distribute IPR-related educational materials, including guides, videos, and e-learning resources. Establish online platforms for easy access to IPR information and updates.

d. **Prioritize ICT Applications:** Give priority to ICT-related patent applications due to the rapidly evolving nature of the field.

   Best Practices: Implement a fast-track system or a separate track for ICT patents, similar to the Green Technology Pilot Program in the US, which expedites examination for environmentally friendly inventions.

e. **Utilize Modern Technology:** Leveraging technology can automate and streamline the patent examination process.

   Best Practices: Implement AI and machine learning tools to assist patent examiners in identifying prior art and evaluating patentability. Countries like Japan and South Korea have incorporated AI into their patent examination processes.

Q17. **What essential steps can be taken to further improve the speed and efficiency of the patent approval process for ICT in India?**
Please support your answer with justification and best practices in India and abroad in this regard.

Submissions:
The following steps can be taken:

a. Prioritize ICT-related patents: Given the rapid advancements in ICT, prioritizing the examination of these patents can stimulate innovation and economic growth.

121802/2024/TD

b. Collaborate with industry and experts: Collaborating with industry stakeholders and experts can lead to better understanding of ICT inventions, resulting in quicker and more informed decisions esp. in the areas of 5G, 6G, AI and blockchain.

c. Establish a dedicated ICT patent examination division: Creating a specialized division focused on ICT patents can lead to more efficient examination by experts in the field.

Q18. **Is there a need to reduce the cost of filing patents in India? If yes, how can it be done? Please support your answer with justification and best practices in India and abroad in this regard.**

Submission:

Reducing the cost of filing Intellectual Property Rights (IPR) in India can encourage more innovators and businesses to protect their intellectual property. A well-balanced approach, incorporating fee reductions, discounts, and support for various applicant categories, can make IPR protection more accessible to a wider range of individuals and businesses in India.

- **Expedited Processing Options:** Telecom and ICT is a fast-changing sector, so if it takes more than 5 years for issuing patents, by that time patent becomes obsolete. Government should take steps to offer expedited examination for IPRs in India. This allows applicants to get their IP protected faster. Most of the innovators find the process cumbersome and end up losing to protect their intellectual property rights.

- **Collaboration and Public-Private Partnerships:** Establish partnerships with organizations or law firms willing to offer pro bono or reduced-cost legal assistance to inventors and start-ups during the patent application process.

- **Online Filing and E-Filing Discounts:** Encourage e-filing by providing discounts for applications submitted electronically. This not only reduces administrative costs but also speeds up the application process.

- **Adjust Fee Schedules:** Consider revising the fee structure, making it more affordable for start-ups, small businesses, and individual inventors. For instance, reducing or waiving fees for micro-entities or small enterprises can be beneficial.

- **Providing Discounts:** Provide substantial fee discounts or waivers for start-ups and small enterprises to make it more accessible for them to protect their innovations. Further, offer reduced fees for students and academic institutions to encourage research and innovation.

121802/2024/TD

- **Reduced Transcription and Translation Costs:** Simplify document requirements and reduce the need for transcription or translation of documents, especially for foreign applicants. This reduces costs associated with language barriers.

- **Government Grants and Subsidies:** Provide government grants or subsidies to individuals and businesses to offset a portion of the IPR filing costs, especially for inventions that align with national priorities.

Q19. **As far as the ICT sector is concerned, suggest measures to enhance filing of patents in India in general and by resident Indians in particular. Do we need a mechanism for handholding in patent filing? Do we need a mechanism of IPR sharing for collaborative research projects? Please support your answer with justification and best practices in India and abroad in this regard.**

Submission:

Encourage for more filing of patents by the resident Indians will boost the Indian industry and use of inhouse telecom designed products.

Incentives x (Revenue in books in India for the applied IPR) / (Global Revenue of the Company with or without applied IPR): This will give a push towards applying IPRs and monetizing innovations from within India.

It is imperative to have a defined mechanism for handholding while filling patents.

Numerous programs exist to educate on the importance of Intellectual Property Rights (IPR), but a positive shift in focus is crucial. The emphasis should be on empowering indigenous companies to effectively monetize their innovations. Beyond supporting Research and Development (R&D), other funds should play a pivotal role in enabling the monetization of innovation, fostering self-sufficiency among companies to finance their own IPR generation. An inclusive approach involves including management institutes in funds extended by technology companies.

Recognizing that some Indian companies and institutes lack dedicated IPR departments, the government can play a proactive role in incentivizing the creation of IPR departments or IP cells. Essential to this initiative is the stipulation that these cells must be staffed with mandatory roles, including patent agents, engineers, and marketing managers. This strategic staffing approach is designed to facilitate the effective monetization of innovations and IPRs, preventing potential losses or missed opportunities.

To further support this initiative, the government can gather data on the size of IPR cells within each organization, both MNCs and Indian companies. This data-driven approach allows for tailored recommendations and incentives.

Drawing inspiration from the Israel Innovation Authority, known for providing substantial grants to subsidize R&D, we can learn valuable lessons. While such grants

initially support innovation, a more positive and sustainable approach involves the government allocating funds for applying patents rather than solely filing for them. This shift aims to mitigate the startup failure rate and prevent the acquisition of IPRs from failed startups by MNCs, promoting a more equitable and thriving innovation ecosystem within India. Incentive schemes or programs can be thoughtfully differentiated to address the unique needs of both startups and established companies, fostering an environment where success is not limited to a select few.

Q20. **a) Is the Fair, Reasonable, and Non-Discriminatory (FRAND) mechanism for licensing of Standard Essential Patents (SEPs) functioning satisfactorily and effectively? Is there a need for any reforms in this aspect?**
b) How can small innovators be protected from the predatory practices?
Please support your answers with justification and best practices in India and abroad in this regard.

Submission on section a :

Standards are necessary for wide adoption of technologies and to ensure interoperability. Standards are formulated by standard setting organizations wherein such standard comprises of various patents claimed to be essential in utilization of a particular technology or manufacture of such technology-based products. However, these organizations have been advised by bodies to license out its Patent (now Standard Essential Patent) to other entities utilizing the said Standard, on Fair, Reasonable and Non-Discriminatory (FRAND) terms.

In the interest of the Indian industry the FRAND mechanism should be robust and more transparent and standardized, enabling equitable access to SEPs, especially in emerging technology areas. Encourage the domestic industries to invest and fil patents.

<u>Best Practice</u>: The European Telecommunications Standards Institute (ETSI) is continuously refining its guidelines for FRAND licensing, serving as a valuable model for adaptability. Strengthening legal mechanisms, such as antitrust and patent misuse laws, can be a shield from exploitation.

Submission on section b:

Though the Indian has a strong mechanism to protect small innovators from unfair actions by patent holders.
However, its essential to promote awareness and encourage them to participate in patent pools among small innovators about the importance of IP rights and how to protect them as they face challenges in monetizing their patents, especially when dealing with larger implementers, as patent litigation is extremely difficult, time-consuming, and expensive.

121802/2024/TD

Q21. **a)** **What additional measures should be taken to strengthen IPR dispute resolution mechanism to ensure confidentiality of the innovation and time-bound disposal of IPR-related disputes?**

b) **How can Alternate Dispute Resolution (ADR) mechanisms for IPR disputes be improved?**

Please support your answer with justification and best practices in India and abroad in this regard.

Submission:

Intellectual property ("IP") law is a rapidly evolving field in India and there is a growing need for efficacious adjudication of disputes arising out of such rights. Since no statutory provision clearly lists disputes or subject matters which are or are not arbitrable, judicial interpretation on the matter is widely relied upon. The ambiguity around this issue has been the result of 18 confusing interpretations, lack of a set precedent, as well as differing opinions by different Indian High Courts.

Arbitration is generally the result of a contract between parties, and most often the parties' contract determines rights and obligations only as between the parties to that contract. Even though the parties' contract establishes the matters that are subject to arbitration, the jurisdictional law at the seat of the arbitration often delineates what subject matter the parties can agree to submit to arbitration. Whether a particular subject matter is often referred to as 'objective arbitrability.' India is a party to the New York Convention. Part II, Chapter I of the Arbitration Act (ie, Sections 44 to 52) is applicable to New York Convention awards.

We believe that the Indian Courts are competent enough to deal with any IPR related disputes. The recently published annual report of the Delhi High Court clearly highlights the level of expertise achieved by the IP Courts in settling IPR issues while being mindful of the global developments happening in relation to some of the most complex issues. Taking a cue from the Delhi High Court's initiative to start IP specific courts, more High Courts have taken the initiative to form IP Divisions, thereby enabling a robust IP dispute resolution mechanism within the boundary of India.

Advantage of Arbitration - Considering the sensitive issue of IP infringement, arbitration ensures the confidentiality of the proceeding which is of utmost importance.

Challenges
a. Getting injunctive relief and punitive damages quickly under arbitration is difficult.

b. Intellectual property disputes may not involve pre-existing contractual relationships. So, despite arbitration the courts may have to deal with many other questions.

c. Confusion as to which areas of IP can be covered under Arbitration proceedings.

121802/2024/TD

d. The technical nature of IP demands for the adjudicators having expertise in that particular field.

ADR mechanisms in India - ADR is generally a clause that is included in the licensing terms and terms where both the parties may mutually agree to undergo ADR in case of any need. Thus, any mandate on institutionalizing ADR may not be desirable and should ideally be left to the negotiating parties to adopt it wherever needed. The Indian courts have set up Hot Tubbing procedures.

Increase in commercial transactions and the need for an efficient and speedy dispute resolution mechanism by Indian legislators may consider repositioning and codifying the matter of arbitrability of intellectual property disputes. However, it is to be noted that matters related to intellectual property rights often transcend national boundaries and arbitration provisions could only be used if they can somehow streamline commercial operations.

Q22. **Whether there is a need to introduce IP-backed financing system in India for ICT sector? If yes, what could be the framework to recognize IP as a collateral? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

Yes, there is a need to introduce an IP-backed financing system in India for the ICT sector.

a. Establishing a framework to recognize IP as collateral can benefit innovation-driven companies seeking funds.

b. Amend IP Laws: Amend existing intellectual property laws, such as the Patents Act, Copyright Act, and Trademarks Act, to explicitly recognize IP assets as eligible collateral for loans.

c. Establish a Security Interest Registry: Create a national registry dedicated to recording security interests in IP assets. Similar to the United States Patent and Trademark Office (USPTO), this registry should be a centralized platform for documenting and tracking IP-backed financing arrangements.

d. Legislative Support: India must enact legislation explicitly recognizing IP as collateral for loans, ensuring legal protection and enforceability. It's a well-established practice in the US and Europe.

e. IP Valuation and Due Diligence: Establish a system for accurate IP valuation and due diligence to assess the value of the IP assets.

121802/2024/TD

   f. SMEs and Start-ups: Initially, limit the use of IP-backed financing to small and medium-sized enterprises (SMEs) and start-ups, as they often lack traditional assets for collateral.

   g. Lending Guidelines: Develop guidelines for lenders to evaluate the creditworthiness of borrowers based on their IP assets.

Section 5: Global Leaders in R&D

Q23. **What measures should be taken to strengthen international collaborations in the field of STEM by the Government of India? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

To strengthen international collaborations in the field of STEM (Science, Technology, Engineering, and Mathematics), the Government of India can adopt several measures and leverage existing frameworks. Most of the recommendation mentioned below are being taken up however, we would like to retreat few of them supported with examples.

1. **Establish Research Consortia:**
   - **Example:** India can create research consortia in collaboration with foreign institutions and industry partners. These consortia can focus on specific STEM areas, fostering collaborative research and development.
   - **Best Practice:** The European Union's Horizon 2020 program encourages collaborative research and innovation, providing a model for cross-border partnerships.

2. **Increase Funding for International Collaborations:**
   - **Example:** The government can allocate specific funds to support joint research projects with international partners, promoting knowledge exchange and resource sharing.
   - **Best Practice:** The U.S. National Science Foundation (NSF) has various programs, such as the NSF Partnerships for International Research and Education, facilitating collaborative research with global partners.

3. **Promote Joint Academic Programs:**
   - **Example:** Encourage the establishment of joint degree programs between Indian and foreign universities, enabling students to gain a global perspective in STEM disciplines.
   - **Best Practice:** The Erasmus Mundus program in the European Union supports joint master's and doctoral programs across multiple countries, promoting international student mobility.

121802/2024/TD

4. **Facilitate International Research Centers:**
   - **Example:** Establish international research centers in collaboration with global institutions, creating hubs for collaborative STEM research.
   - **Best Practice:** The International Centre for Theoretical Sciences (ICTS) in Bangalore is an example of an Indian initiative hosting international workshops and research programs.

5. **Participate in Global Initiatives:**
   - **Example:** India can actively participate in international STEM initiatives such as CERN, fostering collaboration with scientists and researchers from different countries.
   - **Best Practice:** CERN, the European Organization for Nuclear Research, brings together scientists from around the world to conduct cutting-edge research in physics.

By adopting these measures and learning from successful international practices, the Government of India can significantly strengthen its collaborations in STEM, fostering innovation, knowledge exchange, and technological advancements on a global scale.

Q24. **What are the best practices which need to be adopted by India to promote private sectors investment in R&D activities? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

Please refer to the response submitted to question no. 14.

Q25. **Is there a need to introduce avenues for continuing patents in India such as provisions like "Continuation-in-part Application" in the USA? Please support your answer with justification, strategies and best practices in India and abroad in this regard.**

Submission:

The Indian legislature had the foresight to provide all tools necessary for an innovator to continue to innovate and protect his/her patent rights. This is apparent from the provision related to "Patent Of Addition" under Section 54, which is akin to continuation-in-part applications under the US patent system. Thus, any innovator could file for protection of any improvements made on the parent application.

Moreover, the Indian patent system also has provisions akin to continuation applications under the US patent system wherein the subject matter "disclosed" in the parent application could be covered under one or more further applications by dividing the parent application under Section 16.

121802/2024/TD

Therefore, the Indian patents act already incorporates relevant provisions to provide for continuation of patents and hence no additional measures are required.

Q26. **In view of the best practices being adopted by the global leaders in R&D in general and ICT in particular, which are the policies, programs and incentives which need to be adopted by India? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

Please refer to the response submitted to question no. 14.

Section 6: Key Learnings from International Experience

Q27. **What should be the regulatory framework for R&D efforts in the ICT sector for establishing an outcome-based measurable system? Please suggest changes required in the present laws or creating new policies or regulatory frameworks with regard to carrying out R&D, testing of products allotment of spectrum and commercializing of products in ICT Sector.**

Submission:

The following recommendations/frameworks could be adopted with regard to carrying out R&D, testing of products allotment of spectrum and commercializing of products in ICT Sector.

1. **Creation of Sovereign Patent Fund:** Indian technology/product eco-system is still at a nascent stage, hence it will be very difficult for Indian startups/companies to negotiate essential patent licenses from overseas players in any reasonable commercial way. The SPF will enable GoI to negotiate and acquire background IPR from larger foreign entities at a national level, using principles of FRANDS (Fair, Reasonable and Non-Discriminatory basis). SPF can also be used to support participation of Indian scientists/engineers from govt/academia and industry in global telecom standards body meetings such as ITU/IEEE/IETF/MEF/3GPP.

2. **Reinstate 200% weighted R&D deduction for income tax -** Government of India should restore the 200% weighted R&D deduction under section 35(2 AB) for next 5 years, so that telecom industry can increase their R&D investment and create long-term economic value. Moreover, since manpower expenses form a large portion of R&D expenditure in the telecom sector it is critical to include these for weighted tax deductions.

3. **PLI should be linked with local Value Addition:** PLI scheme should imbibe local value addition norms in its future-format and higher incentives proportionate to value-addition should be available. Which means the incentive should be linked

121802/2024/TD

with value addition done in India. A company doing only 5-10 % should have different incentive which is doing a value addition of 50-60% in India.

4. **Reducing the cost of filing Intellectual Property Rights (IPR)** in India can encourage more innovators and businesses to protect their intellectual property. A well-balanced approach, incorporating fee reductions, discounts, and support for various applicant categories, can make IPR protection more accessible to a wider range of individuals and businesses in India.

5. **Incentivize creation of IPR department or IP cell** provided these cells are staffed with (mandatory) patent agents, engineers and marketing managers. Incentives x (Revenue in books in India for the applied IPR)/(Global Revenue of the Company with or without applied IPR): This will give a push towards applying IPRs and monetizing innovations from within India.

6. **Telecom Centres of Excellence (TCOEs)** can be transformed into hubs of innovative product delivery to the telecom industry through a combination of strategic initiatives and collaborations. TCOEs are typically research and development centers or institutions that focus on telecommunications] technologies and innovation.

Q28. **In the context of India, whether top-down or bottom-up approach, or combination thereof should be preferred to facilitate indigenous R&D? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

Please refer to the response submitted to question no. 11.

Q29. **Apart from the measures indicated under New Education Policy what additional measures should be taken to establish a framework at initial stages of education to encourage students for opting experiment-based learning (learning by doing), rather memory-based learning? Please provide your answer quoting the best practices being followed internationally.**

Submission:

Please refer to the response submitted to question no. 1 and 2.

Q30. **What interventions are necessary at policy or governance level to facilitate the growth of knowledge-based industries in India with respect to ICT sector?**

Submission:

To foster the growth of knowledge-based industries in India, there is no need for changes at the governance levels. The matters relevant to business aspects are best regulated by free market forces and guided by industry practices.

Every business engagement is unique, and it is optimal to allow the involved parties to collaboratively find a solution or common ground that suits both parties. Government involvement in governing such engagements uniformly would be challenging, given the diverse nature of business interactions and the potential lack of resources. Any disputes arising from the failure of parties to reach common ground can be resolved through the courts, providing an effective mechanism for conflict resolution. Thus, introducing interventions at the governance level is unnecessary, as it may exceed the government's mandate.

Q31. **How educational institutions can be linked with industries on long term basis for basic R&D, development and commercialization of innovative products on self-sustainable model? Is there any policy intervention also needed? Please support your answer with the best practices being followed in India, or internationally.**

Submission:

Please refer to the response submitted to question no. 1 and 2.

Q32. **Start-ups are carrying out some outstanding work in all kinds of industries. What additional incentives can be given to start-ups to take up R&D activities in the ICT sector? In this regard, will establishing an exclusive venture capital (VC) fund for ICT help startups in the ICT sector to flourish and prosper in India? If yes, please provide a mechanism for the same.**

Submission:

Consider an innovative approach instead of traditional funding for incubators and start-ups. We should motivate and incentivize subject experts who also serve as venture capitalists to establish specialized Incubation Centers. These experts can assess potential start-ups before granting access to their Incubation Centers, providing initial funding. The government can implement a mechanism to enlist these Incubation Centers based on their credibility. To further support this model, the government can supplement the funding that these venture capitalists invest in the start-ups. Israel, known as the Start-up Capital of the world, has successfully implemented a similar model.

Q33. **Suggest ways and means to improve the acceptance of Indian technological innovations globally? Do you envisage the need for a Technology Transfer Organization at the national level to help towards commercialization of innovations in ICT? Please support your answer with justification, frameworks and best practices in India and abroad in this regard.**

121802/2024/TD

Submission:

No comments

Q34. **ICT sector is enabler for fin-tech, health-tech, ed-tech and a host of other applications. In such a scenario, what should be the specific focus areas for R&D in ICT sector? Please support your answer with suitable examples or frameworks and best practices in India and abroad in this regard.**

Submission:

No comments

Q35. **Is there a need for additional tax or fiscal incentives to support R&D activities in emerging technologies in ICT sector? If yes, please give suggestions with justifications and best practices in India and abroad in this regard.**

Submission:

No comments

Q36. **What should be the best practices followed in India to make it a favourable destination for IPR and Patent award nation? Please support your answer with justification, frameworks and best practices in India and abroad in this regard.**

Submission:

The following steps could be taken towards making India favourable destination for IPR:

- A Sovereign Patent Fund (SPF) must be created, these are the funds created by governments or can be a government-backed entity which aims to boost domestic businesses through acquisition and licensing of patented technology.

- It acts as an intermediary in the market and procure license from the Patent holders and then sub-license the same to different businesses in India.

- In some cases, SPFs may also provide financing and technical assistance to domestic firms that are developing new technologies, in order to help them bring their innovations to market more quickly and efficiently.

- SPF are an important tool for supporting domestic technology development and promoting economic growth.

- Improving the speed and efficiency of the patent approval process for Information and Communication Technology (ICT) in India is crucial for fostering innovation, economic growth and technological advancement.

- Incentivizing creation of IPR department or IP cell provided these cells are staffed with (mandatory) patent agents, engineers and marketing managers.

- India could adopt provisions such as Patent Prosecution Highway (PPH) and also focus on reducing the administrative burden on patentees such as section 8 and working statement requirements under form 27. Moreover efficient and timely training of examiners to better appreciate incremental inventions would go a long way to make India a more sought after destination for patent filing.

Q37. **What measures should be taken for quick disposal of IPR or Patent related disputes? Is there a need to create a specialised legal platform for the same? If so, what steps may be taken to adopt them? Please provide your answers for above questions, quoting the best practices being followed globally.**

Submission:

The Indian statutes governing patents, contracts, etc. are robust, and the Indian judiciary is competent and able to apply the law, as written, to licensing related disputes.

While India has taken some cues, such as the IP specific courts, from some of the most robust patent systems to strengthen its IP system, there still are several challenges which need to be tackled.

1. **Speed of Disposal:**
   - *Challenge:* Patent applications take at least three years for final disposal, impacting India's attractiveness for IPR filings.
   - *Positive Approach:* Increase the number of examiners/controllers with legal and technical expertise to expedite evaluation.

2. **Continuous Training for Examiners/Controllers:**
   - *Challenge:* Patent examiners/controllers need to stay updated with global IP developments and practical aspects.
   - *Positive Approach:* Emphasize legal training through engagement with patent practitioners and academicians.

3. **Expedited Examination Provision (Rule 24C):**
   - *Positive Measure:* Specific technological sectors, as deemed fit, can be notified by the Central Government for expedited examination, enhancing the grant process.

4. **Judicial System Pendency and Rotation:**

121802/2024/TD

- *Challenge:* Long pendency in the Indian judiciary is exacerbated by frequent rotation of judges every six months.
- *Positive Approach:* Mitigate financial burdens in IP disputes by either tying judges to assigned matters or increasing the time duration between bench rotations.

Section 7: Others

Q38. **Please comment on any other related issue to promote R&D in the ICT sector in India. Please support your answer with suitable examples and best practices in India and abroad in this regard.**

Submission:

The establishment of the National Research Foundation (NRF), a high-powered apex body with a budgetary allocation of INR 50,000 cr. for five years, marks a significant milestone in providing strategic direction to scientific research in India. While past funding bodies like the Technology Development Board (TDB), Science & Engineering Research Board (SERB), Global Innovation & Technology Alliance (GITA), and Biotechnology Industry Research Assistance Council (BIRAC) served their purposes, NRF is uniquely positioned to transform the research and innovation landscape, steering the country towards a knowledge economy.

Challenges and the Need for Strategic Planning:
India, despite its talent pool, education institutions, and infrastructure, hasn't fully harnessed its potential for overall development and technological leadership. A strategic shift in strategy, policy, and private sector participation is crucial. The NRF provides the impetus for a reverse planning process, starting with defining socio-economic impacts, followed by measurable outputs and the necessary inputs.

1. Setting Impact Aspirations: Aspirations include increasing India's value-added manufacturing and high-tech exports, improving charges for intellectual property, doubling foreign investments in R&D, and transforming Indian industries into global champions. Aiming for a significant increase in high-value employment in India and elevating India's rank in global indices such as the Global Innovation Index and Global Competitiveness Index.
2. Defining Outputs: Education Outputs: Aim for a substantial increase in Gross Enrollment Ratio (GER) in higher education, inclusion of 50 STEM institutions in QS World University Rankings, and a significant rise in quality STEM PhDs and Citation Index. R&D & Innovation Outputs: Focus on co-development of critical platform technologies, a substantial increase in yearly filings of Intellectual Property, and a rise in deep-tech start-ups.
3. Inputs and Fundamentals: Institutional Reforms: Align public-funded R&D and educational institutions under one umbrella with performance-based funding. Create consortia or alliances for infra & manpower sharing to avoid duplication.

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4. Investments: Increase government investment in R&D to 1.5% of GDP, with a focus on both basic and applied R&D. Encourage technology-driven MSMEs with credit guarantees, co-investment in deep-tech start-ups, and reforms in public procurement policy.

5. Political Will and Restructuring: Ensure political will to drive institutional reforms and investments, fostering a conducive environment for India to become a top knowledge-driven economy.

In conclusion, NRF's inception signals a critical phase for India's journey towards a knowledge economy. The outlined strategic planning process, emphasizing impacts, outputs, and necessary inputs, aims to propel India into the league of top knowledge economies globally during the "Kartavya Kaal."