Telecom Regulatory Authority of India

Consultation Paper on

Promoting

Networking And Telecom Equipment Manufacturing

in India

New Delhi, India

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Stakeholders are requested to furnish their comments to Advisor (BB & PA), TRAI by 11.03.2022 and counter-comments by 25.03.2022.

Comments and counter-comments would be posted on TRAI's website www.trai.gov.in. The comments/counter comments may be sent, preferably in electronic form, to Shri Sanjeev Kumar Sharma, Advisor (Broadband and Policy Analysis), Telecom Regulatory Authority of India on the e-mail id advbbpa@trai.gov.in with a copy to jtadvbbpa-3@trai.gov.in

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Chapter 1

Background and Enabling Government Policies and Initiatives

A) Background

1.1. India is the world's second-largest telecommunications market and has registered strong growth in the last decade. The country has mobile subscriber base of around 1.16 billion[1] as of November 2021 which is expected to touch 1.42 billion[2] by 2024. The number of broadband subscriber base has increased to 801.6 million[3] in November 2021 which is expected to touch 900 million by 2025[4]. India's data consumption is around 12 GB per Month/user and is likely to touch 25GB[5] per Month/User by 2025. Telecommunication industry is enabled by a complex value chain that includes service providers, equipment vendors and users. It plays a significant role in economic and social development of a country. As the world gets more and more technologically advanced, most of the emerging technologies would ride on the telecom networks leading to tremendous market opportunities in the sector. The unprecedented growth and rapid digitization in the sector have become the key factors to drive growth of the networking and telecom equipment (NATE) market.

1.2. The telecom industry's contribution to GDP has been estimated to be 6.5%[6] at present and would further increase as the focus shifts to 5G deployments. Programmes like Digital India, Smart Cities, Digital Saksharta Abhiyan (DISHA), National Broadband mission, Industry 4.0 etc. are expected to multiply the demand for telecom products and in turn NATE. It is believed that India's digital economy

[1] https://www.trai.gov.in/sites/default/files/PR_No.04of2022_1.pdf

[2] India's mobile subscriber base to touch 1.42 billion by 2024, 80% to use 4G - The Economic Times

[3] https://trai.gov.in/sites/default/files/PR_No.04of2022_1.pdf

[4] https://www.ibef.org/news/india-to-have-900-million-internet-users-by-2025-report

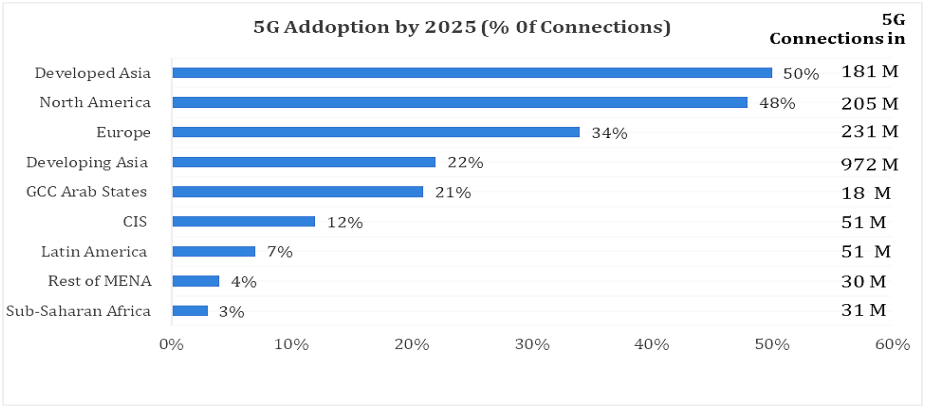
[5] https://www.bloombergquint.com/business/india-s-data-consumption-may-touch-25-gb-month-per-user-by-2025-ericsson

[6] https://www.investindia.gov.in/sector/telecom

has the potential to reach USD 1 trillion by the year 2025[7] driven by increased proliferation of smart phones, improved internet penetration, growth of mobile broadband, uptake of data usage, and further penetration of social media. As the government makes concerted efforts to digitize the economy, the demand for affordable Networking and Telecom Equipment (NATE) is expected to grow considerably. It is therefore important to promote domestic manufacturing sector to meet the growing equipment demand. This in turn will contribute handsomely to the GDP and employment in the country. It will also promote exports and allow India to become important player in international value chain.

1.3. The total wireless data usage in India grew 1.82% quarterly to reach 25,227 PB[8] in the third quarter of FY21[8]. Gross revenue of the telecom sector stood at Rs. 68,228 crore (US$ 9.35 billion)[9] in the third quarter of FY21. Over the next five years, rise in mobile-phone penetration and decline in data costs is likely to add 500 million new internet users in India, creating opportunities for new businesses. The region-wise projections of the 5G subscribers according to 'The Mobile Economy Asia Pacific- 2020 Report' published by GSM association, is given in Figure 1.1.

FIGURE 1.1 - Projections of the 5G subscribers



Source: The Mobile Economy 2020- GSMA[10]

[7]https://pib.gov.in/PressReleaseIframePage.aspx?PRID=15656691:

[8] https://www.ibef.org/industry/indian-telecommunications-industry-analysis-presentation

[9]https://www.ibef.org/industry/telecommunications.aspx

[10]Telecom and network equipment Market Size, Share, Industry Forecast 2028 (fortunebusinessinsights.com)

1.4. The rapidly growing number of mobile phone users and the impending technological shift towards 5G is likely to be key catalysts and will fuel the market growth. Advancements in wireless communication infrastructure have already uplifted the demand for advanced NATE such as mobile radio access network, microwave transmission, IP telephony, optical transport, mobile backhaul, carrier ethernet switches, routers, wireless packet core etc. 5G network deployments mandate high speed all-pervasive broadband, Internet-of-Things (IOT), Machine-to-Machine (M2M) communication and Digitalization of societies. It is therefore likely to give rise to opportunities because of introduction of new services and products, new intermediaries in the value chain, and greater efficiencies in productivity across industry verticals.

1.5. The huge exponentially increasing market, propelled by the emerging 5G technology, provides tremendous opportunities for equipment manufacturers to grow into a potent player in the telecom universe. It becomes necessary for a country to have an agile manufacturing setup for NATE so that value addition to the economy can be maximized.

1.6. The growth of the domestic Networking and Telecom Equipment manufacturing (hereinafter referred as NATEM) would create various forward and backward linkages and expand demand for other electronic components. It would also develop the technical know-how and skills of people in the country, lower the import requirement for telecom end products, and enable the sector to align with Government of India's vision of an Atmanirbhar-Bharat. Robust NATEM sector is also a prerequisite in view of growing security concerns regarding data privacy and overarching geopolitical concerns surrounding personal data protection.

1.7. The competition in the global NATE market, however, is intense. Key players are delivering diversified product portfolios to meet the

customers' needs. Asia Pacific is likely to exhibit substantial growth in the NATE market due to the significant ongoing internet infrastructure development. The manufacturing companies in India need to align with the 'Make in India' initiative of government and enhance industry's share in the economy. They should aspire to emerge as an export hub for markets like South Asian Association for Regional Cooperation (SAARC), Association of South East Asian Nations (ASEAN), African, and Latin American countries to start with, and then emerge as global market player in this sector.

1.8. A review of the manufacturing scenario of NATE shows that the country is not able to fully exploit the upsurge in telecom sector. The sector, on one hand, is able to bring foreign exchange to economy in form of foreign direct investment (FDI), but on other hand, huge amount of foreign exchange is flowing out on account of pay-outs for the imported equipment, inputs, Intellectual Property Rights (IPRs) and profit margins.

1.9. The Export Import data on various components of telecom manufacturing is presented in the table 1.1.

TABLE 1.1 - Export Import data for NATE

Category / Period	**Telegraphic Apparatus**			**Mobile**			**Telecom Cables**			**Parts of Telephonic/ Telegraphic Apparatus**		
	Export (in Rs Cr)	**Import (in Rs Cr)**	**Excess of Import over Export**	**Export (in Rs Cr)**	**Import (in Rs Cr)**	**Excess of Import over Export**	**Export (in Rs Cr)**	**Import (in Rs Cr)**	**Excess of Import over Export**	**Export (in Rs Cr)**	**Import (in Rs Cr)**	**Excess of Import over Export**
2017-18	5221	48150	42929	1367	22788	21421	2775	4104	1329	1666	74527	72861
2018-19	6300	55816	49516	11396	11304	**(92)**	3122	5677	2555	1804	60907	59103
2019-20	5612	38590	32978	27225	7403	**(19822)**	3073	4305	1232	2166	56039	53873
2020-21 (Till 31.12.20)	5249	35351	30102	14232	13389	**(843)**	2399	2879	480	1855	37753	35898

Source – TEPC[11]

[11]Export Strategy for Telecom Equipment by TEPC.

1.10. The Export Import figures showcase the urgent need to establish the self-balancing mechanism by reducing imports and promoting exports to reduce the fiscal deficit arising from the sector. The import dependence of the country results in a narrower, more restricted market availability to domestic manufacturers since demand for equipment manufactured by MNCs has been historically high. MNCs are supported by credit finance agencies, enjoy economies of scale, and earn higher revenues due to large volumes rendering local manufacturers non-competitive. In India, the local manufacturers face various problems related to poor infrastructure, high cost of testing and certification, restricted market access, and reluctance of private players who prefer cheaper imports. Also, domestic industry lacks the ability to continually invest in R&D.

1.11. The NATEM market may be subdivided into finished goods, sub-assemblies, and components on one hand and supporting software on the other. The components manufacturing in India is comparatively nascent. The localization at the component level is much lower when compared to sub-assembly level. The components such as chipsets, PCBs etc are not manufactured in India. Such components are being imported presently to locally manufacture the finished product in India. The import of telecom products includes the import of Integrated Circuits (ICs) and discrete electronic components. The fabrication of ICs involves huge capital investments, so components are being imported due to the inability of domestic production to meet manufacturers' requirements. Considering its priority and area of focus, Government has announced in December 2021, the incentive schemes for developing an entire ecosystem for chip manufacturing in the country. These measures are expected to provide impetus to the sector and set up semiconductor manufacturing facilities in the country, turning India into an electronic hub.

1.12. Semiconductors will be key to the Fourth Industrial Revolution, with 5G, AI and Edge computing transforming and revolutionizing every aspect of our lives. The market is thriving in countries like the USA, China, Taiwan, South Korea, and Japan. The production of Semiconductors consists of three relatively distinct steps: chip design (fabless), fabrication (Foundry, IDM[12]) and assembly and test (ATM/OSAT[13]). The market is dominated by very few companies at present. The strongly interdependent and complex set up of such a market structure creates challenges in terms of ensuring equitable access to all foreign players thereby preventing restrictive powers in the hands of select few countries. The Covid pandemic has made many global giants re-evaluate their manufacturing strategy and they are actively looking for countries like India to spread their risks.

1.13. Through the Production Linked Incentive scheme for semiconductor manufacturing aiming to minimize the import of ICs and discrete electronic components, the government has invited world leaders in manufacturing of ICs and discrete electronic components and offered fiscal support/ incentives for establishing their units for designing and fabrication of ICs in India. A significant incentivization has been offered to the technology companies to build these components locally, rather than importing and assembling them domestically. This will strengthen the electronics manufacturing ecosystem and establish a trusted value chain.

1.14. Decoupling network functionalities from the underlying hardware is at the basis of the design process of 5G networks. As a result softwarization and virtualization are emerging as two disruptive paradigms in next generation networks. The next generation network architectures would be able to provide flexibility, reconfigurability and programmability to support, with fine granularity, a wide and heterogeneous set of use cases[14]. India has

[12] Integrated device manufacturer

[13] Assembly, Test & Materials (ATM)/ Outsourced Semiconductor Assembly and Test (OSAT)

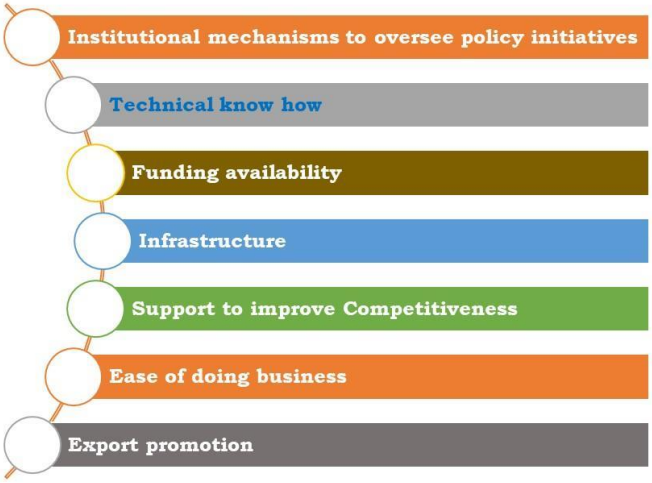
[14] https://www.sciencedirect.com/science/article/abs/pii/S1389128618302500

a strong base in Software development and designing capabilities. There is a sufficiently mature start-up ecosystem in the sector of software products. There is a need to focus on NATEM along with R&D and combine this with the inherent strength of the country in software. With the convergence of networks, modularity of network functions and disaggregation adopted by infrastructure companies, Software solutions/software products are now competing with hardware products. India has the second largest telecom market of the world, and it can leverage its proven competitive advantage in software into the telecom sector particularly for indigenous manufacturing. India can build its own products with greater role of indigenous software. This calls for promoting software product companies as well in India. To develop indigenous long-term strength in futuristic telecom networks, a focused strategy and a long-term plan harnessing country's capability in software and creating own telecom stack in areas of 5G and next generation technologies can build an ecosystem that will make India globally competitive.

B) Elements of local network and telecom equipment manufacturing

1.15. There are various facts that will have to be addressed simultaneously for promoting NATEM in India. As envisaged in NDCP-2018, if India's contribution to global value chains is to be maximized by focusing on domestic production, increasing exports, and reducing the import burden, then initiatives need to be taken on several parallel fronts as depicted in figure 1.2.

FIGURE 1.2 - Elements of promoting NATEM



1.16. Each of these facets have been briefly explained below:

1.16.1. **Institutional mechanisms to oversee policy initiatives**

For time bound and focused approach on various aspects of planning, policy formulation, implementation, monitoring and development of the whole ecosystem for manufacturing in the telecom sector, proper institutional mechanism needs to be put in place to formulate, implement, and monitor various policy initiatives.

1.16.2. **Technical know-how**

In order to create a thriving NATEM ecosystem in the country, huge efforts on promoting Research & Development (R&D) are required on priority. For comprehensive focus on promotion of R&D, various issues pertaining to funding R&D activities, Patent Framework, rights and obligations of Standard Essential Patent (SEP) holders, Licensing of Patents on Fair, Reasonable and Non-Discriminatory (FRAND), Dispute resolution, centralized SEP Portal requires attention. Further Incubation Centres, the need for test beds, access to trials etc. needs to be addressed. Additionally, R&D capability within a country cannot be boosted without addressing the issue of upgradation of manpower skills, introducing specially curated

curriculums based on international learning and establishment of design labs in academic institutions. Another important aspect of the R&D ecosystem is availability of test beds, testing, and certification facilities. Given that the issue of promoting R&D for local NATEM has several facets that need to be addressed, the Authority feels that this requires a separate focus and therefore, the Authority has decided to come out with a separate consultation paper on promoting R&D in the sector.

1.16.3. **Funding availability**

Availability of adequate financing options is instrumental in strengthening the manufacturing sector. Telecom and network equipment manufacturing in India, still in its nascent stage, requires easy availability of cheap credit and multiple capital funding options.

1.16.4. **Infrastructure**

Beyond technical know-how and funding, a manufacturer requires infrastructure for setting up a manufacturing facility. Infrastructural disabilities add to the cost differential which hinders growth of the domestic market. Establishment of manufacturing tech parks and extending incentives to them, ensuring power availability at affordable price, ascertaining availability of Information & Communication Technologies (ICT) facilities and affordable logistics are some of the steps that can be taken to address the infrastructure related issues for NATE manufacturers.

1.16.5. **Support to improve Competitiveness**

Sustained Development of NATEM in India can be ensured only if it has a competitive edge. A buyer, both within India as well as outside, will prefer to buy products at the most competitive price. In several countries, governments have rolled out fiscal incentive schemes like tax holidays/deferment, introduction and exemption of countervailing duties, availability of cheaper capital etc. to improve the competitiveness of locally manufactured products. In addition,

comprehensive schemes like preferential access to market for locally manufactured products and offering production linked incentives are also used as tools for promoting local equipment manufacturing and to overcome various cost disabilities.

1.16.6. **Ease of doing business**

For promoting any business activity, including manufacturing, government needs to ensure that ease of doing business environment exists. It also needs to address issues related to delayed clearances and approvals and too many compliances.

1.16.7. **Export promotion**

Policy measures are also required to ensure that the telecom products manufactured in India are showcased and promoted overseas.

1.17. Some of the above-mentioned elements of promoting local manufacturing have been addressed in the past by various policy measures that have been pronounced/implemented by the Government. Some of the Telecom Regulatory Authority of India (TRAI) Recommendations in the past have also dealt with these subjects in detail. These policy measures and TRAI recommendations have been discussed below:

C) Enabling Government Policies and initiatives

1.18. Government has formulated various policies for promotion of NATEM in the country. The Ministry of Electronics and Information Technology (MeitY) has also launched several schemes for promoting Electronics System Design and Manufacturing (ESDM) in India. Some of the schemes/policy initiatives of the government, including those of MeitY, have been briefly explained in the following paragraphs.

1.19. The **National Digital Communications Policy**, **2018** (**NDCP-2018**)[15] seeks to unlock the transformative power of digital communications networks to achieve the goal of digital empowerment of the country. The policy seeks to remove regulatory challenges and create attractive investment opportunities in new technology segments and stimulate the deployment of new technologies in India. In reference to Local Manufacturing and Value Addition, NDCP-2018 envisages:

(a) Maximizing India's contribution to global value chains, by focusing on domestic production, increasing exports, and reducing the import burden, by:

i. Rationalizing taxes, levies and differential duties to incentivize local manufacturing of equipment, networks and devices to the extent of domestic value addition
ii. Introducing Phased Manufacturing Program for identified product segments in Digital Communication Technologies
iii. Attracting and incentivizing Global OEMs and Generic Component players to setup manufacturing base in India
iv. Ensuring the availability of essential background IPR in Fair, Reasonable and Non-Discriminatory (FRAND) terms required for promoting local manufacturing
v. Promoting design led manufacturing in India by leveraging indigenous software/ R&D capabilities
vi. Incentivizing fab and/or fab-less design and manufacturing of chips and system on a chip (SOC) for network and devices in emerging technologies
vii. Attracting global talent from the Indian diaspora to create best in class enterprises.

(b) Ensuring strict compliance to Preferential Market Access requirements:

[15] https://dot.gov.in/sites/default/files/EnglishPolicy-NDCP.pdf

i. Preferring domestic products and services with domestically owned IPR in procurement by government agencies, especially for procurement of security related products
ii. Incentivizing private operators to buy domestic telecom products.

1.20. Realising the potential of the software product industry in India, the **National Policy on Software Products 2019**[16] was issued with an objective to promote the creation of a sustainable Indian software product industry, driven by intellectual property (IP) and leading to multi-fold increase in the share of the Global Software product market by 2025. Under the scheme, various programs and strategies have been formulated for promoting software product business ecosystem, for promoting entrepreneurship and innovation for employment, for improving access to domestic market and cross border trade promotion etc.

1.21. **Preferential Market Access** is another Policy initiative that envisages preference to domestic products and services, with domestically owned IPR, in the procurements done by government. To ensure preferential access to domestic manufacturers **PPP MII Order 2017**[17] was issued by Department of Industrial Policy and Promotion (DIPP)[18]. The objective of the order was to encourage 'Make in India' and promote manufacturing and production of goods, services and works in India with a view of enhancing income and employment.

1.22. **The Production Linked Incentive (PLI) Scheme**[19] - The PLI Scheme for domestic manufacturing of telecom and networking

[16] https://www.meity.gov.in/national-policy-software-products-npsp-%E2%80%93-2019

[17] https://dtf.in/wp-content/files/CVC_Circular_dated_20.04.2018_-_Public_Procurement_Preference_to_Make_in_India_Order_2017_PPP-MII_Order_-_regarding.pdf#:~:text=Department%20of%20Industrial%20Policy%20and,production%20of%20goods%20and%20services.

[18] now DPIIT (Department for Promotion of Industry and Internal Trade)

[19] https://www.meity.gov.in/writereaddata/files/Notification_Extension_of_PLI_Scheme_23-09-2021.pdf

products such as switches, routers, 4G/5G radio access network, wireless equipment, and other internet of things (IoT) access devices, has been made operational from 1st April 2021. The Scheme will be implemented within the overall financial limit of Rs 12,195 crore for 5 years. Objective of the scheme is to create global champions from India who have potential to grow using cutting edge technology and thereby penetrate the global value chains in telecom products and play an important role in the larger vision of “Digital India".

1.23. DoT has issued amendments in licences in March 2021 for procurement of NATE from trusted sources w.e.f. June 15, 2021, for ensuring security of telecom networks. This mandates the telecom service providers to use the equipment through trusted or authentic sources only. Through this, the government aims to bring enhanced supervision and facilitate effective control by telcos and designated authority over nationwide telecom networks. Rising privacy concerns and imminent threat of possible security breaches to the telecom products and growing awareness about data privacy can provide a huge impetus to the demand of domestically produced equipment.

1.24. MeitY has issued policy to promote **Electronics system Design and Manufacturing (ESDM)[20]** that covers the electronics requirements for Auto Electronics, Industrial electronics, Medical Electronics, Strategic Electronics etc. Some NATE also come under ESDM for which the incentives and schemes decided by MeitY are applicable.

1.25. The **National Policy on Electronics 2019[21] (NPE 2019**) was initiated with the vision of encouraging and driving capabilities in the country for developing core components and creating an enabling environment for the industry to compete globally. To further the same, the Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing was launched on 01 April 2020. The underlying objective was to boost the electronics

[20] https://www.meity.gov.in/esdm/policies

[21]https://www.meity.gov.in/writereaddata/files/eGazette_Notification_NPE%202019_dated%2025022019.pdf

manufacturing landscape including telecommunication equipment and establish India at the global level in the electronics sector.

1.26. In the financial year 2020-21, four schemes to promote electronic manufacturing were launched by MeitY. Three schemes, namely PLI for large scale Electronic Manufacturing, SPECS and EMC2.0 were approved by the Union Cabinet on 20.03.2020. The schemes have been successful in attracting global champions while providing a fillip to domestic companies and making them national champion companies with global aspirations. The fourth scheme PLI for IT Hardware was launched in February 2021, with the objective to provide financial incentive for the manufacturing of Laptops, Tablets, All in One PC's and servers in India. These four schemes are described below:

1.26.1. **Production Linked Incentive (PLI) for large scale Electronics manufacturing**[22] notified on 01.04.2020, offers incentive on incremental sales for a period of five (5) years for mobile phones (having invoice value of Rs 15,000 and above), mobile phones of domestic companies, and specified electronic components. With an incentive outlay of Rs 36,440 crore the scheme is anticipated for a total production of about Rs 10.5 lakh crore of which more than 60% of production will be for exports. The scheme is envisaged to bring in additional investment of Rs 11,000 crore and value addition expected to go up to 35-40% by 2025 from 20-25% presently. After the success of the first round of Production Linked Incentive scheme, the second round of the PLI scheme applicable from 01.04.2021 was approved. The target segment for the purpose of this round is specified electronic components.

1.26.2. **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)** provides a capex

[22] https://www.meity.gov.in/esdm/pli

incentive of 25% on capital expenditure on units manufacturing electronic components, semiconductor / display fabrication units, and capital goods. It was notified on 01.04.2020 and is open to receive applications till 31.03.2023. The total approved expenditure outlay by cabinet is Rs 3,285 crore.

1.26.3. **Modified Electronics Manufacturing Clusters 2.0 (EMC 2.0)** Scheme provides financial assistance for setting up of both EMC projects and Common Facility Centres (CFCs) across the country. 19 Greenfield EMCs and 3 Common Facility Centres (CFCs) have been approved in the earlier EMC scheme. Electronic manufacturing clusters are proposed to be set up under the EMC 2.0 scheme having a minimum area of 200 acres each (100 acres for NE States and Hilly States). The total approved expenditure outlay is Rs 3,762 crore.

1.26.4. **Production Linked Incentive Scheme (PLI) for IT Hardware** offers a production linked incentive to boost domestic manufacturing and attract large investments in the value chain of IT Hardware. The scheme shall extend an incentive on net incremental sales (over base year) of goods manufactured in India. Over the next 4 years, the Scheme is expected to lead to total incremental production of up to Rs 3,26,000 crore, out of which more than 75 % will be for exports. Also, it is expected that Domestic value addition for IT Hardware will rise to 20-25% by 2025 from the current 5-10%, due to the impetus provided by the Scheme. The total budget outlay of the Scheme is Rs 7,350 crore as approved by the Union Cabinet.

1.27. The other major initiatives taken by MeitY are as follows:

1.27.1. To promote large scale manufacturing in the country, **M-SIPS**[23] was announced by the government in July 2012 to offset

[23] https://www.meity.gov.in/writereaddata/files/MSIPS%20notification%20english.pdf

disability and attract investments in Electronics System Design and Manufacturing (ESDM) Industries. The scheme provided incentive for investments on capital expenditure i.e. 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs. Under the Scheme, minimum investment threshold for each product category/ vertical started from Rs 1 crore for manufacturing of accessories to Rs 5000 crores for memory semiconductor wafer fabrication units. This scheme is not active presently.

1.27.2. **Electronic Development Fund (EDF)** has been set up as a "Fund of Funds" to participate in "Daughter Funds" for risk capital to start-ups in ESDM and IT. The vision of EDF is to support Daughter Funds (DFs) primarily in Electronics System Design and Manufacturing (ESDM). The Software Product Development Fund (SPDF) works beyond the scope of EDF and Fund of Funds (FFS) to fulfil the gaps left in EDF and FFS for the growth of the Software Product Ecosystem.

1.27.3. **Expression of Interest (EoI) for setting up of FAB** was issued on 15.12.2020 for setting up/expansion of existing semiconductor wafer/device fabrication (FAB) facilities in the country or acquisition of semiconductor FABs outside India. EOI called for details on various aspects like financial support desired from the Government of India, including Grant-in-Aid (GIA), viability Gap Funding (VGF) in the form of Equity and / or Long-Term Interest Free Loan (LIFL), tax incentives, infrastructure support, and support desired from State Government in terms of extent, value, nature of land, availability and cost of provisioning water, and power tariff. Now, government has come out with comprehensive and all-encompassing package for FAB manufacturing as detailed below:

- **Production Linked Incentives (PLI) for semiconductor and display ecosystem**[24] was approved by Cabinet on 15.12.2021, for development of semiconductor and display ecosystem in India, with an outlay of Rs.76,000 crore (>10 billion USD). The programme invites global companies and incentivizes them for setting up of semiconductor and display manufacturing facilities as well as design in India. This will give momentum to semiconductors and display manufacturing and facilitate capital support and technological collaborations. Broad incentives have been approved under the program include setting up of Semiconductor FABs and Display FABs in India, modernization and commercialization of Semi-conductor Laboratory, setting up of Compound Semiconductors / Silicon Photonics / Sensors (including MEMS[25]) FABs and Semiconductor ATMP/OSAT[26] facilities in India, product design linked incentive of up to 50% of eligible expenditure, and product deployment linked incentive of 6% - 4% on net sales for five years. This is further discussed in detail in chapter 2.

1.27.4. **Incubation centres** help create and grow new businesses and rising companies, providing the entrepreneurs with the know-how, funds, and initial support they need to make their ventures successful. Incubation programs branch out economies, commercialize technologies, create jobs, and create wealth. They are essential in the process of commercialization of technologies. Hence are essential in the telecommunication ecosystem. MeitY has come out with Technology Incubation and Development of Entrepreneurs (TIDE) scheme to develop incubation centres in the areas of Electronics and ICT. TIDE

[24] https://pib.gov.in/PressReleasePage.aspx?PRID=1781723
[25] MEMS - Micro-Electro-Mechanical Systems
[26] ATMP - Assembly, Testing, Marking, and Packaging; OSAT - Outsourced Assembly and Test

aims to assist Institutions of Higher learning to strengthen their Technology Incubation Centres and thus enable young entrepreneurs to initiate technology start-up companies for commercial exploitation of technologies developed by them.

1.27.5. **Next Generation Incubation Scheme (NGIS)** [27] Next Generation Incubation Scheme or "NGIS" is a futuristic and comprehensive incubation scheme entrusted by MeitY to STPI for implementation. NGIS has a vision to promote and support innovative start-ups working towards software product development (including embedded electronics) through a synergized pan-India approach. NGIS has a budgetary outlay of Rs. 95.03 Crore over a period of 3 years. It targets to incentivize 300 select start-ups with seed-fund of up to Rs. 25 Lakh. Other expenses are earmarked towards marketing support, intern/challenge grant, software product security testing service, hackathon/challenge, manpower and Management etc.

1.27.6. **Champion service sector scheme (CSSS)** was announced on 24.03.2021 by the Ministry of Commerce and Industry. A total amount of Rs.3369.75 Crore for 3-5 years has been approved for the scheme by the Expenditure Finance Committee based on the proposals submitted by the concerned Ministry/Department. Under the scheme, in 2020-2021, DoT was allocated Rs.15 Crore for their sectoral scheme 'Brand building of India as Telecom Manufacturing and Services Destination'. DoT has released grants for participation in events like Global Exhibition on Services, Bangalore, BASIS SoftExpo, ConnecTechAsia 2020, AfricaCom 2020, Africa ICT Expo 2020 and India Mobile Congress 2020. Another Rs. 44.5 Crore was allocated to DoT for Setting up of Digital Communications Innovation Square (DCIS). Under DCIS,

[27] https://stpi.in/about-ngis

maximum support to a start-up/MSME is given up to Rs 40 Lakhs for the project duration. Startups (Scaling Stage)/MSMEs who have already tested their prototypes (hardware/software innovations) are eligible to receive the support.

1.27.7. Through **Future Skills PRIME**[28] initiative, the government in association with industry aims to reskill/ upskill a total of about 0.4 million employees over a period of 5 years. Future Skills Prime is one of the lighthouse schemes under the government's Trillion Dollar Digital Economy initiative. The platform would provide interested candidates with multiple options for their skilling needs. Through this platform, learners can exit at multiple points in their learning journey. They can earn badges for digital fluency, earn certificates from courses aligned to the government-approved curriculum, go through blended learning from key program partners like CDAC/NEILIT and complete bridge and foundations courses.

D) Previous recommendations of TRAI

1.28. The Authority has issued Recommendations on Telecom equipment Manufacturing Policy on 12th April 2011 and again on 3rd August 2018. The Recommendations exhaustively cover various concerns of telecom manufacturing in areas of Standardization, promotion of research, funding opportunities, export and other incentivization etc.

1.29. The 2011 Recommendations focused primarily on *Telecom and network equipment Manufacturing Policy* as an integral part of the New Telecom policy. It emphasized the need to reduce the share of imports or Low Value-Added Products in total equipment manufacturing. To achieve the same, it proposed preferential market

[28] https://futureskillsprime.in/

access to domestic players. It also specified fiscal incentives to help the domestic equipment manufacturers. Authority had recommended limiting Excise Duty and VAT on domestic manufactured products. The need to provide tax deferment to new players and tax holiday window for domestic manufacturing was emphasised.

1.30. The Recommendations strongly focused on creation of funds to cater to the requirement of local players and upcoming entrepreneurs. TRAI stated that *'TRDC should set up Telecom Research and Development Fund (TRDF) with a corpus of Rs 10,000 crore which should be invested in secure deposits and bonds and the interest accruals should be used for financing R&D projects.'* The Recommendations cited the need to create a Telecom Manufacturing Fund (TMF) for providing venture capital to indigenous manufacturing and formation of a Telecom Research and Development Corporation (TRDC).

1.31. The Authority has also recommended identification of ten telecom manufacturing clusters to promote the TEM and stated that *'A Telecom Research and Development Park should be established with the purpose of facilitating research, innovation, IPR creation and commercialisation for fast and sustainable growth of the telecom industry.'*

1.32. In 2018, the Authority, extending over its 2011 Recommendations, further recommended that *'India should aim to achieve the objective of 'net zero imports of telecommunication equipment' by 2022.'* To achieve the same, the Authority classified goods into fully finished imported goods and indigenous products. Indigenous products were further classified on whether they were designed, manufactured, or assembled in the country. The Recommendations suggested measures for developing a pool of skilled personnel in the telecom sector through academia industry linkage and creation of Telecommunication Technology and Systems Design Labs in

Universities/ technical institutes asserting the importance of the same in promoting the local ecosystem. The Recommendations also touched upon the need for local telecom development clusters. It stated that **"***Telecom Product Development Clusters (TPDC) within the Electronic Manufacturing Clusters (EMC) should be established. The Government should extend suitable incentives to the TPDCs so as to attract talent and investments into these clusters.*"

1.33. Authority in 2018 outlined the need of IPR creation in India and concerted efforts in the research and innovation domain. To that effect TRAI specified that "*for promoting new age tech start-ups in telecom and network equipment design and manufacturing sector, Government should incentivize setting-up of incubation centres.*" To ensure speedy dissolution of IPR related disputes and filing of patents TRAI recommended for "*A common portal should be developed for self-declaration of Standard Essential Patents (SEP) by the patent holders in the telecom products.*" A huge focus of the 2018 Recommendation was on Standardization and Testing. It has been notified by DoT that most of these recommendations are currently under implementation.

E) Need for present consultation

1.34. Department of Telecom (DoT) vide letter dated 08th October 2020 (**Annexure-IV**), has intimated that most of the TRAI's recommendations dated 03.08.2018 have been considered by the government and has sought further details on certain recommendations such as financing options to telecom operators, incentives to telecom service providers for deployment beyond the quantities mandated in PMA, and creation of a portal for Standard Essential Patents (SEP). In view of above and to address the issues raised by DoT in the letter, the Authority is issuing this consultation paper. The paper intends to take views of stakeholders on existing concerns in NATEM. It intends to further examine measures that should be taken to meet the demand of growing market both within

the country and outside. It also intends to solicit views on measures required for transforming the telecommunication manufacturing landscape and establish the country as an export hub.

1.35. The growth of the domestic NATEM industry depends a lot on R&D activities. The investment in such activities is mandatory to fulfil the dream of a self-reliant India, boost economy, and make India a global R&D hub for the world. As has been mentioned earlier, the R&D and IPR related issues are being taken up separately through another consultation paper and therefore are not part of this paper. Authority is also parallelly seeking views of the stakeholders on "Promoting Local Manufacturing in Television Broadcasting Sector"[29], through the consultation paper already issued. The Union Cabinet has approved on 15.12.2021 the comprehensive program for the development of a sustainable semiconductor and display ecosystem in the country. Accordingly, these topics have not been dealt in this consultation paper. The focus of the current paper is on seeking views of stakeholders on various financial incentives and fiscal/non-fiscal incentives that can be offered for promoting NATEM in India. Since financial incentives and fiscal/non-fiscal incentives for broadcasting equipment will also be similar to those that will be offered for NATE, **for the sake of this paper it is clarified that use of the term "networking and telecom equipment" will also include equipment related to broadcasting and satellite communication.**

1.36. The consultation paper consists of four chapters, the first chapter gives the introductory background on the topic, and lays a roadmap for the paper, listing various initiatives taken by the government to boost NATEM in India. The second chapter analyses the issues related to indigenous manufacturing of telecom and networking products and raises certain questions for seeking comments of the stakeholders. While third chapter lists the international experience

[29] https://trai.gov.in/consultation-paper-promoting-local-manufacturing-television-broadcasting-sector

on NATEM. The fourth chapter summarizes the issues on which response from the stakeholders is being sought for the present consultation paper.

Chapter 2

Promoting NATEM in India – issues involved

2.1 As discussed in the previous chapter, demand for telecom products would increase considerably in near future owing to rapid digitization, technological innovations, and adoption. The new infrastructure will pave the way for a host of advanced customer-focused technologies such as 5G, Internet of Things (IoT), Artificial Intelligence (AI) etc.; the widespread deployment of which will drive the future growth of equipment market. This, in turn, will drive growth of Capital expenditure (CAPEX) in NATEM in next few years in India.

2.2 Promoting NATEM in India has two aspects, the first being to attract the global leaders to manufacture in India and the second to develop indigenous industries. To address the former, the global giants may be encouraged to set up manufacturing units in India for key NATE. To cater to the aspect of development of the indigenous industry, policy focus towards making Indian manufacturers competitive by providing suitable incentives and progressive schemes will be required. This will not only scale up indigenous manufacturing to meet Indian demand but will also help in competing with international giants.

2.3 Figure 1.2 in Chapter-I brings out various elements of promoting NATEM within the country. The foremost is the requirement of putting in place institutional mechanisms to decide policy interventions, monitor its implementation, and take course corrective measures. The next requirement is technical know-how. This should be supported by availability of finances and various fiscal incentives. Availability of technical know-how and capital should then be aided by manufacturing facilities/ infrastructure which normally come in the form of manufacturing parks, where several manufacturing entities are located. The Authority in its

earlier recommendations on Promoting Local Telecom Equipment Manufacturing dated 03.08.2018, have dealt with some of these aspects in detail along with some financial and fiscal/non-fiscal incentives.

2.4 The Authority in these recommendations stated that ***'DoT should coordinate with Ministry of Finance for making available the following financing options, in line with the practices followed by other export-oriented economies, to indigenous telecom equipment manufacturers:***

(i) Venture capital in the form of equity and soft loans.

(ii) Project finance.

(iii) Contract financing options.

(iv) Credit default insurance.'

DoT has informed TRAI that the Digital Communication Commission (DCC) while considering the said recommendations, has asked to seek further details from TRAI on the same. Accordingly, through this consultation paper, the Authority is seeking views of stakeholders on various financing options for promoting NATEM in India. In addition, the Authority is also seeking views of stakeholders on various fiscal/non-fiscal incentives that can be offered for promoting NATEM in India.

2.5 It is imperative for Original Equipment Manufacturers (OEM) to focus on newer and upcoming technologies to ensure relevance in the global NATE market and for the same, sufficient financial resources should be made available. Since NATEM is essentially capital-intensive, a major roadblock to rapid formation and expansion of an equipment ecosystem in the country can be insufficient availability of funds. It has been observed that easy availability of capital, soft-loans, contract financing, and credit default insurance are important for promoting productivity across all manufacturing sectors. The Telecom industry was given infrastructure status by the government in April 2013. This was

aimed at boosting investment in the Telecom sector. However, the sector still suffers from lack of sufficient inflow of credit. The facility of low-cost finance for infrastructure items is readily available to manufacturers in Europe, United States and Asian countries like Korea. Low-cost finance in the form of speedy, easy availability of loans from financial institutions as well as backing from investors are needed for the initial development of NATEM in India. This will help bring Indian manufacturers at par with global players and promote local manufacturing. The following sections discuss previous TRAI recommendations in this regard, the action taken by the government and attempts to explore the various financial opportunities that are available to manufacturers.

2.6 In its 2011 Recommendation TRAI has mentioned various financing options to equipment manufacturers such as

- *All domestic telecom equipment manufacturers producing Indian Products or Indian manufactured products and having an annual turnover of less than Rs 1000 cr, should get access to debt finance for capital and working capital for a period of 5 years on subsidized terms. The extent of subsidy will be 6% for the Indian Product Manufacturers and 3% for producers of Indian Manufactured Products. The Government should formulate a subsidy scheme for the purpose and the subsidy grants can be channelized for disbursement directly to the lending banks.*
- *To create a Telecom Manufacturing Fund (TMF) for providing venture capital to indigenous manufacturing in the form of equity and soft loans for supporting pre and post commercialization product development and brand creation. The TMF would be managed by a corporate body and headed by a person of eminence in the field of banking/venture capital finance.*

2.7 Further in 2018 recommendations the authority stated for creation of Telecom Research and Development Fund (TRDF) with initial corpus of Rs. 1000 Crore. Subsequently, setting up of Telecom

Entrepreneurial Promotion Fund and Telecom Manufacturing Promotion Fund was also suggested.

2.8 Subsequently in 2021 the government launched the PLI scheme for telecom and networking products. The objective of the scheme is to boost domestic NATEM by incentivizing incremental investments and turnover.

A. PLI scheme for NATE and its adequacy

2.9 The PLI Scheme has been launched by DoT with the objective to boost domestic NATEM by incentivizing incremental investments and turnover with a total outlay of ₹ 12,195 crore. The scheme is effective from 1st April 2021 for products such as switches, routers, 4G/5G radio access network, wireless equipment, other IoT access devices. It offers manufacturing companies incentives on incremental sales from products manufactured in domestic units. Investment made by successful applicants in India from 1st April 2021 onwards and up to FY 2024-25 shall be eligible for getting benefits of the scheme, subject to qualifying incremental annual thresholds. The support under the Scheme shall be provided for a period of five (5) years, i.e. from FY 2021-22 to FY 2025-26. DoT has granted approvals to eligible applications each in MSME and non-MSME categories.

2.10 The PLI scheme is expected to make India Atmanirbhar, globally competitive, and create world class manufacturing base. The scheme is also expected to bring an investment of over Rs 3,000 crore and generate large direct and indirect employment[30] which will be in line with the larger objective of "Make in India". As per estimates full utilization of the scheme funds is likely to lead to an incremental production of around Rs 2.4 Lakh Crore with exports of around Rs

[30] https://pib.gov.in/PressReleasePage.aspx?PRID=1763872

2 lakh Crore over five years[31]. Table 2.1 showcases the breakdown of incentives as outlined in the Scheme.

TABLE 2.1 – PLI Incentive scheme Telecom and Networking Products

YEAR	PROPOSED INCENTIVE RATE ON INCREMENTAL SALES	CUMULATIVE INVESTMENT (OTHER THAN LAND AND BUILDING) {BASELINE FOR INVESTMENT – 31.03.2021}	MINIMUM ELIGIBLE INCREMENTAL NET SALES# OF MANUFACTURED GOODS OVER THE BASE YEAR (2019-20)	MAXIMUM ELIGIBLE INCREMENTAL NET SALES# OF MANUFACTURED GOODS OVER THE BASE YEAR (2019-20)
1	7% / 6%	> Or = 20% of X	3*(20% of X)	20*(20% of X)
2	7% / 6%	> Or = 40% of X	3*(40% of X)	20*(40% of X)
3	6% / 5%	> Or = 70% of X	3*(70% of X)	20*(70% of X)
4	5% / 5%	Greater than or equal to X	3*X	20*X
5	4% / 4%		3*X	20*X

Note - X = Committed Total Investment by the Company / entity over a period of four years starting from the year 2021-22
Minimum Threshold of Investment – For MSMEs - ₹ 10 Crores / Other than MSMEs - ₹ 100 Crores
#As defined under Clause 2.2 of the Scheme Guidelines

2.11 The PLI scheme is conceived to create champions in large strategic sectors and a sizable budget has been allocated towards the same in the Union Budget. Such incentives will encourage both global and domestic manufacturers to enhance their manufacturing capacities in the country for catering to domestic and international demand. India is the second-largest telecommunication market and with telecom services providers moving towards 5G technology and new-age connected equipment, domestic manufacturing can play a pivotal role in setting up digital infrastructure in the country. The

[31] https://www.pib.gov.in/PressReleasePage.aspx?PRID=1710134

PLI scheme is expected to reduce large import of telecom equipment and substitute it with made-in-India products.

2.12 Government in recent budget 2022 has announced that scheme for design-led manufacturing will be launched to build a strong ecosystem for 5G as part of the Production Linked Incentive Scheme. The roll out of 5G by the telecom service providers associated with design led manufacturing as part of the Production Linked Incentive (PLI) scheme will help India to position itself as a hub for 5G equipment manufacturing and exports. It has also been announced in the budget that certain percentage of USO Fund will be utilized for R&D purposes. This will strengthen the 'Make in India' initiative to build the strong local manufacturing ecosystem and would develop globally recognized Intellectual Property Rights (IPRs) in India.

2.13 While the PLI scheme is a big step towards promoting local NATEM, it can also be argued that just a single scheme is not enough as it may not cover different requirements of the industry. There are many issues involved in promoting NATEM and TRAI recommendations of 2011 and 2018 on the subject have dealt with them in detail. As envisaged in NDCP-2018, for maximizing India's contribution to global value chains, focus on domestic production, increasing exports, and reducing the import burden will be required. For the same, several parallel initiatives need to be taken, inter-alia, including the following:

a. Steps to promote Research & Development (R&D),
b. Providing funds for R&D,
c. Developing R&D parks,
d. Putting in mechanisms to develop skill sets
e. Addressing issues related to patent framework like rights and obligations of Standard Essential Patent (SEP) holders including dispute resolution
f. Promoting incubation centres

g. Addressing issues related to testing and certification
h. Ensuring availability of component ecosystem
i. Setting up cutting edge technology FAB facility
j. Providing various fiscal and non-fiscal incentives
k. Creating funds for promoting manufacturing and entrepreneurial activities
l. Creating infrastructure for facilitating manufacturing like tech parks
m. Extending incentives for creation of such infrastructure/manufacturing facilities
n. Addressing issues related to power availability and pricing
o. Implementation, monitoring and periodic review of PMA policy
p. Addressing issues arising out of Free Trade Agreements (FTAs)/Information Technology Agreements (ITAs)
q. Announcing Incentive Schemes for telecom equipment parts
r. Addressing ease of doing business issues including expediting clearances and review of all compliance requirements
s. Promoting deployment of indigenous products in other countries through incentivizing system integrators
t. Showcase make in India start-ups and their products in international events
u. Upgrading the manufacturing PSUs under DoT to effectively harness strategic and operational synergies.

2.14 It can therefore be argued that there is a need to go beyond just the PLI scheme and a range of financial, fiscal and non-fiscal incentives needs to be put in place to promote NATEM in India.

2.15 The PLI scheme guidelines specify that eligibility for availing benefits under the scheme was subject to a minimum threshold on 'global revenue' (instead of 'global manufacturing revenue'). Thus, implying that IT/ITES, including software, was added to the telecom and networking segments for revenue calculation. It therefore seems to acknowledge the fact that telecom and networking products are as

integrally linked with software, as electronics. The digitalization of existing 4G networks employ Software-Defined Network (SDN) solutions. The trend is going to increase with next generation networks. Even the Public Procurement (Preference for Make in India) Order (2017), has described hardware design and software design and development among the main inputs/stages in telecom manufacturing. This notification also specified the conditions for these inputs to be qualified for PMI - (i) the IPR resides in India for the hardware design; and (ii) the copyright for the software design and development is in India. However, the PLI scheme's architecture only envisages manufacturing of 'goods', and software is not covered under the specified list of telecom and networking products. The forex outflows will reduce only when product designs (including software/algorithms), are nationally owned.

2.16 Also, PLI scheme is based on investment thresholds and increase in net sales. This may not serve the needs of small start-ups looking for seed funding or companies who are in the expansion stage or companies in R&D space. In view of the above discussion, the Authority would like to seek views of stakeholders

Q1. Is the PLI scheme in its current form effective enough to address the needs of promoting NATEM in India? Are any amendments or extensions required to the current PLI scheme to make it more effective? Please provide details.

Q2. Whether going beyond PLI scheme, a range of financial and fiscal incentives needs to be put in place to promote NATEM in India? Please elaborate your response.

2.17 As has been discussed in Para 2.3 and 2.4 above, TRAI in its earlier recommendations of 2018 has recommended for making available financing options like Venture capital in the form of equity and soft loans, Project finance, Contract financing and Credit default insurance options to indigenous telecom equipment manufacturers.

As DoT has sought further details on these options, these topics are discussed in detail in following paragraphs.

I. Venture Capital and Promoting start-up ecosystem

2.18 Venture capital (VC) is a form of private equity and a type of financing that investors provide to start-up companies and small businesses that are believed to have long-term growth potential. Venture capital generally comes from well-off investors, investment banks, and any other financial institutions. The investors invest their capital in start-ups with a long-term growth perspective. The Electronics Development Fund (EDF) under MeitY is one such Fund of Funds fostering R&D and innovation in technology sectors like electronics, Information Technology and Nano-electronics. It supports the Venture Fund, Angel Fund, and Private Equity Funds focusing on product and technology development of electronic sector.

2.19 **Electronics Development Fund (EDF)** is a venture capital fund in the nature of 'fund of funds' to participate in professionally managed "daughter funds" which in turn provides risk capital to companies developing new technologies. Setting up of EDF is one of the important strategies enabling a vibrant ecosystem of innovation and research and development. EDF was set up to provide risk capital to start-ups in Electronic System Design and Manufacturing and IT, leading to multiple Intellectual Properties creation/acquisition by Start-ups, supporting start-ups and companies working in IoT, Robotics, Drones, Autonomous Cars, Health-tech, Cybersecurity, AI/ML, etc. The objective of the EDF policy is to support Daughter Funds including Early-Stage Angel Funds and Venture Funds in Electronics System Design and Manufacturing (ESDM), Nano-electronics and IT. The supported Daughter Funds will promote innovation, R&D and product development within the country in the specified fields of ESDM, nanoelectronics and IT. They will also support acquisition of foreign companies and technologies for

products imported in India in large volume. The core focus of the Daughter Funds would be to develop domestic design capabilities which will create a resource pool of IP within the country in the specified fields. The list of Daughter Funds of EDF along with their status[32] regarding Fresh Investments is placed as **Annexure- I**. As such EDF does not have exclusive focus for the Telecom sector and may not be sufficient to take care of the need of venture funding required for promoting NATEM in India.

2.20 The NATE ecosystem at this point requires streamlined focus and specific funding to become competitive. The provision of grants or seed funding to Start-ups/SMEs would entail significant expenditure for the sector. Although various financing and incentivization schemes exist to promote electronics manufacturing, separate dedicated funds for financing and incentivizing design, development, and manufacturing of new-age NATE for 5G and futuristic technologies with proper administration for disbursal of funds may give a boost to domestic manufacturing. **As 5G and futuristic technology infrastructure is going to be largely software driven, a separate fund for development of telecom related software can also be conceptualized for the overall growth of the telecom & networking product ecosystem.**

2.21 Start-ups play a vital role in enabling and accelerating deployment of next generation technologies in the country. In India number of start-ups have grown by 12-15% during 2014-19 y-o-y[33] however they are predominantly software start-ups. The start-ups in hardware space are negligible. The major reason is that huge Capex and longer gestation periods demand access to large funds, which are difficult to arrange. Further even after developing a prototype, products need longer time to market and mass production becomes

[32] https://www.meity.gov.in/writereaddata/files/List_EDF_04052020.pdf

[33] https://tsdsi.in/startup-white-paper/

a challenge. Start-ups for NATE thus require favourable policies and support to meet their cost disabilities.

2.22 Another issue faced by start-ups is in 'Access to Trial'. Telecom Operators expect carrier-grade products for their network, and thus start-ups do not get opportunity for their unproven products. One of the possibilities can be to facilitate access of the domestic market to the product start-ups so that they can gain strength and grow. 5G accelerators for Early Stage 5G Start-ups, like in Taiwan or Europe, and access to required funds and trials can enable them to compete globally.

2.23 Start-up community requires a concerted effort in the early planning stage to meet the challenges faced in the new world order. To infuse confidence and stimulate a telecom product start-up ecosystem, proactive steps in the form of grants for early-stage tech risk sharing are required. Research projects having commercialization potential, require funding and mentorship for initial years. They require support for making them scale to a matured eco-system in say next 5 to 10 years period. Special financial instruments to support start-ups at preferential terms can encourage a robust NATE start-up ecosystem. Some prominent examples of funding options/grants adopted for new age start-ups or SMEs in other sectors in the country or in other countries of the world are as follows–

- **Ignition grant** is a concept of early-stage funding, giving start-ups a chance to validate their technology and develop a first prototype or find their niche in the market. Ignition grants provide upcoming start-ups and researchers with financial assistance required to convert ideas or technologies into viable products for commercial or other uses. École polytechnique fédérale de Lausanne (EPFL), one of Europe's most vibrant and cosmopolitan science and technology institutions, provides grants to any start-up vision based on a novel technical solution with a demonstrated technology. In India the "Biotechnology

Industry Research Assistant Council" (BIRAC) launched the Biotechnology Ignition Grant (BIG) whereby a grant funding scheme provides funds to scientist entrepreneurs from research institutes, academia, and start-ups. This was done to foster generation of ideas with commercialization potential and taking them closer to market through a start-up. BIRAC's strategy is to support the ideas which have an unmet need for funding and mentorship.

- **Challenge grants** are funds disbursed by one party (the grant maker), usually a government agency, corporation, foundation, or trust (sometimes anonymously), typically to a non-profit entity. Challenge grants are associated with successful completion of projects. It is essentially goal oriented. It creates a thriving ecosystem of competition among relevant industries which is important to keep the market dynamic and to provide financial assistance. In the United States, the National Endowment for the Humanities (NEH), an independent federal agency created in 1965 is one of the largest funders of humanities programs. It has introduced Infrastructure and Capacity Building Challenge Grants. The program funds two distinct types of projects viz. Capital Projects and Digital Infrastructure, each with its own Notice of Funding Opportunity.[34]

  Instituting "Grand Challenges" is also part of the broader initiative of MeitY Startup Hub to drive new tech-driven business models and rapidly scale up prototyping of technologies. Challenges complement traditional innovation methods as the core goal of challenges is to come up with fresh ideas to solve business challenges. These pitching events encourage budding and existing start-ups to recognize how they could make real world impact with a host of tangible and intangible benefits in terms of prize money, potential investment opportunities,

[34] https://www.neh.gov/grants/preservation/infrastructure-and-capacity-building-challenge-grants

networking, promotion, mentoring, providing visibility and a platform to work in a cross-disciplinary atmosphere[35].

- Some other government schemes to promote and support innovative start-ups in Electronics and ICT such as Technology Incubation and Development of Entrepreneurs (TIDE), Next Generation Incubation Schemes (NGIS), Champion Service Sector schemes (CSSS) have already been discussed in the previous chapter. In addition, MeitY has implemented **Multiplier Grants Scheme[36] (MGS)**. MGS aims to encourage collaborative R&D between industry and academic/R&D institutions for development of products and packages. Under the scheme, if industry supports R&D for development of products that can be commercialized at institution level, then the government will also provide financial support that is up to twice the amount brought by industry. The proposals for getting financial support under the scheme are to be submitted jointly by the industry and institutions.
- There are various other government schemes, the benefits of which budding entrepreneurs can avail. One of the websites lists[37] about 50 such schemes. These have been provided in a table as **Annexure-III**. Most of these schemes are either sector agnostic or can be availed by entrepreneurs working in the IT enabled services sector.

2.24 The Authority in 2011 had recommended the Telecom Entrepreneurial Promotion Fund (TEPF) and Telecom Manufacturing Promotion Fund (TMPF) so that issues relating to private sector participation in the manufacturing of indigenous telecom equipment and market access for indigenous telecom equipment can be addressed effectively. For promoting research, innovation, standardization, design, testing, certification and

[35] https://meitystartuphub.in/challenges

[36] https://www.meity.gov.in/content/multiplier-grants-scheme

[37] https://inc42.com/buzz/startup-scheme-indian-government-startups/

manufacturing of indigenous NATE for 5G and subsequent generation technologies like 6G, broadcasting sector equipment in light of convergence, setting of dedicated funds either similar to EDF or in line with the ones earlier recommended by Authority (Telecom Entrepreneurial Promotion fund and Telecom Manufacturing Promotion Fund) may be required.

Q3. Does the Electronic Development Fund (EDF) meet the requirements of promoting NATEM in India? What are the limitations in EDF for the NATEM sector and how can its scope be enhanced?

Q4. Is there a need for creation of separate funds on lines of EDF or those earlier recommended by TRAI (like TEPF and TMPF) for promoting NATEM in India? What institutional mechanisms should be put in place to govern the fund(s)? Give justification and elaborate on its possible impact on the sector.

Q5. What additional measures are suggested for promoting and supporting the Start-up ecosystem in the telecom sector in India?

II. Project Financing

2.25 Project Financing refers to the funding of long-term projects, through a specific financial structure. Lending arrangements are based on the cash flow generation of the project. Finances can consist of a mix of debt and equity. Liability is limited to the contributed equity capital, and lenders often have limited recourse to project sponsors[38]. The cash flows from the project enable servicing of the debt and repayment of debt and equity. In the telecom sector, apart from others, some of the USOF initiated projects can also fall under this category where the TSPs or their consortium can opt for project financing mode. Development of telecom infrastructure requires favourable investment support

[38] https://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf

through innovative project financing schemes. Some of the financial institutions are already addressing the needs of project financing. For example, the Industrial Finance Corporation of India (IFCI) provides customized financial solutions to meet the growing and diversified requirement for different levels of the projects – Greenfield projects, brownfield, diversification, and modernization of existing projects in infrastructure and manufacturing sectors. The various sectors covered are Power including Renewable energy, Telecommunications, Roads, Oil and gas, Ports, Airports, Basic Metals, Chemicals, Pharmaceuticals, Electronics, Textiles, Real Estate, Smart Cities and Urban Infrastructure etc.

III. Contract financing

2.26 Contract financing provides financial assistance in the form of gap funding to eligible Contractor Firms/Companies for contract works execution. Interest rate is fixed based on credit worthiness of the borrower, risk perception, rating, and other relevant factors. Additional security may be required to cover the loan. Contract financing is useful when the credit history of a small or medium company is not available, which can block access to conventional bank loans and commercial lines of credit. SMEs are heavily dependent on credit because of fewer financing options, hence are highly affected by the loan contract terms. Contract design can be effective at mitigating commercial risks such as the business cycle, fluctuations in demand, and sometimes inflation risk if payments are linked to prices. The contract specifies milestones and payments based upon the progress toward completing the project[39].

2.27 Some of the leading banks have products that cater to the contract financing needs[40]. Working Capital Term Loan for Contract Finance under start-up India scheme[41] is one such Contract Financing

[39] https://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf
[40] https://www.hdfcbank.com/sme/borrow/working-capital/working-capital-for-contractors
[41] https://www.startupindia.gov.in/content/sih/en/government-schemes/WCTL_ContractFin.html

Option. Under the scheme, North-Eastern Development Finance Corporation Ltd (NEDFi)[42], provide one-time core working capital assistance to deserving units in the form of working capital term loan, aiding up to maximum of 75% of working capital requirement of business for one cycle of operation.

IV. Schemes for insuring/guaranteeing Credit

2.28 Credit markets are characterized by market failures and imperfections including information asymmetries, inadequacy or lack of recognized collateral, high transaction costs of small-scale lending and perception of high risk. To address these market failures and imperfections, many governments intervene in credit markets in various forms. A common form of intervention is represented by Credit Guarantee Schemes (CGSs) providing third-party credit risk mitigation to lenders and increasing access to credit for SMEs. This is through the absorption of a portion of the lender's losses on the loans in case of default, typically in return for a fee. The popularity of CGSs is partly due to the fact that they commonly combine a subsidy element with market-based arrangements for credit allocation. A Credit Guarantee Scheme can be a critical policy instrument for easing financing constraints especially for SMEs/Start-ups. Some of the schemes guaranteeing credit are discussed below:

2.28.1 **Credit default insurance** is a financial agreement, usually a credit derivative, to mitigate the risk of loss from default by a borrower. Banks and debt capital markets are the two most common sources of debt financing for large corporations. Banks have a positive approach to support all bankable manufacturing opportunities in the telecom sector. However, they are often reluctant to lend to MSMEs and start-ups with no established records of profitability. MSMEs suffer from

[42] North Eastern Development Finance Corporation Ltd (NEDFi) is a Public Limited Company registered under the Companies Act 1956 on 9th August, 1995. The shareholders of the Corporation are IDBI, SBI, LICI, SIDBI, ICICI, IFCI, SUUTI, GIC and its subsidiaries.

informational asymmetry. Commercial banks fear default risks hence often do not want to provide easy credit to small enterprises with no track record. A lender/borrower risk of investment is reduced by shifting all or a portion of that risk onto an insurance company. National Credit Guarantee Trustee Company Ltd. has been set up by the Department of Financial Services, under Ministry of Finance, to function as a common trustee company to manage and operate various credit guarantee trust funds. The objective is to nurture the start-up ecosystem and give a boost to the small and medium enterprises in the country. The Credit Guarantee Scheme for Micro and Small Enterprises (CGS) was launched by the Government of India (GoI) to make collateral-free credit available to the micro and small enterprise sector.[43]

2.28.2 **Export Credit Guarantee Corporation (ECGC) scheme[44]** was formulated to provide insurance protection to Indian exporters against payment risks by offering several types of insurance covers. Over the years the Export Credit Guarantee Corporation of India has proved to be useful to Indian exporters. It pays 80% to 90% of the loss incurred by Indian exporters. The remaining 10% to 20% of the loss alone has to be borne by the exporters.[45] Since the exporter industries for NATE is in a very nascent stage as of now, it can be argued that a dedicated scheme, along above lines, may be helpful to mitigate the risk for exporters of the sector. It can also be instrumental in providing the export-oriented manufacturers the much-needed risk taking ability by safeguarding them against bad debts. For the exporters facing stiff competition in the global market and having constraints in terms of loss

[43] http://dcmsme.gov.in/CLCS_TUS_Scheme/Credit_Guarantee_Scheme/Scheme_Guidelines.aspx

[44] https://commerce.gov.in/about-us/public-sector-undertakings/export-credit-guarantee-corporation-of-india-limited/

[45] https://cleartax.in/s/ecgc

bearing capacity, the safety net provided by credit guarantee schemes provides a level playing field.

Q6.a. Which of the financial instruments related to project financing, contract financing and credit default insurance currently available in India are being used by the stakeholders and to what extent?

Q6.b. Are these financing instruments able to cater to the needs of NATEM in India?

Q6.c. Are there any suggestions to further improve these financial instruments or are there any new proposed financial instruments that can cater to the needs of NATEM in India? Please provide full details along with justification.

V. Other possible ways to incentivize NATEM in India

A) Incentive Schemes with specific focus on CAPEX

2.29 Capital linked incentives or incentives linked to CAPEX are extremely crucial for industries to strengthen their presence in the market at the very beginning. Especially for NATE, where CAPEX cost is historically high, incentive schemes offered to cater to the initial capital, can improve the strategic position and fuel market growth for the industries. To address this, certain schemes have been implemented by MeitY which were primarily for Electronics System Design and Manufacturing (ESDM). Recently the Cabinet has also approved a package with set of schemes to incentivize development of Semiconductors and Display Manufacturing Ecosystem in India. These schemes have been discussed in the following sections.

2.29.1 **Modified Special Incentive Package Scheme (M-SIPS)**[46] offer incentive for investments on capital expenditure was formulated

[46] https://www.meity.gov.in/esdm/incentive-schemes

as 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZs. Over and above providing capital expenditure linked incentives, it also included reimbursement of countervailing duty/excise for capital equipment for non-SEZ units and reimbursement of duties and central taxes for some of the projects with high capital investments. The scheme was initially introduced for 29 categories of ESDM products including telecom, IT hardware, consumer electronics, etc. Later the revised scheme included products of 44 categories. The list of applicable telecom products under M-SIPS[47] would need to be expanded in view of upcoming technologies. Under telecom products it includes Optic fibre equipment, Terrestrial Communication equipment, Satellite communication equipment, switches/ Routers, transport systems, Wireless technology equipment up to LTE and LTE Advanced, Radio systems, Antenna systems, CPEs etc. The incentives were available for a period of 5 years from the date of approval of the application, the scheme was closed for new application in Dec 2018. Keeping 5G adoption and infrastructure demand in view, a similar scheme with specific focus on 5G RAN products, 5G testing equipment, software products, Internet of things, Artificial Intelligence, Robotics and Cloud Computing component-level products etc. might be beneficial to promote the cause of NATEM.

2.29.2 **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS**)[48], notified in April 2020, aims to strengthen the manufacturing ecosystem for electronic components and semiconductors by providing a Capex incentive of 25% on capital expenditure on units manufacturing electronic components, semiconductor/display fabrication units, and capital goods. However, in view of insufficient coverage of

[47] https://www.meity.gov.in/writereaddata/files/MSIPS%20Notification.pdf
[48] https://www.meity.gov.in/esdm/SPECS

telecom specific equipment, a need is felt to either expand the scope of the scheme or formulate similar incentives on capital expenditure for the manufacturing of telecom and network products. Target manufacturing of NATE components related to 5G handsets and 5G network equipment through this scheme will help meet domestic demand, increase value addition, and promote employment opportunities in the telecom sector.

2.29.3 **Programme for Development of Semiconductors and Display Manufacturing Ecosystem in India[49] -** The Union Cabinet has approved on 15.12.2021 the comprehensive program for the development of a sustainable semiconductor and display ecosystem in the country. The program aims to provide attractive incentive support to companies / consortia that are engaged in Silicon Semiconductor FABs, Display FABs, Compound Semiconductors / Silicon Photonics / Sensors (including MEMS) FABs, Semiconductor Packaging (ATMP / OSAT), Semiconductor Design. Earlier in December 2020 government invited EoI for Setting up / Expansion of existing Semiconductor Wafer / Device FAB facilities in India or acquisition of Semiconductor FABs outside India. It had asked companies to detail the kind of support they will require from the government such as Grant-in-Aid (GIA), Viability Gap Funding (VGF) in the form of equity and/or Long-Term Interest Free Loan (LIFL), tax incentives, infrastructure support, etc. They also asked what support they would require from state governments in terms of extent, value, and nature of land; availability and cost of provisioning water; and power tariffs. Subsequently, MeitY had also issued EoI dated 16.03.2021 to incentivize and attract investment for setting up of Display FABs in India. Displays constitute a significant portion of the total bill of materials (BoM) in electronic products. For instance, displays account for over 25% of the BoM in the case of

[49] https://pib.gov.in/PressReleasePage.aspx?PRID=1781723

smartphones and over 50% in the case of LCD/LED TVs. As per a report launched by industry association India Cellular and Electronics Association (ICEA), in collaboration with Grantwood Technologies, the domestic consumption of display components exceeded $5 billion in 2020 alone[50]. The demand for display components in India is expected to sharply rise over the next five years, which is estimated to be much greater than $10 billion in 2025, mainly resulting from the "Make-in-India" national strategy to promote electronic manufacturing. Globally, the display was a $100 billion industry in 2020 and is projected to grow over $125 billion in revenues by 2024. Under the program, following broad incentives have been approved for the development of semiconductors and display manufacturing ecosystem in India:

i & ii) **Scheme for setting up of Semiconductor and Display FABs in India** shall extend fiscal support of up to 50% of project cost on pari-passu basis to applicants who are found eligible and have the technology as well as capacity to execute such highly capital intensive and resource incentive projects. Government of India will work closely with the State Governments to establish High-Tech Clusters with requisite infrastructure in terms of land, semiconductor grade water, high quality power, logistics and research ecosystem to approve applications for setting up at least 2 greenfield Semiconductor FABs and 2 Display FABs in the country.

iii) **Compound Semiconductors / Silicon Photonics / Sensors (including MEMS) FABs and Semiconductor ATMP / OSAT Units:** The Scheme for Setting up of Compound Semiconductors / Silicon Photonics / Sensors (including MEMS) FABs and Semiconductor ATMP / OSAT facilities in India shall extend fiscal support of 30% of capital expenditure to approved units. At least 15 such units of Compound Semiconductors and

[50] https://icea.org.in/wp-content/uploads/2021/05/Displays-Report_20.05.21.pdf

Semiconductor Packaging are expected to be established with government support under this scheme.

iv) **Semiconductor Design Companies:** The Design Linked Incentive (DLI) Scheme shall extend product design linked incentive of up to 50% of eligible expenditure and product deployment linked incentive of 4% to 6% on net sales for 5 years. Support will be provided to 100 domestic companies of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems and IP Cores and semiconductor linked design and facilitating the growth of not less than 20 such companies which can achieve turnover of more than ₹1500 Crore in the coming 5 years.

v) Cabinet has also decided that the Ministry of Electronics and Information Technology will take requisite steps for modernization and commercialization of **Semi-conductor Laboratory (SCL)**. MeitY will explore the possibility for the Joint Venture of SCL with a commercial fab partner to modernize the brownfield fab facility.

vi) To drive the long-term strategies for developing a sustainable semiconductors and display ecosystem, a specialized and independent "**India Semiconductor Mission (ISM)**" will be set up. The India Semiconductor Mission will be led by global experts in the semiconductor and display industry. It will act as nodal agency for efficient and smooth implementation of the schemes on Semiconductors and Display ecosystem.

Thus, with announcement of this program, for development of semiconductors and display manufacturing ecosystem in India with an outlay of Rs 1.54 lakh Crore comprehensive Fiscal Support/ incentives for every part of supply chain including semiconductors, electronic components, sub-assemblies, and finished goods has been put in place by MeitY. Incentive support to the tune of Rs.55,392 crore (7.5 billion USD) have been approved under PLI for Larges Scale Electronics Manufacturing, PLI for IT Hardware, SPECS Scheme and Modified

Electronics Manufacturing Clusters (EMC 2.0) Scheme. In addition, PLI incentives to the quantum of Rs.98,000 crore (USD 13 billion) are approved for allied sectors comprising of ACC battery, auto components, telecom and networking products, solar PV modules and white goods. In total, Government of India has committed support of Rs. 2,30,000 crore (USD 30 billion) to position India as global hub for electronics manufacturing with semiconductors as the foundational building block[51].

B) Interest Subvention scheme

2.30 Under the interest subvention schemes, a subsidy or rebate in the rate of interest on the loans is extended by financial institutions and subsidy is borne by the Government to promote the industry. Interest subvention schemes support the domestic equipment manufacturer to stay competitive in the market and enjoy a level playing field against foreign manufacturers. In this regard a prominent example would be the interest subvention scheme introduced by the Reserve Bank of India in 2018 wherein relief is provided up to 2 per cent of interest to the MSMEs on their outstanding fresh/incremental term loan/working capital during the period of its validity. Interest subvention schemes may be helpful to provide relief to local telecom equipment manufacturers reducing the financial burden on account of interest on loan components thereby facilitating growth.

Q7. Whether the existing schemes relating on CAPEX and interest subvention are meeting the requirement of finance for NATEM in India.? Suggest modifications/ new schemes needed if any with details.

[51] https://pib.gov.in/PressReleasePage.aspx?PRID=1781723

C) Specific schemes for supporting Medium and Small-Scale Enterprises

2.31 Medium and Small-Scale Enterprises (MSMEs) are often opined to be the backbone of the manufacturing sector in the country. There are various areas of growth opportunities for MSME in telecommunications. However, their integration with the digital economy and the telecom sector has been low over time. Bridging this gap in component manufacturing would essentially provide a much-needed boost to the sector. Manufacturing components that cater to larger NATE manufacturers can be an emerging opportunity for MSMEs in the sector. MSMEs suffer from lack of funds and face tough competition from large businesses. Credit facility in form of loan with appropriate enabling policy for the MSMEs will enable them to take full advantage of the expanding market and integrate themselves more fundamentally with the equipment value chain both within India and outside.

2.32 As has been brought out in Chapter-I, a document issued by Ministry of Micro, Small and Medium Enterprises[52] enlists 13 schemes from the Ministry of Communication and Information Technology under which Micro, Small and Medium Enterprises (MSMEs) can avail various benefits. In addition, there are certain specific schemes available for MSMEs such as

- SIDBI Make in India Soft Loan Fund for MSME (SMILE)[53]
- Assistance to re-energize capital investments by SMEs (ARISE) [54]
- UBHARTE SITAARE programme[55]
- Covid -19 Special Relief Package etc.[56]

These schemes are devised to meet capacity expansion needs of small and medium enterprises and provide customized solutions to

[52] https://msme.gov.in/sites/default/files/MSME_Schemes_English_0.pdf
[53] https://sidbi.in/en/products
[54] https://sidbi.in/en/products
[55] https://sidbi.in/en/products
[56] https://msme.gov.in/initiatives-ministry-msme-covid-19-relief

meet their financial needs. The loans are available at competitive rates and are structured specific to the requirements.

2.33 It can be argued that various schemes are already available for small and medium enterprises and the same shall benefit the companies in NATEM. However, it needs to be examined whether the existing schemes have actually been effective for telecom specific manufacturing/financing requirements, or whether a dedicated scheme is required for the same. In view of aforesaid, the Authority would like to seek comments from stakeholders on the following question.

Q8. Whether the existing financial assistance schemes for MSMEs that are into NATEM are sufficiently catering to their requirement or a separate dedicated scheme is required for the sector? Please provide a detailed response along with suggested schemes, if any.

D) Fiscal and Non-Fiscal Incentives

2.34 **Cost disabilities for manufacturing in India**

Indian manufacturers reportedly have a local cost disadvantage compared to countries like China, Vietnam, Thailand. Given the limited profit margins of domestic manufacturers of NATE, cost disabilities impact the overall business viability for them. Certain cost disabilities have been discussed here

- **Cost of Capital**

  The cost of finance or commercial borrowings in India is very high compared to other exporting countries, creating disadvantage for domestic manufacturing. Manufacturers in major export economies have the advantage of availability of finance at concessionary or lenient terms and have attractive finance packages to support domestic manufacturing. Stakeholders have indicated that countries like China, USA, and Japan reportedly

offer credits to local manufacturers at 3-4% interest rates. A recent EY report[57] stated that average differential in cost of capital for investing in India compared to developed countries is about 3%.

- **Cost of Infrastructure**

  Manufacturing largely depends on supply of continuous and high-quality power. The industrial electricity and water supply charges are higher than the normal rates in India. Even the land for manufacturing units, if not made available at cheaper rates, can impact the cost competitiveness. The difference in costs of building material and logistics can further add to the woes. For strengthening NATEM and making it competitive in the domestic as well as international marketplaces, the cost disadvantage in respect of capital, power, and other infrastructure needs to be compensated.

- **Compliance cost**

  The cost of compliance with respect to related to granting of permits, enforcing contracts, registering property, starting business, Import of Goods at Concessional Rate of Duty (IGCR), Import Export Codes, Direct and Indirect Taxes has been consistently high in India. It further discourages manufacturing viz-a-viz cheaper imports. While promotion of Ease of Doing Business in obtaining permits and clearances can facilitate the rapid expansion of the domestic manufacturing ecosystem, however, in the meantime, this cost continues to hamper the same.

- **Cost of testing and certification**

  Additional cost of testing & certification, multiple standardization agencies and lack of timely testing is another impediment for the

[57] https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/strategy-transactions/2021/cost-of-capital-survey-report-2021.pdf?

Indian NATEM. Standards contribute predictability and lower risks for both producers and consumers. Manufacturers support Standardization as it allows them to achieve economy of scale in production and eases maintenance requirements. It is essential to streamline the rules of standardization associated with locally manufactured products. Multiplicity of standard setting and testing agencies and time and costs involved in testing and certifications can impact competitiveness of Indian NATE manufacturers and increase their costs vis a vis global player.

2.35 A survey report of ICEA suggests that for investments, Vietnam appears to be 1.7 times more attractive, and China is about twice as attractive compared to India. India currently suffers a cost disability of 7.52%–9.8% vis-à-vis Vietnam and 17.32%–19% vis-à-vis China for the manufacturing of these products locally[58]. The cost disability in India in terms of capital, power, labour, logistics and other infrastructure is higher by about 10-20% in comparison with the developed countries[59].

2.36 Other competing countries provide fiscal and non-fiscal incentives to cover the cost differentials and promote the manufacturing sector. Incentivization schemes for equipment manufacturers coupled with initial funding and infrastructural support can help to offset the heightened end cost for the products.

Q9: Whether any cost disadvantage is experienced by domestic NATE manufacturers as compared to global counterparts due to various limitations discussed above? If yes, what is percentage cost disadvantage to domestic NATE manufacturers vis a vis other country? The details of calculations and methodology adopted for the same may be provided.

[58] https://icea.org.in/wp-content/uploads/2020/11/Making-India-Atmanirbhar_Final_compressed.pdf
[59] https://icea.org.in/wp-content/uploads/2021/02/DisabilityReport.pdf

2.37 Domestic manufacturers in India face the dual problem of having to produce products that have world class quality on one hand, and on the other, these products need to be cheaper to compete in the international market. Targeted policy and incentives can lead to Made-in-India equipment competitive or cheaper than imported equipment of similar specifications. This will generate domestic and foreign demand thus leading to more and more investment. Given the positive correlation between offered incentives and strong business performance of a sector, policymakers use levers of offering fiscal incentives and market-based policies. Incentive based policies are becoming increasingly popular as tools for addressing a wide range of issues and a need for the same is also being felt for NATEM. Focus on long term consistent policy frameworks and incentive programs will facilitate flow of foreign investment in the sector and will help to make manufacturing units scalable and competitive. Therefore, it is imperative to look at fiscal and non-fiscal incentives that may impact and strengthen the domestic telecom equipment industry. The following sections attempt to discuss various fiscal and non-fiscal incentives and seek stakeholder comments regarding the relevance and necessity of the same. Various incentives that are discussed are as follows:

I) Those that offer fiscal incentives - Tax holidays and Tax deferment

II) Those that are combination of both fiscal and non-fiscal incentives - Preferential Market Access, Graded incentives to TSPs beyond PMA and Telecom Product Development Clusters

D.1) Tax Holidays

2.38 A tax holiday is an incentive program run by the government with the objective of attracting investment by reducing taxes on

businesses. The tax rate cut offered for setting up new manufacturing firms can act as a key incentive for the expansion and growth of the manufacturing sector in the country, thereby boosting Make in India. As the telecom industry is in the preliminary stages of expansion with constricted market opportunities and severe global competition, taxes add to the overall manufacturing expenditure of domestic equipment manufacturers. The tax relief would therefore encourage private companies to redirect their savings from the saved tax outflow to capital expenditure and in turn help perpetuate business expansions. Suitable tax breaks for companies investing in NATEM, R&D, skill development for telecom equipment, and additional tax incentive to the manufacturers of finished telecom products developed using indigenously developed electronic components, will facilitate growth of indigenous equipment manufacturing. The finance ministry in the year 2020 announced various measures including the slashing of tax rates applicable to domestic companies and newly incorporated manufacturing companies.

D.2) Tax deferment

2.39 Tax deferral is when taxpayers delay paying taxes to some point in the future. Some taxes can be deferred indefinitely, while others may be taxed at a lower rate in the future. The objective of deferred tax is simply to streamline operational expenditure at the onset of a manufacturing firm. As has been discussed previously, the Covid pandemic has made many global giants re-evaluate their manufacturing strategy and are actively looking for countries to spread their risks. Incentives like tax holidays or deferred tax might be instrumental in shifting their attention to India. There are various schemes allowing Tax deferment that have been enacted by the government. CBIC has issued guidelines on manufacturing and other operations in customs bonded warehouses. To promote the "Make in India" initiative and as part of the ease of doing business

measures, the Scheme enabled businesses to import raw materials and capital goods without payment of duty for manufacturing and other operations in a bonded manufacturing facility for exports, while allowing import duty deferral for the domestic market. Inputs/ raw materials can be imported and deposited in the bonded warehouse without the payment of Basic Customs Duty and Integrated Goods and Services Tax (IGST). No interest is applicable at the time of payment of duties on the clearance of finished goods manufactured using inputs/ raw materials. Only the duties on inputs/ raw materials are to be paid when the resultant goods are cleared for home consumption apart from GST/ IGST on the finished goods.

2.40 The growth potential of the Indian telecommunications market is well recognized. The tax holidays/deferred taxes incentives can be utilized by the manufacturers for expansion of manufacturing facilities and thereby aiding growth. However, any such scheme that is offered may have to be seen and weighed against overall fiscal benefits that are being offered to the sector.

Q10. Whether schemes allowing tax holidays/deferment of tax are available for NATE manufacturers? If yes, are they meeting the requirement? If no, what modifications are required? Please justify and provide details.

D.3) Preferential Market Access (PMA) - Incentives to domestic manufactured products[60]

2.41 Only creation of a domestic manufacturing industry in India is not sufficient, the manufacturers need a sustainable market to remain relevant. Government's support for products that are made in India can help create a sustained market pull for Indian products.

[60] https://dot.gov.in/dot-pmapmi-policy

Preferential Market Access scheme is a concerted effort of government to achieve the same.

2.42 For Promoting manufacturing of Indian products, TRAI in its 2011 recommendation has emphasized that: *Preferential market access should be provided to the domestic manufactured products (comprising both Indian Manufactured Products and Indian Products) in procurement by the Government and Government Licensees (service providers both public and private) subject to the value additions proposed for the corresponding years and Government or Government licensee (service providers- both public and private) were made to be responsible for meeting the market access criterion.*

2.43 Authority in its 2011 recommendations defined Domestic manufactured products as products manufactured in India that meet the minimum value addition criterion prescribed in the policy. Domestic manufactured products were further categorized into either Indian Manufactured Products (IPR residing outside India) or Indian Products (IPR residing within India). The Authority in 2011 recommended that preferential market access should be provided to the domestic manufactured products (comprising both Indian Manufactured Products and Indian Products) in procurement by the Government and Government Licences (service providers both public and private) as per tables below subject to the value additions proposed for the corresponding years.

Table 2.2 - The Preferential market Access for domestic products (As recommended by TRAI in 2011)

Year	2012-13	2014-15	2016-17	2019-20
Market Access for Domestic Manufactured Products	**30%**	**45%**	**60%**	**80%**
Value addition	**25%**	**35%**	**50%**	**65%**

Table 2.3 - Preferential market access for Indian products

(As recommended by TRAI in 2011)

Year	2012-13	2014-15	2016-17	2019-20
Market access for Indian products	**15%**	**25%**	**35%**	**50%**

What the above table implied was that for the year 2012-2013 the market access for domestic manufacture (consisting of both Indian manufactured products and Indian products) would be 30% and market access for Indian products alone would be 15%. This would imply that out of 30% market access for domestic manufactured products, the Indian products get exclusive access to 15% market and the remaining 15% is available both to the Indian Manufactured products as well as the Indian products.

The Authority also stated that: *The Department of Telecom should suitably modify the relevant clauses in the UAS Licences issued/to be issued and the Unified Licence to include the stipulations of percentages of market access, value addition and auditing in respect of domestic products.*

2.44 The Authority laid down a detailed procedure for implementing PMA. It also prescribed incentives and penalties for implementing the scheme. It was recommended that the service provider procuring more than 10% of the market access requirement of telecom equipment in the form of Indian Manufactured Products should get a rebate equivalent to 10% of its licence fee for that year and the service provider procuring more than 20% of its telecom equipment requirement in the form of Indian Manufactured Products should get a rebate equivalent to 20% of its licence fee for that year. It was clarified that for the purpose of this recommendation licence fee does not include USOF contribution of 5% of AGR. If a service provider is not able to meet the criteria of market access then it will deposit an amount equal to 5% of the shortfall in the value of the equipment in

the Telecom Research fund or the Telecom Equipment Manufacturing fund.

2.45 Authority also said that to make implementation effective there has to be a system of penalties to discourage service providers from not meeting the market access requirements. The Authority is of the opinion that the service provider not meeting the access criteria should contribute to development of Indian Products by contribution towards R&D fund or Telecom Equipment Manufacturing fund.

2.46 The Authority also recommended that *For Indian products* if a service provider is not able to meet the criteria of market access then it will deposit an amount equal to 10% of the shortfall in the value of the equipment in the Telecom Research fund or the Telecom Equipment Manufacturing.

2.47 PMA was notified by Department of Electronics and Information Technology (DeitY) vide Notification No. 8(78)/2010-IPHW on 10.02.2012. A Notification No. 8(78)/2010-IPHW dated 10.02.2012 was issued for providing preference to domestically manufactured electronic products as a part of procurement process for the electronic products that have security implications for the country and were to be utilized in Government own use while ensuring that no commercial resale is involved. As per the notification, telecom products which are procured across sectors were to be notified by the DoT. The Policy was revised and notified by DeitY vide Notification No 33(3)/2013-IPHW dated 23.12.2013. Further, guidelines for operationalization/ implementation of PMA policy were issued by DeitY, vide Notification No. 33(7)/2015-IPHW dated 16.11.2015. In furtherance of the Policy issued by DeitY on 10.02.12, DoT laid down the policy for providing preference to domestically manufactured telecom products in government procurement vide DoT's Notification No 18-07/2010-IP dated

05.10.2012.[61] Further, value addition criterion for PMA to domestically manufactured telecom products was notified by DoT vide Notification No 18-07/2010-IP dated 11.01.2017.

2.48 In its 2018 Recommendations Authority reemphasized Market access to domestic manufacturing and impressed upon following

(a) A Nodal Officer should be appointed in DoT/TEC to look into the cases related to lack of implementation of Preferential Market Access (PMA) policy issued by DoT.

(b) Value addition claims of each product, specified under the PMA policy, should be verified independently and this information should be made available at a central repository/ the government portal.

(c) DoT should immediately review its PMA policy, issued in October 2012, so that the products specified under the Policy as well as the norms of the value addition specified in the Policy can be aligned with the present day's local market realities.

(d) PMA policy should be made applicable for all public telecom networks to address the national security concerns.

(e) Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives

2.49 Authority further recommended that on acceptance of the recommendations, for promoting the indigenous telecom products, the specific values for various kinds of incentives proposed under the recommendations would be recommended separately.

2.50 Department for Promotion of Industry and Internal Trade (DPIIT) issued **PPP MII Order 2017** for ensuring preferential access to domestic manufacturers. The objective of the order was to encourage

[61] https://dot.gov.in/sites/default/files/policy_for_preference_to_domestically_managed_telecom_products_in_government_procurement.PDF

'Make in India' and to promote manufacturing and production of goods, services and works in India with a view of enhancing income and employment. The Order was made applicable for procurement by the Ministry / Department / attached / subordinate offices, or autonomous body controlled by, the Government of India and includes government companies as defined in the Companies Act.

2.51 DoT issued Public Procurement (Preference to Make in India) order in August 2018 in reference to DPIIT order, for a list of telecom products, services and works for their purchase preference in public procurements from local suppliers, fulfilling Local Content (LC) criterion. DoT has identified conditions for the inputs to be qualified as Local Content and the Scheme mandates the preference to Local content in public procurement.

2.52 For the local value addition considerations and allowing usage of imported components for telecom equipment, DoT in Aug 2021 has issued a list of 25 telecom product segments, including satellite phones, broadband equipment, optical fiber cable etc., which will qualify as local products even if they use imported components for domestic manufacturing. The notification enables companies making telecom products to import components in public procurement projects in compliance with PMI order, giving opportunity for foreign vendors also to qualify as local manufacturers even with small amount of local value addition. This was to be reviewed when the semiconductor fab (electronic chip plant) in India becomes operational. Later the August 2021 order was kept in abeyance by DoT as not mandating only 'Make in India' companies to offer equipment was defeating the very purpose of the policy.

2.53 Though policy for preferential market access has been notified by DoT and preference to domestic manufacturing has been mandated in public procurements, certain points related to monitoring and implementation of PMA Policy of DoT have been raised by

stakeholders during preliminary discussions. These are discussed below:

- In certain public procurements e.g. USOF tenders element-wise compliance of Local Content as per the DOT notification is not monitored instead low value addition components like tower erection, civil work, installation charges, AMC charges etc are construed as local value addition to take benefits under PPP-MII Order 2017 as these infra items are having high value in total site pricing. Therefore, the actual benefit of the PMI scheme for domestic equipment manufacturing is not getting extended. On the contrary some of the stakeholders also mentioned that present calculation methodology doesn't capture the local value addition at the Project level. The cost incurred for local sourcing of material for network rollout, spares cost, warranty, AMC etc are not getting captured. Main inputs/ stages cost incurred on assembly/ testing/ integration and other necessary requirements for deploying the equipment in the network is not being considered.
- The scope of the policy should be enlarged to include purchases by State Governments, Purchases by Telecom operators, World bank funded projects for the listed products, Indian projects undertaken in other countries against LOC or Grant in Aid etc.
- On many occasions buyers ignored the directions of the standing committee for implementation of PPP MII order. Implementation agencies shall be made responsible for policy compliance and ensuring strict compliance both at buyer end as well as sellers end for making wrong declarations and prompt action to be taken against defaulters.
- Many times, the procuring agencies do not follow the protocol to get a waiver from Standing committee as per DPIIT guidelines to get Make in India policy exemption for domestic manufacturing. Foreign make and models have been sought even if equivalent domestic products are available. Strict enforcement of PMI in all

Government tenders needs to be ensured and use of restrictive tender conditions should be avoided.

- Government's PMI policy in telecom is defined at the product level and not at the manufacturer's level. There are challenges around the existing methodology of calculating local value addition norms as in view of the large number of products and their scalability, telecom manufacturing facilities tend to be in 'nodes' where a few products are manufactured on a global scale and exported to meet global demand. Due to the inability to create scale, no entity can manufacture the entire bouquet of its products in one geography. However, tenders insist on all products from one OEM. Indian SMEs not having all the subsystems required for a project, are left out from participating.

2.54 Large global players who are locally manufacturing in India, have argued that the high threshold of value addition criteria adopted in some of the PMA based Request for Proposals (RFPs), acts as a barrier for them. There may be issues and challenges around calculation of local value addition norms and till the time India develops local component manufacturing ecosystem, realization of high value addition may be difficult. On the contrary, it can also be argued that the major objective of the PMA policy in the telecom sector is to promote progressively increasing value addition based domestic manufacturing in the country and the preference to domestic manufacturing will automatically see development of component ecosystems in future. Therefore, incentivizing design based manufacturing in India to increase value creation in manufacturing through PMA will certainly drive development of manufacturing technology by domestic companies. Policy is thus a Nudge intervention that ensures positive reinforcement and influences the behaviour by way of incentivizing through preferential market access. The scope of the policy may be further enlarged.

2.55 It might also be prudent to formulate graded incentives over and above PMI/PMA policy as has been previously recommended by the

Authority. DoT has asked for further clarification regarding the graded incentives beyond PMA Scheme and the section below discusses the same.

D.4) Graded incentives to Telecom Service Providers beyond PMA

2.56 Graded incentives beyond PMI/PMA policy can give impetus for deploying more indigenous equipment in the network thereby attracting business, aiding value addition and helping India becoming self-reliant, as has been previously recommended by the Authority

2.57 TRAI in its 2018 Recommendation had stated that '***Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives.'*** DoT in its recent reference has asked for further details regarding the same. The Authority also recommended in 2011 and 2018, the following with respect to Preferential Market Access: *PMA policy should be made applicable for all public telecom networks to address the national security concerns.* However, the TRAI recommendation on making PMA policy to be made applicable for all public telecom networks is yet to be implemented by DoT.

2.58 Telecom service providers are the ones who are driving new developments in markets. Without their active involvement achieving self-reliance in indigenous design and manufactured products will be a distant reality. The Service providers can drive indigenous development of telecom networks and end user equipment by engaging with Indian suppliers of equipment as well as financing research institutions.

2.59 Government have issued amendments in licence conditions for Service Providers in March 2021, for mandatorily connecting only that equipment in the network which are designated as trusted

products from trusted sources under the National Security Directive on Telecom Sector. Making PMA applicable for all public telecom networks, can help in addressing security concerns emanating from imported telecom equipment.

2.60 In its 2011 Recommendation TRAI has recommended various Preferential market access related graded incentives as has been discussed above. An incentive-based approach deploying a combination of rewards and penalty might be instrumental in ensuring local procurement in the private sector as well. Further development of 5G product manufacturing capabilities will require a focus on creating access to the domestic manufacturers in procurement done by private TSPs as they are the one who are planning to deploy 5G equipment in their networks.

2.61 Considering the present market conditions, the major share of wireless subscribers, about 90% of the total number of subscribers are served by the private telecom service providers leaving only 10% of subscribers who are served by PSU telecom service providers. Therefore, the domestic market for telecom products is dominated by the purchasers who are private service providers. Though the Indigenous products get preference in public purchases under the PMI orders of DPIIT, there is no such policy support to either incentivize or mandate private telecom service providers to buy indigenous products. If sufficient market access is not available to the Indian manufacturers, they may not be able to achieve economies of scale and become globally competitive in absence of volumes. Therefore, it can be argued that there is an opening to incentivize the domestic telecom service providers to procure their equipment from domestic manufacturers. This will help the indigenous manufacturers to become competitive in the domestic as well as international market. This demand stimulation can provide positive externality to the growth of the manufacturing sector in India.

Q11. Is the PMA/PMI scheme in its current form comprehensive for promoting NATEM? Are there any suggestions for modifications? How can the challenges associated with implementation of PMA/PMI be addressed? Please elaborate.

Q12. Whether the incentives to Telecom Service Providers to deploy indigenous manufactured products in their network will be helpful in promoting NATEM in India? Please justify with reasons. What incentivization model is suggested?

D.5) Telecom Product Development Clusters (TPDC)

2.62 The objective of Telecom Product Development Clusters (TPDC) that are dedicated to manufacturers of technology products and solutions is to provide an environment that will enable development of an ecosystem where the input suppliers and finished product manufacturers are located close to each other. This not only helps in reducing costs, but also helps in reaching economies of scale by each individual business entity.

2.63 Realizing the potential of Telecom Clusters in improving the profitability of domestic manufacturers through proximity of related units, better infrastructure facilities and cost benefit through better logistics, Authority in 2011 had recommended that *"Ten telecom clusters be identified immediately. The Central/State Governments should make all efforts to develop infrastructural facilities in a time bound manner so that the infrastructure related disabilities are removed for the units that are located in the clusters."*

2.64 Owing to the importance of manufacturing eco-system provided by manufacturing clusters, Authority in 2018 further recommended that *"Telecom Product Development Clusters (TPDC) within the Electronic Manufacturing Clusters (EMC) should be established. The*

Government should extend suitable incentives to the TPDCs so as to attract talent and investments into these clusters."

2.65 TPDCs can be promoted through government support or in Public Private Partnership mode by providing/facilitating pre-identified land, ensuring adequate availability of large quantities of pure water, uninterrupted power, pollution free environment, logistics, waste disposal etc. If India wants to be a global manufacturing hub for NATE, achieving scale and cost competitiveness will be a major focus for manufacturers. For this, creation of thriving self-sustaining dedicated TPDCs added with exemptions/ incentives and infrastructural support may be required. While formulating the policies for TPDCs, one can draw a leaf and two from the development of Special Economic Zones (SEZs) and Software Tech Parks in India. The TPDCs should incentivize large scale participation of non-government entities or private sector players and should be able to, inter-alia, provide –

- Low-cost infrastructure (Land, power, water etc)
- Tax exemptions and subsidies.
- Superior communication and technology infrastructure
- R&D Promotional Schemes.
- Incubation services
- Schemes for nurturing MSME and Start-ups.
- Access to Trial/Testing beds
- Regulatory Sandboxes

2.66 Incentives, if offered to TPDCs, can serve similar purpose as that for the **Special Economic Zones (SEZs)**. Government has granted several incentives to SEZ units such as Tax incentives, world class physical infrastructure to facilitate the manufacturing sector especially exports of manufactured goods. To attract investment including foreign investment into SEZs, some of the incentives and facilities that are offered to the units in SEZs are mentioned here

- Duty free import/domestic procurement of goods for development, operation, and maintenance of SEZ units.

- 100% Income Tax exemption on export income for SEZ units under Section 10AA of the Income Tax Act for first 5 years, 50% for next 5 years thereafter and 50% of the ploughed back export profit for next 5 years. (Sunset Clause for Units has become effective from 01.04.2020.)
- Exemption from Central Sales Tax, Exemption from Service Tax and Exemption from State sales tax. These have now been subsumed into Goods & Service Tax (GST) and supplies to SEZs are zero rated under the Integrated Goods & Services Tax (IGST) Act, 2017.
- Other levies as imposed by the respective State Governments.
- Single window clearance for Central and State level approvals.

In addition to earning of foreign exchange and development of infrastructure, SEZs have achieved significant local area impact in terms of direct as well as indirect employment, emergence of new activities, changes in consumption pattern and social life. As of Jan 2022, there are 268 SEZs that are operational[62]. Most of these are in IT/ITES sector, however only a few are related to NATEM. Government has announced in budget 2022 that Special Economic Zones Act to be replaced with a new legislation to enable States to become partners in 'Development of Enterprise and Service Hubs" for export promotion.

2.67 The existing **Software Tech Parks** provides 100% Income Tax holiday, Duty-free import, Excise duty exemption on purchases from within India, 100% depreciation on Capital Goods over five years and Green Card. A green card is a novel initiative of the Software Technology Parks for projects, less than or equal to ₹100 million. This helps the unit to get one-stop priority access to telephone lines, electricity, licenses, and other ancillary services from government agencies.[63] The Direct Tax and Indirect Tax benefits and Export

[62] http://sezindia.nic.in/upload/uploadfiles/files/Op_%20SEz.pdf

[63] https://vakilsearch.com/advice/move-your-business-to-a-software-technology-park/

incentives to manufacturers in the TPDCs may be helpful to attract foreign capital as well.

2.68 Under **Modified Electronic Manufacturing Cluster 2.0 (EMC 2.0) Scheme**[64] notified in April 2020 by MeitY financial assistance for the setting up of both Electronic Manufacturing Cluster projects and Common Facility Centres (CFCs) across the country is provided. Grant-in-aid is released to State Governments or its agencies for setting up electronic clusters (Central and State Share are 50:50). TRAI in 2018 had recommended for Telecom Product Development Clusters (TPDC) within the EMCs to be established. However, the government is yet to implement the same. 20 Greenfield EMCs and 3 Brownfield CFC projects have already been set up under the earlier EMC scheme.[65] As more companies form a geographical cluster, strong positive network externalities on account of larger scale of production can be achieved and logistics cost may fall with higher volumes. Creation of TPDCs and removing infrastructure bottlenecks for telecom products with specially curated taxes, incentives and subsidies will attract large investments and promote creation of a robust self-sustaining telecom equipment ecosystem that can lead to setting up of global manufacturing hubs.

Q13. What should be the incentive structure (fiscal and infrastructural) for Telecom Product Development Clusters (TPDC) set up within the EMCs or separately?

E) Other relevant issues affecting competitiveness of local manufacturers

2.69 Indian manufacturers are also facing several issues that are affecting their competitiveness not only in the global markets but

[64] https://www.meity.gov.in/esdm/emc2.0

[65] https://www.meity.gov.in/esdm/clusters

also against imported products within India. Some of these issues have been discussed in the following paragraphs.

i. **Under invoicing/ dumping of cheaper goods**

Some countries dump low-priced products in India forcing many industrial units to operate at below capacity levels and in some cases to shut down completely. The economic motive of dumping is to remove competition in the Indian market which has proved to be very detrimental for the local ecosystem of telecom equipment. Local manufacturing in the country at present is suffering severely due to lack of protection from cheaper imports which accounts for a vast majority of the market demand. Dumping duty imposed as an additional import duty to offset the effect of dumping and stricter enforcement of anti-dumping and anti-circumvention rules may be beneficial to tackle the issue for promoting NATEM in India.

ii. **Mis-declaration in duty free HS codes**

Harmonized System (HS) Code is a standardized numerical combination used to categorize and sub-categorize various goods being traded across countries. Though the main objective of the Code is to help customs authorities ascertain the right duties and taxes on imports, there have also been instances of misdeclaration of HS Codes. Some stakeholders have informed that equipment is often imported through various duty-free HS Codes which are meant for import of inputs for the manufacture of mobile phones. It needs due surveillance mechanisms and stricter implementation of existing norms to ensure such unlawful import does not hamper the cause of NATEM in India.

iii. **Exploitation of Free Trade Agreements/Information Technology Agreements (ITAs)**

FTAs are arrangements between two or more countries or trading blocs that primarily agree to reduce or eliminate customs tariff

and non-tariff barriers on substantial trade between them. By eliminating tariffs and some non-tariff barriers FTA partners get easier market access into one another's markets. For example, ASEAN has an FTA with India but not with Canada. ASEAN's custom duty on leather shoes is 20% but under the FTA with India it reduced duties to zero. Assuming other costs being equal, an Indian exporter, because of this duty preference, will be more competitive than a Canadian exporter of shoes. Secondly, FTAs may also protect local exporters from losing out to foreign companies that might receive preferential treatment under other FTAs. However, there are several instances of re-routing being reported, where countries that do not have FTAs, are exploiting the opportunities and dumping cheap imports in India through FTA countries. Surveillance and strict compliance can curb such malpractices.

iv. **Inverted Duty Structure**

An inverted duty structure comes up in a situation where import duties on input goods are higher than duties on imported finished goods. In most of the cases, the issue of inverted duty structure has been addressed by the government by raising the BCD (Basic Custom Duty) on various imported items while at the same time reducing the BCD on the raw materials required for manufacturing items like Mobile Handsets, OFC (Optical Fibre Cable) and other majorly used telecom equipment. Inverted duty structure can be a roadblock in promoting NATEM because until the supporting ecosystem of semiconductors and other parts is created, import of certain components cannot be substituted. Higher custom duties on basic components raise assembling cost, rendering the domestic product financially unviable.

v. **Issues of landed costs parity**

A 'landed cost' is the term used when referring to the final cost of products plus all associated shipping and logistics costs required

to get the goods delivered through to a final location. There was reportedly about 5%[66] cost differential in manufacturing in India for exports vis-à-vis existing global nodes (e.g., Malaysia, China) due to additional landed costs. High landed costs lead to increased total cost to the manufacturer. Suitable reduction in taxes, levies and/or subsidizing certain activities associated with the import process, until all the components and parts are being holistically manufactured within the country, may be helpful in offsetting such costs.

2.70 In order to curb dumping and other import related malpractices in India new norms for 'rules of origin' have been made effective from September 21st, 2020.[67] The new enforcement measures are likely to ensure that products imported under free trade agreements have the correct preferential rate of customs duties applied and inbound shipments can be checked if they are suspected to be low-quality products or goods being dumped by a third country that has illegally routed them through an FTA partner nation. A notification has been given by India's Department of Revenue to the Customs Administration of Rules of Origin under Trade Agreements Rules, 2020, which "shall apply to import of goods into India where the importer makes a claim of preferential rate of duty in terms of a trade agreement".

Q14. Whether NATEM is facing any limitation affecting competitiveness of Local manufacturers due to misdeclaration of HS codes, inverted duty structures, landed cost differential etc.? Please provide specific details. What are the suggestions for improvement? Please elaborate.

[66] https://www.trai.gov.in/sites/default/files/CiscoSystems_CP_PLTEM.pdf

[67] https://www.cbic.gov.in/resources//htdocs-cbec/customs/cs-act/formatted-htmls/RevisedCus(AdminofRules)Rules2020.pdf

F) Promoting competitiveness for exporters of Indian manufactured equipment

2.71 There are two ways to curb the growing trade deficit - import substitution and export promotion. The section that follows outlines few measures for promoting competitiveness for exporters of Indian manufactured equipment. The Government of India has already declared and implemented certain schemes/Instruments to promote export. Some of them are discussed below:

2.71.1 **RODTEP Scheme**[68]

RODTEP (Refund of duties and taxes on export products) is a Scheme for Remission of Duties and Taxes on Exported Products. The scheme was introduced with the objective to ensure that the exporters receive the refunds on the embedded taxes and duties previously non-recoverable like VAT, Mandi Tax, Coal cess etc. thereby reducing their operational expenses. RODTEP is implemented across all sectors uniformly and do not have any threshold limit to it. Hence, all companies big and small, irrespective of size, market capitalization or export limit, manufacturing in the export sector can avail it. It is expected to give a boost to the domestic industry and Indian exports by providing a level playing field for Indian manufacturing sector including NATEM in the international market.

2.71.2 **Schemes by EXIM Banks**

Term finance is provided to Indian exporters of eligible goods and services which enables them to offer deferred credit for overseas buyers. Exim Bank also provides term loans/deferred payment guarantees to 100% export-oriented units, units in trade zones, computer software exporters in collaboration with International Finance Corporation, Washington. It therefore enables small and medium enterprises to upgrade export production capability.

[68] https://www.dgft.gov.in/CP/?opt=RoDTEP

2.71.3 **Interest Equalization Scheme**[69]

The Interest Equalization Scheme (IES) for pre and post shipment rupee export credit was introduced in 2015 and is currently being implemented by DGFT through RBI. Initially the scheme ensured that interest for all exporters across merchandise export segments was equalized by 3% per annum. That is, loans available from banks to exporters covered under the scheme are charged interest at 3% below the market rate. However, in view of the lack of competitive power of MSME in the export sector the equalization rate has been revisited to 5% for exports manufactured by MSME in 2018.

2.71.4 **Export Credit Guarantee Corporation Scheme**

As already discussed previously, ECGC has been implemented to provide insurance protection to Indian exporters against payment risks by offering several types of insurance covers. It creates a safety net for Indian manufacturers helping them step up their exporting abilities.

Q15. Whether the current schemes/ measures or policy support for exporters of Indian manufactured equipment are sufficiently meeting the requirement to promote the global competitiveness of Indian NATE exporters? Are the Schemes/instruments in India consistent with the international schemes for exporters in leading manufacturing countries? Please suggest measures to bridge the gap if any.

G) Leveraging Software capabilities

2.72 As the world is moving towards 5G and other futuristic technologies, software solutions are becoming hardware agnostic and are required to be treated as separate products. Software product companies have R&D and IPR in India and can help create a successful product

[69] https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=12124&Mode=0

ecosystem. Considering the shift in Telecommunications industry towards *Software-ization*, Cloudification, N*etwork Slicing* and *Virtualization* with the evolving technologies from 5G onwards, the country can derive unparalleled advantage with the Software product and availability of competent software developers. This can become one of the driving factors towards 5 Trillion+ economy.

2.73 Web scale infrastructure commonly called Web scale IT, is a converged architecture technology with scalable and flexible software that can run on compute intensive hardware. This allows to integrate various infrastructure components—computation, storage, virtualization, and networking—into one platform or equipment. Aggregating resources and centralizing management increases efficiency and flexibility and minimizes maintenance. Web-scale IT is characterized by use of open-source software and commodity hardware to create infrastructure that can be completely controlled by software. The disaggregation adopted by web-scale internet companies, deployment of servers and switches with open-source software and automation has transformed traditional IT infrastructure and is enabling deployment of services with agility, consistency, tolerance, efficiency and cost effectiveness. 5G system architecture enables modularization of network functions and aligns well with the Network Function Virtualization (NFV) and Software-Defined Network (SDN) principles. The cloud computing principles being adopted in technologies such as NFV and SDN for 5G, will certainly benefit the telecom industry in the 5G and future technology era.

2.74 Open and disaggregated networks can be an opportunity to transform telecoms supply chains, disaggregating the components of the network and providing open software to control a multi-vendor assembly of components. It allows for multiple components to be combined and built into complete solutions. Open-source approach may help operators find interoperable and cost-effective solutions, encourage innovation, improve quality and security. It also

broadens the service and manufacturing base. Open architecture has specifically changed the way Radio Access Networks (RAN) work. Traditionally, RAN were proprietary interface and the TSPs were forced to procure entire hardware and associated software for RAN from global OEM players. Now, with open RAN, TSPs have flexibility to use solutions from multiple vendors. Establishing RAN is a major cost to the Service Providers who can reduce this cost by using open RAN architecture. Specifically, in 5G where the number of sites will considerably increase, open RAN if developed locally can cut dependence on global players and reduce deployment costs considerably.

2.75 Software companies require less initial capex to build up and hence they can achieve faster escalation in growth parameters. However, for reaching the end users new companies need hand holding, funds, and incentives to reach to a level thereby needing support and incentives which can help them to scale up.

2.76 Stakeholders have stated that the current PLI and PMI policy issued by DoT are limited for hardware/ physical products manufacturing only and Software has been treated as an overlay sub-product. Treatment of 100% Software solutions as a separate product has not been considered. There may be instances where 100% software solutions will be competing with hardware solutions in the converged world. For example, cloud-based solutions could be competing with physical solutions in 5G. In such a scenario a separate focus for software solutions and products in the various schemes and incentives can benefit software products. India's strength in Information Technology can be leveraged to gain an advantageous position in software products that either supplement or substitute networking and telecom hardware equipment.

2.77 MeitY has taken various steps for promoting the software development in the country such as National Policy on software products (2019), Software development and re-engineering

guidelines for Cloud ready applications, Policy on adoption of open-source software for Government. of India etc. The Software Product Development Fund (SPDF) created by MeitY have been conceptualized for the overall growth of the software product ecosystem. SPDF may help the Indian Software Product Ecosystem by investing in the complete chain of Software Product development through investment not only in start-ups but also in MSMEs and Companies. Extending scope of SPDF for telecom technology products can cater to the needs and preferences for 5G and future technology products, thereby bridging digital divide and promoting access of technology by all.

Q16. Whether the existing incentives/policies issued by DoT and MeitY do meet the requirements for the growth of telecom software products? What additional policy initiatives and enabling regulatory measures are suggested to facilitate integration of telecom equipment and software products that are made in India? What measures are required to enhance exports of such products? Please justify your response.

Q17. Stakeholders are also requested to comment on other relevant issues, if any.

Chapter 3

International Experience

3.1 As has been discussed in the previous chapters, the market for telecom equipment has been steadily experiencing an expanding demand in the last few decades as more and more refined technological inventions enter the market and integrate with our lives. Given the strategic importance of the manufacturing ecosystem, globally an increasing number of governments are prioritizing and increasing their investments to strengthen their influence in the manufacturing space. They are also offering a high incentivizing strategy to support manufacturing industries, considering its key role in enhancing growth. Policy makers have realised that local manufacturing helps to create jobs and save foreign exchange and are therefore formulating concrete policies to promote the same.

3.2 Notably, numerous factors influence the level of business expenditures in a country, such as

a) economic and industrial structure (e.g., the share of high-technology sector);
b) the number of large firms and the average size of enterprises;
c) the availability of adequate Science and Technology (S&T) infrastructure;
d) the extent of international openness and links to the world economy;
e) the level of government expenditures on basic research;
f) the extent of intellectual property protection, etc.

Governments are one of the crucial factors in this spectrum of influences, and they use a range of mechanisms to further stimulate business. The choice of approach such as government efforts, partnerships, direct funding, market-based incentives, etc. depends largely on the national context. The direct funding has the advantage

of allowing governments to retain control over the process. Subsidies ensure that industry helps address important public missions or areas where significant gaps exist between public and private returns.

3.3 The practices followed in some of the developed countries in the world in the context of raising funds/ capital, promoting start-up ecosystem, incentivizing the manufacturing sector through various fiscal and other incentives have been discussed subsequently.

A. USA

3.4 Lawmakers in the US are actively pushing for 100% local content in telecom products amidst the risk of data security breaches. The market therefore would expand considerably in the next few years to come. The sectoral regulator, Federal Communications Commission (FCC), finalized a $1.9 billion program to replace equipment from Chinese telecom companies in 2021[70]. The main sources of financing in the USA at the early stages of expansion of industries are via debt (borrowings) from banks, venture capitalists and government.

3.5 From the standpoint of incentives and policy support, the United States has over time come up with a diverse portfolio of policies that are intended to support domestic manufacturing. Some of the existing schemes for manufacturing promotion are –

1. **Manufacturing Extension Partnership (MEP)**[71] is a system of government and non-profit partnerships coordinated by National Institute of Standards and Technology (NIST)[72] that are intended to help small and medium-sized manufacturers improve production processes, upgrade their technological capabilities, and innovate.

[70] https://www.cnbc.com/2021/07/13/fcc-finalizes-program-to-rip-and-replace-huawei-zte-equipment-in-us.html
[71] https://sgp.fas.org/crs/misc/R44308.pdf
[72] https://www.nist.gov/

NIST matches funds from non-federal sources such as state governments or user fees.

2. **Manufacturing USA (MUSA)**[73] is a network of 14 research institutes, each focused on a particular advanced manufacturing technology, intended to make early-stage scientific research suitable for use in manufacturing production. The research institutes are public-private consortia, located near universities or national laboratories and are an active example of promoting industry academia linkage by the government.

3. AMTech[74] is a competitive grants program intended to establish new organizations or strengthen existing industry-driven associations that address high-priority research challenges impeding the growth of advanced manufacturing in the United States. The AMTech program funds broad participation across the value-chain through the competitive planning grants it offers. AMTech incentivizes the formation and strengthening of industry-driven technology associations in areas of advanced manufacturing. Activities supported include detailed technology roadmaps of critical advanced manufacturing technologies and associated long-term industrial research challenges. It is therefore a significant impetus to R&D in the advanced manufacturing sector.

4. **National Export Initiative (NEI)**[75] is a customer service-driven strategy with improved information resources to ensure American businesses are fully able to capitalize on expanded opportunities to sell their goods and services abroad. NEI/NEXT was created with the vision that American companies reach more overseas markets by improving data, providing information on specific export opportunities, working more closely with financing organizations

[73] https://www.manufacturingusa.com/

[74] https://www.manufacturing.gov/programs/advanced-manufacturing-technology-consortia-amtech

[75] https://2009-2017.state.gov/e/eb/cba/nei/index.htm

and service providers, and partnering with states and communities to empower local export efforts.

5. The **Investing in Manufacturing Communities Partnership (IMCP)** [76] program is an initiative designed to revolutionize the way federal agencies leverage economic development funds. It encourages communities to develop comprehensive economic development strategies that will strengthen their competitive edge for attracting global manufacturer and supply chain investments. Through IMCP, the federal government is rewarding best practices – coordinating federal aid to support communities' strong development plans and synchronizing grant programs across multiple departments and agencies. Non-designated communities nationwide can learn from the best practices employed by these designated communities to strengthen American manufacturing. The initiative, one of its kind, is actively promoting the creation of communities with similar development goals and strategies.

B. China

3.6 In the context of China a key component of the switch to indigenous innovation in the country was direct funding of Chinese firms. China funded more than 100 government research institutions with over 600,000 technicians and specialists engaged in various types of R&D related to the production of telecommunications equipment and other high-technology goods. It has introduced 'Made in China 2025' (MIC 2025) in 2015 which seeks to boost China's economic competitiveness by advancing China's position in the global manufacturing value chain including core component manufacturing, leapfrogging into emerging technologies, and reducing reliance on foreign firms. The domestic content requirement for mobile and other electronic devices are as high as

[76] https://www.manufacturing.gov/programs/investing-manufacturing-communities-partnership

80% according to MIC 2025.[77] At the same time the scheme grants preferential access to capital to domestic companies. As a result, State-owned banks are distributing subsidies, low-interest loans, and bonds, especially for small and medium-sized enterprises.

3.7 It is also important to note that the venture capital (VC) industry in China has grown rapidly, and increasingly focused on the digital sector. The IT sector saw 837 venture capital investment whereas the semiconductor and electronics sector saw 419 venture capital investment in the year 2020.[78] The credit policies in China are specially focused on diverting loans to the small and medium scale industries. PBC (People's Bank of China) has employed a range of policies, including differentiated reserve ratios, loan refinancing, and rediscounted loans to aid small and medium scale industries in raising their capitals. They are also enabling new financing schemes e.g., intellectual-property-based guaranteed loans, supply chains finance based on receivables and inventory etc. to promote local manufacturing.

3.8 Over the past three decades, R&D investment in China has risen by nearly a factor of 40 due to the strategic planning devised by China for promotion of R&D. The country has designated a number of National Economic and Technological Development Zones (NETD Zones, or ETDZs) and Special Economic Zones (SEZs), each of which offers its own mix of incentives and its own rules and regulations which must be met in order to receive them. It has recently developed policies supporting SMEs and manufacturing research and development (R&D) which incorporate huge deductions in taxes for various components in the manufacturing value chain aimed at removing the adverse impact of Covid-19 on the country. The percentage of the tax deduction on enterprises' R&D costs is

[77] https://www.uschamber.com/assets/archived/images/final_made_in_china_2025_report_full.pdf
[78] https://www.statista.com/statistics/225817/number-of-venture-capital-investments-in-china-by-sector/

now at 100 percent (from 75 percent). That is, for every RMB 100,000 spent on R&D, the company will be able to deduct RMB 200,000 from its taxable income.[79]

3.9 China's commitment to promoting innovation by SMEs, boost high-quality development, and enhance the resilience of the industrial chain, is reflected in the central government plans to allocate more than 10 billion yuan from 2021 to 2025 to support the growth of "little giants".[80] These so-called "little giants" are SMEs that focus on a market niche and specialize technologies applicable to those markets, creating a strong innovation capacity for the industry as a whole. To further protect the MSMEs from the adverse impact of the pandemic, the country has announced that *"For inclusive small and micro-enterprise loans due before the end of 2021, the enterprise and the bank independently negotiate the deferment of principal and interest and continue to provide incentives to the local corporate bank that handles the deferred principal and interest of the loan. The incentive ratio is 1 percent of the loan principal."* and "*Issue small and microcredit loans to qualified local corporate banks and continue to provide preferential financial support at 40 percent of the principal."*[81] Apart from this, the Certified High and New Technology Enterprises (HNTEs) in China take benefit from a reduced Corporate Income Tax rate of 15%, as opposed to the standard 25%[82] under its innovation incentives. The Chinese government are trying to harness the growth potential in companies in China through encouragement/ incentivization, bolstering, and investment. A US Chamber of Commerce report recently stated, China has built its global ambition on local protection emerging to the forefront of the value chain by

[79] https://www.sjgrand.cn/chinas-innovation-boost-for-smes-and-manufacturing-rd/
[80] https://www.sjgrand.cn/chinas-innovation-boost-for-smes-and-manufacturing-rd/
[81] https://www.sjgrand.cn/chinas-innovation-boost-for-smes-and-manufacturing-rd/
[82] https://www.fiducia-china.com/chinas-innovation-incentives/

single minded incentivization of the local telecom manufacturing ecosystem.[83]

C. Germany

3.10 Germany's economic and innovation policy is outlined in the Digital Agenda of the BMWi (Federal Ministry for Economics and Energy). It focuses on digital infrastructure, digital economy, digital workplaces, innovative public administration, digital environments in society, etc. The snapshot of the German economy as tabulated below showcases that a significant share of the market share at present is met by local production for ICT equipment.

Table 3.1 - Germany's ICT Market Overview[84]

	2015	2016	2017	2018	2019(Estimated)
Total Local Production	174.8	174.6	182.2	196.4	192.8
Total Exports	37.7	39.4	43.0	43.0	n/a
Total Imports	64.0	64.5	71.8	68.8	n/a
Total Market Size	201.1	199.7	211.0	221.8	n/a

3.11 Germany has a robust system in place to promote research and development in various sectors. Incentive programs in Germany are available through different public funding instruments, different institutions and for different funding purposes. Though the individual funding requirements are case specific and can arise from various sources, the different incentives instruments including grants, loans and guarantees are generally available for all funding purposes and can normally be combined; thereby matching different business activity needs at different development stages of the company. Germany has also organized its **economic promotion**

[83] https://www.uschamber.com/international/understanding-us-china-decoupling-macro-trends-and-industry-impacts

[84] Germany - Information and Communications Technology | SelectUSA.gov

policy to cater to the specific needs of different enterprises. Various financial assistance schemes are discussed below -

I. **Grants for Investments, R&D, and Hiring Personnel**

3.12 Direct grants are of central significance within the Joint Task of Improving Regional Economic Structure (Gemeinschaftsaufgabe – GRW) and are mainly designed to reduce the investment costs for building new business premises. Other grant programs are used to stimulate activities related to research and development or the deployment of new technologies and are offered by a wide range of specialist institutions. Grant programs for employment are also one of the key features in Germany trying to create more employment opportunities in the manufacturing sector.

II. **Project Financing by Public Loans**

3.13 Public promotional loans are another attractive and important funding instrument. Such loans are available for investments, working capital, R&D projects, recruitment, or other specific purposes relating to the investment project in Germany. These funds are awarded by the publicly owned KfW Group at the national level, and by the development banks at federal level. Complementary public guarantees are used to simplify investor access to financing by strengthening their collateral and thereby ensuring that loans flow into the hands of all investors, equitably

III. **Project Financing by Private Equity**

3.14 Technologically innovative start-ups with huge capex and R&D requirements rely largely on financing through equity such as venture capital (VC). In Germany, appropriate VC partners can be found through the BVK (German Private Equity and Venture Capital Association). Special conferences and events like the (German Equity Forum) provide another opportunity for young enterprises to come into direct contact with potential VC partners. Public institutions such as the VC-entities of the different development

banks and public VC companies may also offer partnership programs in this development. In India, government organized or promoted conventions or conferences where VCs are brought in direct contact with start-ups, MSMEs and other upcoming ventures in the sector might help bridge the accessibility gap between start-ups and Venture Capitals, since start-ups with insufficient market capitalization often find it very hard to gain the confidence of big venture capitalist units in the country.

IV. **Public Venture Capital Companies**

3.15 Venture capital companies (VC) in Germany offer equity financing to young and innovative enterprises to support early-stage development, act as subsidiaries of the development banks of the federal states and support companies actively by providing risk capital as well as management and industry knowledge for their further development. The investment focus is on innovation and is mainly in industry sectors including ICT, life sciences, and new materials.

V. **Public-Private Equity Companies**

3.16 For established companies seeking to finance further growth or for start-ups as well, “Public-Private Equity Companies for Small and Medium-Sized Enterprises" are available as financing partners in the federal states. MBGs operate primarily through silent participation through the provision of subordinated capital almost as a silent partner or an angel investor. A further advantage of financing by equity capital from the federal state MBGs for companies is that they have easier access to the financing network of the respective development bank. A start-up is normally looking for seed financing for market entry. MBGs are in place to offer higher volumes of capital for expansion financing. The country organizes “pitch events” for allowing the start-ups to get in touch with venture capital companies.

VI. **Financing Investment Projects with Public Loans**

3.17 National Public Loan Programs - The KfW Group is the nationally operating development bank of the Federal Republic of Germany. It makes several financing tools available to different target groups via the National Public Loan Program.

3.18 State Development Bank Loan Programs - In addition to the KfW Group, each German state has its own development bank that finances projects within the respective federal state. State development bank loans are generally tailored to meet the requirements of small and medium-sized enterprises. It is a goal-oriented effort to promote the MSMEs in the country.

3.19 Securing Bank Loans with Public Guarantees- The loans required for economically appropriate projects can often only be collateralized to a partial degree. In such instances company attempts to attract financing can be very challenging. Public guarantees can serve as a loan security or supplement in the case of any shortfall in securities. Thereby it encourages financial institutions (i.e., commercial banks) to offer loans to companies. The benefits are as follows:

- Ease loans in case of insufficient collateral
- Cover up to 80 percent of respective loan amount
- Available through different programs and institutions depending upon the loan amount to be secured

D. United Kingdom

3.20 Developing equipment within the country has been a priority with the U.K. In this context in September 2021, the U.K government launched a new diversification strategy for the complete removal of "high-risk" vendor equipment from the country's next generation telecom infrastructure. The new strategy aims at tackling the issues of "overreliance" on vendors and address its privacy concern by shifting focus towards domestic components. This is sure to boost the demand for indigenous products in the country. UK's new

telecom strategy includes funding new Open RAN trial with NEC under NeutrORAN [85]project aiming for live 5G Open RAN within the UK in 2021 and testing solutions to deploy 5G networks in the "most cost effective, innovative and secure way". The strategy sets out a long-term vision for a healthy supply market, which revolves around three key pillars: supporting incumbent suppliers, which will continue to be a major part of the UK market and help the UK meet its ambitious digital infrastructure plans; attracting new suppliers into the UK market; and accelerating open-interface and interoperable technologies such as Open RAN.

Existing Programmes/Initiatives:

3.21 **High Value Manufacturing Catapult**

The High Value Manufacturing (HVM) Catapult opened in October 2011 and is conceived as providing a "transforming resource to accelerate the commercialisation of new and emerging manufacturing technologies". The HVM Catapult network was established by the Technology Strategy Board with over 200 million pound sterling investment from the government. It consists of seven technology and innovation centres: The Catapult is designed to provide businesses with access to the best manufacturing expertise and facilities in the country, in academia, research, industry and government. It is also intended to bridge the gap between early innovation and industrial scale manufacturing, at the same time act as a channel for public and private sector funding flowing into target projects.

3.22 **Centres for Innovative Manufacturing (EPSRC)**

EPSRC is the main UK government agency for funding research and training in engineering and the physical sciences and invests more than £800 million a year in a broad range of subjects. The EPSRC

[85] https://economictimes.indiatimes.com/news/international/business/uk-launches-new-telecom-strategy-to-tackle-huawei-dominance/articleshow/79495859.cms?from=mdr

Centres for Innovative Manufacturing are part of an initiative to "maximise the impact of innovative research for the UK". They support both existing industries, while also opening up new industries and markets in growth areas.

3.23 **Advanced Manufacturing Supply Chain Initiative (AMSCI)** Advanced Manufacturing Supply Chain Initiative (AMSCI) is a funding competition for collaborative research and development "designed to improve the global competitiveness of UK advanced manufacturing supply chains". Funding amounting to £120m is available for "research and development, skills training, and capital investment to help UK supply chains achieve world-class standards and encourage major new suppliers to locate in the UK". While BIS is the policy owner for the initiative, competitions are run by the Technology Strategy Board (now Innovate UK), and Birmingham City Council is the accountable authority for the initiative.

3.24 **Tax reliefs and incentives**

The UK government has successfully created a set of venture capital schemes that offer generous tax reliefs for investors, making the UK one of the best places to start, finance and expand a business in Europe. The 4 venture capital schemes are the:

- Enterprise Investment Scheme (EIS)
- Seed Enterprise Investment Scheme (SEIS)
- Social Investment Tax Relief (SITR)
- Venture Capital Trust (VCT)

3.25 **Research and Development (R&D)** tax reliefs offer generous incentives of up to 230% for companies investing in UK research and development projects.

3.26 **Annual Investment Allowance (AIA)** was introduced from April 2008 and most businesses regardless of their size and subject to certain conditions, have been able to claim this on their expenditure on plant and machinery. The permanent limit of the annual amount

was set at £200,000 from 1 January 2016. The AIA is a 100% capital allowance provided for procurement of plant and machinery up to a certain limit thereby reducing the CAPEX burden of the companies.

3.27 The **Manufacturing Made Smarter** program supporting technology SMEs through growth accelerators is a partnership between the government and the private sector where experts work with businesses to identify barriers to growth and ways to overcome them. It will also create a national network of innovation 'hubs' where businesses can partner or share advice, to help spur growth and creative ideas. Under the competition program Manufacturing Made Smarter: Digital Supply Chain, to drive digital innovation in manufacturing supply chains, wherein UK registered firms of all sizes can apply for up to 70% of the funding they need for industrial research projects in digital technologies to transform supply chains in UK manufacturing. The funding is from the Industrial Strategy Challenge Fund.

3.28 U.K. government launched a £30 million competition, **Future RAN Competition** (FRANC) to fund R&D projects with the main aim of accelerating the adoption of Open RAN (O-RAN) in the country. Innovators are encouraged to submit proposals for projects that will help to fast-track the availability of viable Open RAN products and suppliers and create a stronger case for government and business investment in the technology. The U.K. government also launched a new high-tech lab, SmartRAN Open Network Interoperability Centre (SONIC Labs) to accelerate the adoption of O-RAN in the country. For developing Open RAN products in India, such challenge-oriented schemes might enable small and medium industries to emerge to the forefront of innovation.

3.29 In late 2019, the government announced its intention to invest £5 billion to support the rollout of telecoms infrastructure, targeted at the most challenging 20% of the UK to ascertain that digital

infrastructure is provided to every citizen equitably even in the farthest corners of the country. Ofcom's consultation 'Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26', published in January 2020, highlights the need for investment in the UK's telecoms infrastructure. It sets out Ofcom's 'four-point plan' to:

- Improve the business case for fibre investment
- Protect customers from high prices and encourage competition
- Improve the network in rural areas
- Close the ageing copper network

3.30 **Targeted tax incentives to manufacturing industries**[86]: The UK based accountancy and business advisory firm, in a survey, have assessed that a simplification and extension of R&D tax reliefs could help drive further investment in innovation. With an objective to help the manufacturing sector access skilled workforces, attract new funds and reduce the cost of manufacturing premises and assets, the advisory firm have recommended number of targeted tax measures for UK manufacturing sector, such as

- Introducing new tax credits for manufacturers that invest in reducing carbon emissions.
- Extending the current Annual Investment Allowance limit at £1 million giving manufacturers the opportunity to commit to significant capital investment for the medium to long term.
- Increasing the number of Enterprise Zones to help encourage manufacturing clusters.
- Introducing new tax incentives that align education or training with specific skills such as robotics and automation that are required by advanced manufacturers.
- Establishing a new government-backed manufacturing trade network and exporting academy to help UK manufacturers break

[86] https://www.pesmedia.com/uk-manufacturing-industry-tax-incentives-24022021/

into new international markets and access expert advice on overseas regulation, intellectual property, and tax compliance issues.

E. South Korea

3.31 South Korea is one of the most globally integrated countries in the world with a large and sophisticated economy and large domestic firms enjoying already mature status. It is a leading producer of semiconductors and there is an enormous market for suppliers of equipment, materials, and services for semiconductor production. Market demand is expected to be driven further by increasing connectivity through innovative technologies such as 5G network, connected car, and IoT etc. To retain its leadership in the semiconductor market, local governments and companies are proactively investing in the next step of miniaturizing semiconductors with innovative processes such as utilizing extreme ultraviolet lithography, developing new materials, and diversifying its supply chain etc.

3.32 Semiconductors account for the largest share of South Korea's exports and chip exports are expected to double to $200 billion by 2030. The government seeks to build a "K-semiconductor belt" that stretches to dozens of kilometres and brings together chip designers, manufacturers and suppliers. The Korean government have incentivized its domestic industry with tax breaks, lower interest rates, eased regulations and reinforced infrastructure, to promote its chipmakers as global leaders. Further South Korea is inviting global suppliers to come and work with its homegrown chipmakers so that it can build an ecosystem on its soil rather than see them relocate elsewhere. The government has also expanded subsidies and relaxed accreditation requirements for high tech investments. Notably, it has allocated separate provisions in their budgets for promoting investments and to increase incentives, expand on-site support, make joint investment in R&D centres, to attract foreign talents and

increased support for global joint projects. The government's support for ICT development began as early as the 1990s, when Internet started its initial upswing and at present the R&D investment still accounts for almost 5% of the total GDP[87] one of the largest in the world. Some other measures taken by the country to promote ICT is as discussed below -

3.33 **Digital New Deal**

One of the key measures undertaken by South Korea to overcome pandemic induced losses was signing of the Digital New Deal. The fund allocated for creation of 5G infrastructure and self-sustaining robust digital economy as per the Deal is almost US$2.2 billion[88] Under the Deal, the South Korean government hopes to continue to build on its lead in 5G infrastructure creation. In its proposed third supplementary budget, South Korea aimed to spend US$41 million on cloud computing for the government, as well as an additional US$541 million to promote the industrial convergence between 5G and AI. The Deal also focuses on overcoming challenges of 'Big Data', addressing data usability by creating a "data dam" to collect data from public and private sources and then standardize the data so it can be analysed.

3.34 **Trade Shows**

SEMICON[89] and SEDEX[90] (exhibition showcasing the latest semiconductor materials, equipment, and related technologies) are some of the major trade events for the semiconductor industry in Korea, whereby multiple manufacturers come together to exhibit their prowess in the entire value chain of semiconductor manufacturing. In various other fields as well, like Cloud Computing, AI organisation etc. trade shows provide industries with

[87] https://news.itu.int/republic-korea-leader-information-communication-technologies/
[88] https://thediplomat.com/2020/06/south-koreas-digital-new-deal/
[89] https://www.semiconkorea.org/en/node/1
[90] https://parksystems.com/events/meetings-exhibits/2347-sedex-2020-the-22nd-semiconductor-exhibition-coex-seoul-korea-2

ample opportunities for global recognition and has been a popular method used by the country to develop its ICT sector.

3.35 **ICT Tax Incentives**

Korea is placed among the OECD countries that provide the largest level of total government support to business R&D as a percentage of GDP. Government tax relief measures have always safeguarded the interest of SMEs and the private sector in the country. Under the new K-Semiconductor Strategy unveiled in May 2021, government aims to attract more than US$450[91] billion of investments from the private chip sector through significant tax incentives and other measures. These include up to 50 percent in tax breaks for chip research and development (R&D) investments and a six-fold increase in tax breaks for investments in facilities. Additionally, The Tax Revision bill was released in 2021 outlining measures designed to incentivize investment in national strategy technologies, new growth engines, core technologies and the intellectual property market as well as boost consumption and support businesses.

3.36 Some of the main corporate tax- credits and incentives in Korea are discussed below[92]:

- **Special tax deductions for SMEs** – The country allows for tax deduction to the extent of 5% to 30%, depending on corporate location, size, business types, etc., with a cap of KRW 100 million on income.
- **Integrated investment Tax incentives** - Under the new tax credit scheme, they have been simplified and integrated into a single investment tax incentive scheme.
- **R&D tax credit** for SMEs meeting annual sales revenue and asset value thresholds and engaging in R&D activities. In 2020, Korea undertook two changes in its R&D tax relief provisions:

[91] https://asiasociety.org/policy-institute/supply-chains-shifting-indo-pacific/south-korea
[92] https://www.oecd.org/sti/rd-tax-stats-korea.pdf

- The scope of the R&D tax credit was extended to additionally cover expenses incurred for innovative growth-related technology investments (e.g., biotechnology, design, and manufacturing of system semiconductors, etc.). In addition, R&D costs incurred by an overseas enterprise that is controlled by a domestic corporation became eligible for the R&D tax credit.
- Tax credit for technology transfer among SMEs (Korean patent box regime) - Tax credit and reductions have been introduced to facilitate the transfer of technology between companies to enhance technical competencies in the country.

3.37 The amendments to the Act on Support for Overseas Companies to Return to Korea (U-turn Act)[93] announced by the Korean Ministry of Trade, Industry and Energy in Nov 2020, aimed at strengthening support for high-tech industries and R&D centres returning to Korea, widens the scope of companies eligible for U-turn subsidies and support.

3.38 Resolving administrative barriers, the government provides all-embracing support to semiconductor companies through regulatory reforms. For example, licensing approval procedures are shortened as much as possible. Further the Economic Policies released in June 2020 outlines several prescriptions aiming to incentivize investment, such as revising regulations to promote smart working and doing business remotely; to deregulate additional key industries including data and artificial intelligence, autonomous vehicles, medical technologies, Fintech, tech start-ups, and e-commerce; and promote regulatory sandboxes as well as regulation-free zones.

F. TAIWAN

3.39 Taiwan is a well-known ICT manufacturing hub due to its strong ICT industry base, robust semiconductor manufacturing clusters, and

[93] Act on Support for Overseas Companies to Return to Korea (U-turn Act)

advanced manufacturing capacity. The government has identified cloud and mobile computing as the most promising sectors. Another emerging segment is cybersecurity. The cybersecurity of ICT products amidst data privacy threats is one of the biggest concerns for buyers. Taiwan's cybersecurity market therefore is estimated to be worth US$1.74 billion[94]. Given the elaborate market availability it is one the leading providers of cybersecurity service all over the world. According to the Industrial Technology Research Institute, nearly 80 percent of global network security hardware equipment is produced in Taiwan.[95] Taiwan's economic sophistication attracts many investors, particularly technology firms looking to take advantage of Taiwan's infrastructure, large industrial base, advanced research, and development (R&D) and highly skilled labor force. Taiwanese tech companies tend to form clusters around various industry subsegments, collaborating and exploring possibilities and finding ways to improve on existing technologies and refine manufacturing efficiencies. This technique has allowed them to become globally competitive. The various incentives provided by the government are as discussed below –

3.40 **Tax Incentives**

The Management, Utilization, and Taxation of Repatriated Offshore Funds, 2019 provides preferential tax rates of 8 percent to 10 percent for firms and individuals repatriating offshore funds within two years of the act's date of enforcement. Statute for Industrial Innovation was amended to extend a wide range of tax incentives for ten additional years. This has been a very innovative mechanism to raise funds by redirecting them into domestic territory. The government also formulated an Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan, a three-year

[94] https://www.trade.gov/country-commercial-guides/taiwan-information-and-telecommunications-technology

[95] According to the Industrial Technology Research Institute, nearly 80 percent of global network security hardware equipment is produced in Taiwan.

(2019–2021) program which offers tax regulation consultation support services and establishes a designated task. It has made concerted efforts to emerge self-sufficient in the ICT domain over time.

3.41 **Special Economic Zone**

In February 2021, it was announced that US$394 million[96] would be invested over five years to develop a 5G Artificial Intelligence of Things Park in Kaohsiung. The Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan extends to the aforementioned business parks as well. The Telecommunications Management Act aims to ensure the sound development of telecommunications. Pioneers for Innovation Leadership on Technology Program[97] was announced to make Taiwan a high-tech hub by aiming to attract US$1.34 billion worth of R&D investment by foreign tech companies. Taiwan will emphasize research by foreign tech firms in Taiwan, co-innovation between Taiwanese and international companies, and development of value-added applications and services by Taiwanese firms.

3.42 The prevalent government initiatives include **R&D tax credit** for companies or limited partnerships, whereby domestic companies receive 10% or 15% of qualifying R&D expenses. Biotech and new pharmaceuticals companies (BNPCs) receive 35% of qualifying R&D and personnel training expenses. The objective of the incentive is to promote industrial innovation and commercialize the same.

3.43 **Cash grants under various government programs**

These Grants are administered for R&D and innovative business models for various industries up to 50% of an R&D project's expenditure. Grant volume varies depending on the program and can range from NTD 1 million to tens of million which offers more

[96] https://asiasociety.org/policy-institute/supply-chains-shifting-indo-pacific/taiwan

[97] https://1library.net/document/qoo07jkq-department-industrial-technology-pioneers-innovation-leadership-technology-program.html

flexibility.[98] The Industrial Development Bureau offers a subsidy program, the "Industrial Upgrade Innovative Platform Program,"[99] that can subsidize up to 50% of an approved R&D budget, with no ceiling.

3.44 **Patent Jurisdiction**

Under Taiwan's Income Tax Act,[100] an exemption from the 20% withholding tax levied on royalties paid to a foreign company is granted where the payment relates to the following: the use of patent rights, trademarks, and/or various kinds of special licensed rights to introduce new production technology or products, improve product quality, or reduce production costs, as well as remuneration paid to a foreign company for technical services rendered during the construction of a factory. To promote the circulation and application of the results of innovation or R&D, up to 200% of the R&D expenditure incurred in the current year may be deducted from taxable income.

3.45 The government has overtime formulated, implemented, and amended various policy prescription and incentivization strategies to further strengthen the ecosystem. In between 2019 and 2020 the most significant changes undertaken are as follows –

- The Statute for Industrial Innovation[101] was amended in July 2019.
- Taiwan provides various cash grants (up to 50% of an R&D project's expenditure) to encourage state-of-the-art technology

[98] https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-survey-of-global-investment-and-innovation-incentives-taiwan-2020.pdf

[99] https://tiip.itnet.org.tw/index.php?lang=2

[100] https://taxsummaries.pwc.com/taiwan/individual/taxes-on-personal-income#:~:text=Individual%20income%20tax%20(IIT)%20rates&text=A%20non%2Dresident%20alien%20residing%20in%20Taiwan%20for%20more%20than,where%20the%20remuneration%20is%20paid.

[101] https://english.ey.gov.tw/News3/9E5540D592A5FECD/0e9b0184-4096-4a83-9aad-6e61be1ea7bf#:~:text=The%20Statute%20for%20Industrial%20Innovation%2C%20first%20enacted%20in%20May%202010,capital%20for%20Taiwan's%20innovative%20technologies.

development and innovation services in specific industries/ technologies.

- To encourage local investment, the government announced major financing programs in 2019.

These changes in details are discussed below -

3.46 The amendments to The Statute for Industrial Innovation are as below -

- Increased R&D investments by state-owned enterprises
- Allowance for tax breaks for limited partnership venture capital firms
- Providing tax breaks for angel investors
- Allowing tax deferrals on stock-based employee compensation, with tax assessed at the lower of two values
- For stock received by individuals in exchange for intellectual property, or stock distributed to creators of technology, allowing tax assessment at the lower of two values
- Promoting public procurement of innovation
- Creating intangible assets valuation mechanism
- Enforcing compulsory auction of idle land in industrial zones
- Allowing tax deductions for undistributed surplus earnings invested in tangible assets

3.47 The government has also announced various major financing programs[102] to encourage local investment to provide loans and subsidize bank service fees ranging from 0.5% to 1.5% per year (for up to five years). Few prominent programs among others are -

- Encourage Taiwanese Business Investment Action Program
- Program to encourage domestic corporations to deepen their roots in Taiwan
- Program to accelerate investment by SMEs

[102] https://investtaiwan.nat.gov.tw/showPageeng1135?lang=eng&search=1135

Chapter 4

Issues for Consultation

4.1 Stakeholders are requested to provide their answers/comments on the following issues:

Q1. Is the PLI scheme in its current form effective enough to address the needs of promoting NATEM in India? Are any amendments or extensions required to the current PLI scheme to make it more effective? Please provide details.

Q2. Whether going beyond PLI scheme, a range of financial and fiscal incentives needs to be put in place to promote NATEM in India? Please elaborate your response.

Q3. Does the Electronic Development Fund (EDF) meet the requirements of promoting NATEM in India? What are the limitations in EDF for the NATEM sector and how can its scope be enhanced?

Q4. Is there a need for creation of separate funds on lines of EDF or those earlier recommended by TRAI (like TEPF and TMPF) for promoting NATEM in India? What institutional mechanisms should be put in place to govern the fund(s)? Give justification and elaborate on its possible impact on the sector.

Q5. What additional measures are suggested for promoting and supporting the Start-up ecosystem in the telecom sector in India.

Q6.a. Which of the financial instruments related to project financing, contract financing and credit default insurance currently available in India are being used by the stakeholders and to what extent?

Q6.b. Are these financing instruments able to cater to the needs of NATEM in India?

Q6.c. Are there any suggestions to further improve these financial instruments or are there any new proposed financial instruments that

can cater to the needs of NATEM in India? Please provide full details along with justification.

Q7. Whether the existing schemes relating on CAPEX and interest subvention are meeting the requirement of finance for NATEM in India.? Suggest modifications/ new schemes needed if any with details.

Q8. Whether the existing financial assistance for MSMEs that are into NATEM are sufficiently catering to their requirement or a separate dedicated scheme is required for the sector? Please provide a detailed response along with suggested schemes, if any.

Q9: Whether any cost disadvantage is experienced by domestic NATE manufacturers as compared to global counterparts due to various limitations discussed above? If yes, what is percentage cost disadvantage to domestic NATE manufacturers vis a vis other country? The details of calculations and methodology adopted for the same may be provided.

Q10. Whether schemes allowing tax holidays/deferment of tax are available for NATE manufacturers? If yes, are they meeting the requirement? If no, what modifications are required? Please justify and provide details.

Q11. Is the PMA/PMI scheme in its current form comprehensive for promoting NATEM? Are there any suggestions for modifications? How can the challenges associated with implementation of PMA/PMI be addressed? Please elaborate.

Q12. Whether the incentives to Telecom Service Providers to deploy indigenous manufactured products in their network will be helpful in promoting NATEM in India? Please justify with reasons. What incentivization model is suggested?

Q13. What should be the incentive structure (fiscal and infrastructural) for Telecom Product Development Clusters (TPDC) set up within the EMCs or separately?

Q14. Whether NATEM is facing any limitation affecting competitiveness of Local manufacturers due to misdeclaration of HS codes, inverted duty structures, landed cost differential etc.? Please provide specific details. What are the suggestions for improvement? Please elaborate.

Q15. Whether the current schemes/ measures or policy support for exporters of Indian manufactured equipment are sufficiently meeting the requirement to promote the global competitiveness of Indian NATE exporters? Are the Schemes/instruments in India consistent with the international schemes for exporters in leading manufacturing countries? Please suggest measures to bridge the gap if any.

Q16. Whether the existing incentives/policies issued by DoT and MeitY do meet the requirements for the growth of telecom software products? What additional policy initiatives and enabling regulatory measures are suggested to facilitate integration of telecom equipment and software products that are made in India? What measures are required to enhance exports of such products? Please justify your response.

Q17. Stakeholders are also requested to comment on other relevant issues, if any.

Annexure- I

List of Daughter Funds of EDF along with their Status[103]

Sr. No.	Name of the Daughter Fund	Total Targeted Corpus (in Rs Crore)	Amount committed by EDF (in Rs Crore)	No. of investments already made	Investment Objectives
1	Endiya Seed Co- creation Fund	150.00	30.00	12 Average Investment size in the Startups- Rs 10 crore	To foster innovation and product development by investing in IP/ R&D/ product start-ups in the areas of technology (IoT, Fabless Semiconductors, Saas and IT), healthcare (digital health, medical devices, nanotech in pharma/biotech) and consumer tech, focused on tackling India problems with a potential to scale globally.
2	KARSEMVEN Fund	96.15	24.00	11 Average Investment size in the Startups- Rs 4.5 crore	To assist start-ups, early stage, SME's and such other enterprises in Semiconductor Industry, allied and other related businesses, primarily in the State of Karnataka.
3	Aaruha Technology Fund I	100.00	20.00	10 Average Investment size in the Startups- Rs 1.8 crore	To focus on investments in early / seed stage investments in deep technology areas of ESDM, IT including VLSI, design/ Semicon, Information Security and services with emphasis on Innovation, Product development, IP Creation and disruptive technologies for social impact in India.
4	Unicorn India Venture Fund I	100.00	20.00	17 Average Investment size in the Startups- Rs 3.4 crore	Few of the primary sectors which the Fund is focused includes the following: SMAC (Social Media / Mobility / Analytics / Mobility/ Cloud) Nano Technology IT Internet of things Financial Technology / Security.

[103] https://www.meity.gov.in/writereaddata/files/List_EDF_04052020.pdf as accessed on 30.11.2021

5	Yournest India VC Fund	300.00	60.00	7 Average Investment size in the Startups- Rs 8.4 crore	The Fund's investments will be made in the domain of Electronic System Design and Manufacturing (ESDM), Nano-electronics and Information Technology. Its portfolio companies may be involved in - · New product development · New and Innovative service offerings · Deployment of new technology · Innovation in the business model · Scalable Idea in an emerging sector · Disruption with automation · Driving R&D in electronics, IT and Nano-electronics across verticals
6	PI Venture Fund I	130.00	15.00	11 Average Investment size in the Startups- Rs 9.4 crore	To invest in early stage ventures with combination of the below listed sectors: □ Electronics □ Intellectual Property □ Internet of things □ Nano-tech Information Technology
7	Ventureast Proactive Fund II	1000.00	100.00	12 Average Investment size in the Startups- Rs 25 crore	The fund will focus on investments in technology driven businesses including both hardware and software that address the needs of consumer, semi-urban/rural, MSMEs and enterprises. The technologies relating to hardware will include IoT, Electronics, Enterprise Application, Innovations in energy efficiency.

Annexure- II

Instruments by SIDBI

Loan Scheme	Loan Amount	Loan Tenure
SIDBI Make in India Soft Loan Fund for MSME **(SMILE)**	Minimum loan size – Rs.10 lakh for Equipment Finance and Minimum Loan Size for Others – Rs.25 lakh.	Up to 10 years, including 3-year moratorium
Smile Equipment Finance **(SEF)**	Minimum loan amount is Rs.10 lakh	Up to 72 months
Loans under partnership with OEM (Original Equipment Manufacturer)	Up to Rs.1 crore	Up to 5 years
Working Capital (Cash Credit)	Depends upon the financial ability of the applicant	As per the terms and conditions
SIDBI thematic assistance for purchase of capital assets in new enterprises **(STHAPAN)**: Financial assistance to Greenfield Units for setting up new units which includes purchase of land, construction of factory building, purchase of equipment, plant and MFA etc	Term Loan upto 2000 Lakh, subject to maximum of 75% of the project cost.	Repayment – Generally upto 7 years
Assistance to re-energize capital investments by SMEs **(ARISE):** Financial assistance shall be provided to brownfield / existing entities for undertaking expansion / modernization / capital expenditure in the same line of business	Term Loan upto 700 Lakh, subject to maximum of 80% of the project.	upto 7 years
SIDBI-loan for purchase of equipment for enterprise's development plus **(SPEED PLUS)**	Upto 100% of the machinery cost subject to maximum of ₹2 crore for New to SIDBI customers and up to ₹3 crore for existing customers of SIDBI	Repayment 2 to 5 years
SIDBI assistance to export oriented MSMEs under **UBHARTE SITAARE** programme: Term loans to Export oriented MSMEs for expansion, modernisation, diversification, technology / capacity upgradation, product R&D, etc, by investment in Land and building, machinery and equipment, etc	Need based financial assistance, subject to maximum of 80% of the project cost	Repayment – Generally upto 6 years (Extendable upto 10 years)

Annexure - III

Indian Government's Various Incentive Schemes for Entrepreneurs[104]

Name Of The Scheme	Headed By	Industry Applicable	Fiscal Incentive (*T&C applied)
Support for International Patent Protection in Electronics and Information Technology (SIP-EIT)	Department of Electronics and Information Technology (DeitY)	IT Services, analytics, enterprise software, technology hardware, Internet of Things, AI	Up to INR 15 Lakhs per invention or 50% of the total expenses incurred in filing and processing of the patent application upto grant, whichever is lesser.
Multiplier Grants Scheme (MGS)	Department of Electronics and Information Technology (DeitY)	IT Services, analytics, enterprise software, technology hardware, Internet of Things, AI	Limited to a maximum of INR 2 Cr per project and the duration of each project should, preferably, be less than two years. For industry consortiums these figures would be INR 4 Cr and three years.
Software Technology Park (STP) Scheme	Software Technology Parks of India (STPI)	IT services, fintech, enterprise software, analytics, AI	Sales in the DTA up to 50% of the FOB value of exports is permissible and depreciation on computers at accelerated rates up to 100% over 5 years is permissible.
Electronic Development Fund (EDF) Policy	Department of Electronics and Information Technology (DeitY)	IT Services, analytics, enterprise software, technology hardware, Internet of Things, AI, nanotechnology	Companies will get risk capital from "Daughter Funds" set up by Electronic Development Fund (EDF).
Modified Special Incentive Package Scheme (M-SIPS)	Department of Electronics and Information Technology (DeitY)	Technology hardware, Internet of Things, aeronautics/aerospace and defence, automotive, non-renewable energy, renewable energy, green technology,and nanotechnology	Majorly provides capital subsidy of 20% in SEZ (25% in non-SEZ) for units engaged in electronics manufacturing.
Scheme to Support IPR Awareness Seminars/Workshops in E&IT Sector	Department of Electronics and Information Technology (DeitY)	IT services, analytics, enterprise software, technology hardware, Internet of Things, AI	Organisations are provided with a grant between INR 2 Lakhs to INR 5 Lakhs.
NewGen Innovation and Entrepreneurship Development Centre (NewGen IEDC)	NewGen Innovation and Entrepreneurship Development Centre (NewGen IEDC)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality),	Provide a limited, one-time, non-recurring financial assistance, up to a maximum of INR 25 Lakhs.

[104] https://inc42.com/buzz/startup-scheme-indian-government-startups/

		automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and Beverages, pets and animals, textiles and apparel.	
The Venture Capital Assistance Scheme	Small Farmers' Agri-Business Consortium (SFAC)	Agriculture	The quantum of SFAC Venture Capital Assistance will depend on the project cost, location and the promoter's status.
Credit Guarantee	Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)	Sector-Agnostic	Both term loans and/or working capital facility up to INR 100 Lakhs per borrowing unit are being provided.
Performance and Credit Rating Scheme	National Small Industries Corporation (NSIC)	Sector-agnostic	The incentives are proportional to the turnover of the MSMEs.
Raw Material Assistance	National Small Industries Corporation (NSIC)	Sector-agnostic	MSMEs will be helped to avail economics of purchases like bulk purchase, cash discount, etc. Also, all the procedures, documentation and issue of letter of credit in case of imports will be taken care of.
Revamped Scheme of Fund for Regeneration of Traditional	Khadi and Village Industries Commission	Sector-agnostic	Funds limited to a maximum of INR 8 Cr to support soft, hard and thematic interventions are provided.
Single Point Registration Scheme (SPRS)	National Small Industries Corporation (NSIC)	Sector-agnostic	Micro and small enterprises will get exemption from payment of Earnest Money Deposit (EMD) and will be issued tender sets free of cost.
Aspire - Scheme for promotion of innovation, entrepreneurship and agro-industry	Steering Committee, Ministry of MSME	Agriculture, pets and animals, social impact, healthcare and life sciences	Based on nature of existence of the incubator
Infrastructure Development Scheme	National Small Industries Corporation (NSIC)	Sector-agnostic	For a deposit of six months refundable rent, an office space of 467

			sq.ft. to 8,657 sq.ft. is provided.
MSME Market Development Assistance	Office of the Development Commissioner (MSME)	Sector-agnostic	Provides air fare reimbursements based on category entrepreneur lies in (General, women, SC/ST/PwD). The total subsidy on air fare and space rental charges will be restricted to INR 1.25 Lakhs per unit.
National Awards (Individual MSEs)	Office of the Development Commissioner (MSME)	Sector-agnostic	The Selected National awardee is facilitated with a cash prize of INR 1 Lakh, INR 75K, INR 50K in order of ranking.
Coir Udyami Yojana	Coir Board	Agriculture	The amount of bank credit will be 55% of the total project cost after deducting 40% margin money (subsidy) and owner's contribution of 5% from beneficiaries.
International Cooperation (IC) Scheme	Office of the Development Commissioner (MSME)	Travel and tourism, human resources, events, advertising	The incentives vary as per the organisation category.
Credit Linked Capital Subsidy for Technology Upgradation	Office of the Development Commissioner (MSME)	Sector-agnostic	Ceiling on loans under the scheme has been raised from INR 40 Lakhs to INR 1 Cr while the rate of subsidy has been enhanced from 12% to 15%.
Bank Credit Facilitation Scheme	National Small Industries Corporation (NSIC)	Sector-agnostic	N/A
Atal Incubation Centres (AIC)	Atal Innovation Mission (AIM)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	AIM will provide a grant-in-aid of INR 10 Cr to each AIC for a maximum of five years

Atal Tinkering Laboratories	Atal Innovation Mission	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and Beverages, pets and animals, textiles and apparel. Eligibility: Schools (Grade VI – XII) managed by the Government, local body or private trusts/society can apply to set up an ATL.	AIM will provide grant-in-aid that includes a one-time establishment cost of INR 10 Lakhs and operational expenses of INR 10 Lakhs for a maximum period of five years to each ATL.
Scale-up Support to Establishing Incubation Centres	NITI Aayog	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and Beverages, pets and animals, textiles and apparel.	Grant-in-aid support of INR 10 Cr will be provided in two annual instalments of INR 5 Cr each.
Udaan Training Programme For Unemployed Youth Of JandK	National Skill Development Corporation (NSDC)	Education, human resources	INR 750 Cr has been earmarked for the implementation of the scheme over a period of five years
Enhancement of Competitiveness in the Indian Capital Goods Sector	Department of Heavy Industries (DHI)	Chemicals, technology hardware, healthcare and life sciences, aeronautics/aerospace and defense, agriculture, automotive,	One time grant up to 25% of the cost of the technology acquisition of each technology. Maximum amount given

		construction, non-renewable energy, renewable energy, green technology, Internet of Things, nanotechnology, social impact, food and beverages, textiles and apparel.	shall not exceed INR 10 Cr
National Clean Energy Fund (NCEF) Refinance	Indian Renewable Energy Development Agency (IREDA)	Renewable energy, clean energy, green energy plants.	REDA would provide funds received from NCEF by way of refinance to scheduled commercial banks and financial institutions (including IREDA). Maximum refinance amount INR 15 Cr per project.
IREDA Scheme For Discounting Energy Bills	Indian Renewable Energy Development Agency (IREDA)	Renewable energy, clean energy, green energy	Up to 75% of the invoice value pending for maximum six months from the date of application subject to a maximum bill discounting facility of INR 20 Cr. The minimum amount of transaction covering a set of bills shall not be less than INR 1 Cr.
Bridge Loan Against MNRE Capital Subsidy	Bridge Loan Against MNRE Capital Subsidy	Renewable energy, clean energy, green energy	The projects will get up to 80% of the existing pending eligible capital subsidy claim, as verified by the IREDA with a minimum loan assistance of INR 20 Lakhs.
Bridge Loan Against Generation-Based Incentive (GBI) Claims	Indian Renewable Energy Development Agency (IREDA)	Renewable energy, clean energy, green energy	A minimum loan assistance of INR 20 Lakhs is provided under this scheme.
Loan for Rooftop Solar PV Power Projects	Indian Renewable Energy Development Agency (IREDA)	Renewable energy, clean energy, green energy	The quantum of loan from the IREDA shall be 70% of the project cost with minimum promoter's contribution of 30%. IREDA may extend the loan up to 75% of the project cost.
Credit Enhancement Guarantee Scheme	Indian Renewable Energy Development Agency (IREDA)	Renewable energy, clean energy, green energy	Provide credit enhancement by way of unconditional and irrevocable partial credit guarantee to enhance the credit rating of the proposed bond.

Dairy Entrepreneurship Development Scheme	National Bank for Agriculture and Rural Development (NABARD)	Agriculture, pets and animals, social impact, food and beverages.	The incentives differ with respect to the cost of the required equipment or establishment of the facilities
4E (End to End Energy Efficiency)	Small Industries Development Bank of India (SIDBI)	Sector-agnostic	Up to 90% of the project cost with minimum loan amount of INR 10 Lakhs and maximum loan amount not to exceed INR 150 Lakhs per eligible borrower can be granted. The MSME unit has to pay only INR 30,000 and applicable taxes and the balance fee will be paid by SIDBI to auditors.
Pradhan Mantri Mudra Yojana (PMMY)	Micro Units Development and Refinance Agency Ltd. (MUDRA)	Sector-agnostic	MUDRA offers incentives through these interventions: >Shishu: covering loans upto INR 50,000/- > Kishor: covering loans above INR 50,000/- and upto INR 5 Lakhs > Tarun: covering loans above INR 5 Lakhs and upto INR 10 Lakhs
Stand Up India	Small Industries Development Bank of India (SIDBI)	Sector-agnostic	Composite loan between INR 10 Lakhs and INR 1 Cr to cover 75% of the project cost can be taken up, inclusive of term loan and working capital.
Sustainable Finance Scheme	Small Industries Development Bank of India (SIDBI)	Green Energy, Non-renewable Energy, Technology Hardware, Renewable Energy	Suitable assistance by way of term loan / working capital to ESCOs implementing EE / CP / Renewable Energy project provided.
SIDBI Make in India Soft Loan Fund for Micro Small and Medium Enterprises (SMILE)	Small Industries Development Bank of India (SIDBI)	Sector-agnostic	The loan amount granted is based on category entrepreneur lies in. (General, women, SC/ST/PwD)
Startup assistance Scheme	Small Industries Development Bank of India (SIDBI)	Sector-agnostic	The financial assistance provided is need-based, subject to a maximum of INR 200 Lakhs and equity kicker
Growth Capital and Equity Assistance	Small Industries Development Bank of India (SIDBI)	Sector-agnostic	MSMEs are helped to leverage equity / sub debt assistance from SIDBI for raising higher debt funds.
Assistance to Professional Bodies and Seminars/Symposia	Science and Engineering Research Board (SERB)	Events, chemicals, technology hardware, healthcare and lifesciences,	The incentives include nominal support for pre-operative expenses

		aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	
Ayurvedic Biology Program	Science and Engineering Research Board (SERB)	Chemicals, healthcare and life sciences, nanotechnology, social impact.	Support is primarily given to encourage participation of young scientists and research professionals in such events along with nominal support for pre-operative expenses.
Industry Relevant R&D	Science and Engineering Research Board (SERB)	Sector-agnostic	The industry share should not be less than 50% of the total budget. Overhead is provided to the academic partner. The SERB share shall not exceed INR 50 Lakhs for a project.
High Risk-High Reward Research	Science and Engineering Research Board (SERB)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	The research grant covers equipment, consumables, contingency and travel apart from overhead grants. No budget limit is prescribed for these projects.
Technology Development Programme (TDP)	Science and Engineering Research Board (SERB)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace	Provided support for project staff salaries, equipment, supplies and consumables,

		and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	contingency expenditure, patent filing charges, outsourcing charges, etc.
National Science and Technology Management Information System (NSTMIS)	Department of Science and Technology (DST)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction, design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	Grant-in-aid are provided for projects. Also, overheads on projects are provided at the rate of 10% of the total project cost for educational institutions and NGOs and 8% for laboratories and institutions under Central Government departments/agencies.
Biotechnology Industry Partnership Programme (BIPP)	Biotechnology Industry Research Assistance Council (BIRAC)	Healthcare and life sciences	Support is provided for high-risk, accelerated technology development especially in futuristic technologies.
Industry Innovation Programme on Medical Electronics (IIPME)	Biotechnology Industry Research Assistance Council (BIRAC)	Healthcare and life sciences	The loan and grant are provided according to the start-up stage.
Extra Mural Research Funding	Science and Engineering Research Board (SERB)	Chemicals, technology hardware, healthcare and lifesciences, aeronautics/aerospace and defence, agriculture, AI, AR/VR (augmented + virtual reality), automotive, telecommunication and networking, computer vision, construction,	The research grant covers equipment, consumables, contingency and travel apart from overhead grants. No budget limit is prescribed.

		design, non-renewable energy, renewable energy, green technology, fintech, Internet of Things, nanotechnology, social impact, food and beverages, pets and animals, textiles and apparel.	
SPARSH (Social Innovation programme for Products: Affordable and Relevant to Societal Health)	Biotechnology Industry Research Assistance Council (BIRAC)	Healthcare and life sciences	The loan and grant are provided according to the start-up stage.
Promoting Innovations in Individuals, Startups and MSMEs (PRISM)	Council of Scientific and Industrial Research	Sector-agnostic	Support grant is provided under categories such as PRISM Phase I, PRISM Phase II and PRISM-R&D Proposals.
Science and Technology of Yoga and Meditation (SATYAM)	Department of Science and Technology (DST)	Healthcare and life sciences	Not specified.
Rapid Grant for Young Investigator (RGYI)	Department of Biotechnology (DBT)	Healthcare and Life sciences	RGYI provides start-up grants to young investigators across the country working in different settings such as central government funded institutions, state government-funded university departments, scientists at DSIR-approved private institutions etc.
Biotechnology Ignition Grant (BIG)	Biotechnology Industry Research Assistance Council (BIRAC)	Healthcare and life sciences	Up to INR 50 Lakhs for research projects with a commercialisation potential with duration of up to 18 months are provided.

Annexure-IV

18-09/2018-IP
Government of India
Ministry of Communications
Department of Telecommunications
(Investment Promotion Cell)
20, Ashoka Road, Sanchar Bhawan,

New Delhi, Dated 8th October, 2020

Office Memorandum

Sub: TRAI Recommendations dated 03.08.2018 on "Promoting Local Telecom Equipment Manufacturing"- reg.

The undersigned is directed to refer to the TRAI Recommendations on the above subject. In this regard, it is to state that TRAI recommendations were placed before the Digital Communication Commission (DCC) on 19.09.2020. Many of the recommendations are already under implementation and necessary action is being taken on the rest of the recommendations as approved by the DCC.

2. Kind attention is hereby drawn on the following recommendations of TRAI and views of the DCC thereof:

(i) TRAI's recommendation No. 3.1(d):

On lines of the Technology Development Board (TDB), working under the chairmanship of Secretary, Department of Science and Technology, Government of India, a multidisciplinary Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, under the Telecom Engineering Centre(TEC), for faster and coordinated decisions relating to funding of and incentives for design, development, and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D, testing and certification, and manufacturing in the telecom sector in the country. This board would be responsible for administration and disbursal of funds from TRDF.

DCC's view:

DCC is of the view that CDOT is already working with this mandate and recommended to get suggestions from TRAI on further improvement in the matter.

(ii) TRAI's recommendation No. 3.4(c):

A common portal should be developed for self-declaration of Standard Essential Patents (SEP) by the patent holders in the telecom products. The portal should also have

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महानगर दूरसंचार भवन, नई दिल्ली-2
13 OCT 2020
डायरी सं. 5413

the facility for listing of registered telecom product design, manufacturing, marketing, and System Integration (SI) companies along with their designs/ products so that development of the complete ecosystem in the country can be facilitated.

DCC's view:

DCC accepted this recommendation and is of view that further details may be sought from TRAI on this.

(iii) TRAI's recommendation No. 3.6(h):

DoT should coordinate with Ministry of Finance for making available the following financing options, in line with the practices followed by other export-oriented economies, to indigenous telecom equipment manufacturers:

(i) Venture capital in the form of equity and soft loans;
(ii) Project finance;
(iii) Contract financing options;
(iv) Credit default insurance.

DCC's view:

DCC is of view that TRAI may be requested to furnish more details on this recommendation for taking up with Ministry of Finance.

(iv) TRAI's recommendation No. 3.7(e):

Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives.

DCC's view:

DCC is of view that TRAI may be requested to furnish more details on this recommendation.

3. TRAI is requested to provide the requisite suggestions/details as per DCC's view in para 2.

(Rahul Dwivedi)
Under Secretary (IP)
Tele: 2303 61774

Secretary,
Telecom Regulatory Authority of India (TRAI)
Mahanagar Doorsanchar Bhawan,
New Delhi

List of Acronyms

S.No.	Acronym	Description
1	4G/5G	4th/5th generation cellular wireless system
2	AI	Artificial intelligence
3	AIA	Annual Investment Allowance
4	AGR	Adjusted gross revenue
5	AMSCI	Advanced Manufacturing Supply Chain Initiative
6	APTA	Asia Pacific Trade Agreement
7	ASEAN	Association of Southeast Asian Nations
8	ATM	Asynchronous Transfer Mode
9	ATMP	Assembly, testing, marking, and packaging
10	BCD	Basic Custom Duty
11	BIG	Biotechnology Ignition Grant
12	BIRAC	Biotechnology Industry Research Assistance Council
13	BIS	Bureau of Indian Standards
14	BMWi	Germany's Federal Ministry for Economics and Energy
15	BoM	Bill of Material
16	BVK	German's Private Equity and Venture Capital Association
17	CAGR	Compound Annual Growth Rate
18	CapEx	Capital expenditure
19	CBIC	Central Board of Indirect Taxes and Customs
20	CECA	Comprehensive Economic Cooperation Agreement
21	CEPA	Comprehensive Economic Partnership Agreement
22	CFCs	Common Facility Centres
23	CGS	Credit Guarantee Scheme for Micro and Small Enterprises

24	CGSS	Credit Guarantee Scheme for Start-ups
25	CGST	Central Goods and Services Tax
26	CKD	Completely knocked down
27	CII	Confederation of Indian Industry
28	CPE	Customer Premises Equipment
29	CSSS	Champion service sector scheme
30	DCC	Digital Communication Commission
31	DCIS	Digital Communications Innovation Square
32	DeitY	Department of Electronics and Information Technology
33	DFs	Daughter Funds
34	DGFT	Directorate General of Foreign Trade
35	DIPP	Department of Industrial Policy and Promotion
36	DLI	Design Linked Incentive
37	DoT	Department of Telecommunications
38	DPIIT	Department for Promotion of Industry and Internal Trade
39	ECGC	Export Credit Guarantee Corporation schemes
40	EDF	Electronic Development Fund
41	EIC	Export Inspection Council
42	EIS	Enterprise Investment Scheme
43	EMC	Electronics Manufacturing Clusters
44	EoI	Expression of Interest
45	EPCG	Export Promotion of Capital Goods
46	EPFL	'Swiss Federal Institute of Technology in Lausanne
47	EPSRC	Engineering and Physical Sciences Research Council
48	ESDM	Electronics System Design and Manufacturing

49	EXIM	Export-Import Bank of India
50	FAB	Fabrication
51	FDI	Foreign direct investment
52	FFS	Fund of Funds
53	FRAND	Fair Reasonable and Non-Discriminatory
54	FRANC	Future RAN Competition
55	FTA	Free Trade Agreement
56	FY	Financial Year
57	GB	Gigabyte
58	GDP	Gross Domestic Product
59	GIA	Grant-in-Aid
60	GoI	Government of India
61	GRW	Ghirardi-Rimini-Weber
62	GST	Goods and Services Tax
63	GSM	Global System for Mobile communication
64	HS	Harmonized System
65	HVM	High Value Manufacturing
66	ICEA	India Cellular and Electronics Association
67	ICT	Information and Communication Technology
68	ICs	Integrated Chips
69	IFCI	Industrial Finance Corporation of India
70	IGCR	Import Goods Concessional Rate
71	IGST	Integrated Goods and Services Tax
72	IMCP	Investing in Manufacturing Communities Partnership
73	INR	Indian Rupee

74	IoT	Internet of Things
75	IP	Internet Protocol
76	IPR	Intellectual Property Rights
77	ISM	India Semiconductor Mission
78	IT	Information Technology
79	ITA	Information Technology Agreements
80	ITC	Input Tax Credit
81	KfW	Kreditanstalt für Wiederaufbau
82	KRW	Korean won
83	LC	Local Content
84	LIFL	Long-Term Interest Free Loan
85	LCD	Liquid crystal display
86	LED	Light Emitting Diode
87	LTE	Long Term Evolution
88	LTEM	Local Telecom Equipment Manufacturing
89	M2M	Machine-to-machine
90	MBG	Merchant Banking Group
91	MEIS	Merchandise Exports from India Scheme
92	MeitY	Ministry of Electronics and Information Technology
93	MEP	Manufacturing Extension Partnership
94	MEMS	Micro Electro Mechanical systems
95	MFN	Most Favoured Nation
96	MIC	Made in China
97	MIMO	Multiple Input/Multiple Output
98	ML	Machine learning

99	MNCs	Multinational Companies
100	M-SIPS	Modified Special Incentive Package Scheme
101	MPLS-TP	Multiprotocol Label Switching Transport Profile
102	MSME	Micro, Small and Medium Enterprises
103	MUSA	Manufacturing USA
104	NABARD	National Bank for Agriculture and Rural Development
105	NDCP	National Digital Communication Policy
106	NE	Northeastern
107	NEC	National Electrical Code
108	NEDFi	North Eastern Finance Corporation Ltd
109	NEH	National Endowment for the Humanities
110	NEI	National Export Initiative
111	NGIS	Next Generation Incubation Scheme
112	NIST	National Institute of Standards and Technology
113	NPE	National Policy on Electronics
114	NTD	New Taiwan dollar
115	NTP	National Telecom Policy
116	OECD	Organization for Economic Co-operation and Development
117	OEMs	Original Equipment Manufacturer
118	OFC	Optical Fibre Cable
119	O-RAN	Open RAN
120	OSAT	Outsourced assembly and test
121	OTN	Optical Transport Network
122	PB	Petabyte
123	PBC	People’s Bank of China

124	PC	Personal Computer
125	PCBs	Printed circuit boards
126	PLI	Production Linked Incentive
127	PMA	Preferential Market Access
128	PMI	Preference to Make in India
129	POTP/POTS	Packet Optical Transport Product or Switch
130	PPP-MII	Public Procurement Preference to Make in India
131	PTN	Packet Transport Node
132	R&D	Research and Development
133	RAN	Radio Access Network
134	RFPs	Request for Proposals
135	RMS	Risk Management System
136	RoDTEP	Refund of duties and taxes on export products
137	RoO	Rules of origin
138	SAARC	South Asian Association for Regional Cooperation
139	SCL	Semi-conductor Laboratory
140	SEIS	Seed Enterprise Investment Scheme
141	SEP	Standard Essential Portal
142	SEZs	Special Economic Zones
143	SIDBI	Small Industries Development Bank of India
144	SITR	Social Investment Tax Relief
145	SKD	Semi knocked down
146	SoC	System on a chip
147	SONIC	SmartRAN Open Network Interoperability Centre
148	SPDF	Software Product Development Fund

149	SPECS	Scheme for Promotion of manufacturing of Electronic Components and Semiconductors
150	SME	Small and Medium Enterprise
151	TEMC	Telecom Equipment Manufacturing Council
152	TEMO	Telecom Equipment Manufacturing Organization
153	TEPF	Telecom Entrepreneurship Promotion Fund
154	TIDE	Technology Incubation and Development of Entrepreneurs
155	TMPF	Telecom Manufacturing Promotion Fund
156	TMF	Telecom Manufacturing Fund
157	TMPF	Telecom Manufacturing Promotion Fund and Telecom Manufacturing Fund
158	TPDC	Telecom Product Development Clusters
159	TRAI	Telecom Regulatory Authority of India
160	TRDF	Telecom Research and Development Fund (TRDF)
161	TSP	Telecom Service Providers
162	UK	United Kingdom
163	UNICEF	United Nations Children's Fund
164	US/USA	United States of America
165	USD	United States Dollar
166	USOF	Universal Service Obligation Fund
167	VC	Venture capital
168	VCT	Venture Capital Trust
169	VGF	Viability Gap Funding
170	VoIP	Voice over Internet Protocol
171	WTO	World Trade Organization