ANNEXURE: USISPF RESPONSE TO TRAI CONSULTATION PAPER ON INPUTS FOR FORMULATION OF NATIONAL TELECOM POLICY – 2018

The Indian telecom industry is exploding in leaps and bounds. Currently, India has 1.17 billion wireless telephone connections, and its broadband connection customer base now stands at 276.52 million. India with 462.12 million users online as of March 2017 is also home the 2nd highest number of internet users in the world[1] with the number growing at a CAGR of 19.6% between 2007 and 2017[2]. It currently contributes 6.5% to India's GDP, but is expected to contribute towards 8.2% of GDP & create 30 lakh direct jobs by 2020[3]. In a clear recognition of its potential, FDI equity inflow in the telecom sector from April, 2016 to March, 2017 was $5.564 billion, which is more than four times the average inflow of about $1.3 billion dollars every year since 2013-14[4].

The potential for cloud services is limitless. The Indian public cloud services market had a value of USD 1817 million in 2017, which is set to grow to 4104 USD million by 2020[5]. Increased government expenditure on National Optical Fibre Network (NOFN), e-governance, coupled with growing acceptance of cloud services among small and medium businesses (SMBs) is expected to drive up the market for cloud computing in India. Cloud computing usage among Indian enterprises is expected to create over a million new jobs by 2022.[6] In order to harness these benefits, the government can play a leading role to create an enabling environment to facilitate new infrastructure creation and growth of the industry.

Emerging technology trends – Cloud Computing, Internet of Things (IoT), Transition of Brick and Mortar networks to Software -Defined Networks (SDNs) and Network Function Virtualisation (NFVs), Machine to Machine (M2M), Augmented and Virtual Reality, all have necessitated need for a robust, enabling and supportive policy and regulatory framework. What is needed are big ticket reforms for bridging the ever-increasing gap between technology and policy in the data space for the growth of Indian economy.

Naturally, the telecom industry in India is moving away from being anchored in traditional definitions of mobile, broadband and wifi and steadily inching towards futuristic technologies like 5G, IoT and M2M. Data is a key growth driver, with the sector seeing a six-fold increase in data traffic - from 561 million GB in the first quarter to 2.988 billion GB in the third quarter of 2016-17 - which is a whopping 400 % jump[7]. The government's ambitious Digital India

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[1] https://www.statista.com/statistics/262966/number-of-internet-users-in-selected-countries/;

[2] Accelerating Growth & Ease of Doing Business – Telecommunications (August, 2017), KPMG, available at https://assets.kpmg.com/content/dam/kpmg/in/pdf/2017/08/Accelerating-growth.PDF;

[3] Ibid;

[4] http://www.zeebiz.com/companies/news-not-connectivity-but-application-driven-new-telecom-policy-to-focus-on-end-users-18575;

5 Gartner Says Public Cloud Services in India Forecast to Reach $1.8 Billion in 2017 https://www.gartner.com/newsroom/id/3592917

6 Cloud Computing to help generate 1.1 mn jobs in India by 2022: Study, Hindu Business Line, October 26th 2017, http://www.thehindubusinessline.com/info-tech/cloud-computing-to-help-generate-11-million-jobs-in-india-by-2022-study/article9925120.ece;

[7] http://www.zeebiz.com/companies/news-not-connectivity-but-application-driven-new-telecom-policy-to-focus-on-end-users-18575;

umbrella programme, also hinges on data connectivity and aims to bring 100% tele-density, high-speed internet highways and delivery of citizen-centric services electronically[8].

Last 2 decades in the Indian telecommunication space has been the year of voice telephony were we have done exceedingly well. However, the future is of data and therefore need for an enabling and supporting policy framework for the growth of data services. Unlike in the voice, data is predominantly dependant on technology and innovation. Therefore, the policies should be formulated keeping in mind what is good for data.

We thank TRAI and the Department of Telecommunications for providing this opportunity to provide inputs to the National Telecom Policy, 2018. The Policy provides a framework for prioritising regulatory, and developmental initiatives as India enters a crucial phase of its development into a full-fledged digital economy.

As the Department has repeatedly emphasised, the Policy must be aligned with other national initiatives and visions for maximum gains for the national interest. The visions of the Policy must be closely aligned with, and support other path-breaking initiatives including Digital India, Start Up India, and Make in India.

We congratulate TRAI & Department of Telecommunication's vision for the National Telecom Policy 2018. We believe that the extensive multi stakeholder consultations conducted in this regard will yield in the creation of a policy that will pre-empting and enable the technological leaps that will revolutionize the industry.

The entire ICT ecosystem, has or is witnessing major transformation, from voice centric to data centric, from fixed line to wireless/mobile broadband, from minimal internet to internet dominance, no applications to the emergence of millions of applications, no social media to social media prevalence etc. All this will require revolutionary reforms in the current licensing framework to move towards a regime of "permission-less innovation".

With this in mind we offer the following general comments:
- **Need for Time-bound Implementation**: In order to ensure that India keeps pace with global developments in information and communication technologies (ICT), it is crucial that policy initiatives are implemented in a timely manner. With this in mind, we recommend the inclusion of a specific time-frame within the "Objectives" section of the Policy. Within a fast-moving development cycle in ICT, this will ensure that status of implementation of the Policy may also be reviewed regularly.
  - We recommend that the Policy objectives (contained in section "C") be reviewed periodically and amended to include a specific timeframe for implementation/completion by 2023.

- **Promoting the ease of innovation and doing business**: In line with the government's objectives to promote innovation and the ease of doing business in India, the Policy must look to reform outdated or overly prescriptive legal and regulatory frameworks,

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[8]https://economictimes.indiatimes.com/articleshow/60454561.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst;

and clearly orient India towards consolidating its position as a global centre of innovation. This includes minimising overlaps in jurisdictions of regulators, institutionalising excellence in research and innovation, and encouraging competition in the market.

- Encouraging **free and fair competition** is critical since the sector is predominantly served by private players from India and overseas. Competitive forces and an enabling regulatory environment will encourage new players to enter the market and lead to greater choice for consumers. Competition in India's telecom and services sector has served India's consumers and businesses well and has delivered unprecedented growth and affordability to consumers.

For purposes of convenience for TRAI, we have made amendments within the text of Chapter Two of the Consultation Paper itself. Additional comments have also been provided towards the end.

Chapter 2: STRUCTURE OF NATIONAL TELECOM POLICY 2018

A. Preamble:

1. World-over, the telecommunication services are being recognized as enabler of socio-economic development. An Indian Council for Research on International Economic Relations (ICRIER) study pointed out that a 10 percent increase in the rate of growth of broadband subscribers will result in a 2.4 percent increase in the GDP rate. International experience also suggests that telecommunication services catalyze the growth of all sectors of economy, particularly, the fundamental sectors viz. health, education, agriculture, digital services, and industry. The bottom-of-the pyramid gains the most from the virtuous cycle of growth fueled by telecommunication services.

2. After pronouncement of NTP-2012, during last few years, telecommunication sector in India has seen massive transformation. While the mobile networks have got upgraded from 3G to 4G in large parts of the country, the availability of smart phones at affordable prices is driving the mobile internet subscriptions. Further, with the steep decline in tariffs of telecommunication services, the affordability has increased and the consumption of data has increased multifold. Access to internet has empowered millions of Indians by giving them access to real-time information, Government services, marketplaces, and social media that is having positive impact on quality of life.

3. Growth of data communication systems and services is helping in enhancing the economic conditions in rural and remote areas, and spur new businesses by enabling access of markets to a large number of small and medium enterprises (SMEs). Above all, growth of digital communication networks is boosting competitiveness, enabling innovation, and improving productivity. As such, enhanced investments in telecom network infrastructure that allow fast, reliable, and affordable internet connectivity are leading to socio-economic growth and job creation in India.

4. The convergence of voice, video and data services has also become reality now. Online audio-visual content in regional languages is immensely popular because of the low literacy rates. While the telecom networks are being extensively used to deliver video services, after digitization of the cable TV networks, these are being used to provide broadband services. In order to meet the growing demand for the video, it would be necessary to encourage development of converged broadband and broadcast networks, and cloud infrastructure for Video on Demand (VoD) services. While video distribution in broadcast mode can fulfill the need of masses, the video on demand can meet the specific requirements of the consumers. Convergence of the networks can ensure efficient utilization of the available resources. The convergence of information, communication, and broadcasting services are creating vast new capabilities that are benefiting individual, businesses and society as a whole.

5. While the objectives of NTP-2012 relating to telecommunication services have largely been met except the rural tele-density, the expected success in making India a global hub of domestic manufacturing, development of state of the art technologies through R&D, and creation and incorporation of Indian IPRs in global standards have not been achieved.

6. The digital transformation is emerging as a key driver of sweeping change in the world around us. The telecommunication industry is at the forefront of this transformation. After connecting the individuals and enterprises, innovators are turning their attention to the Machine to Machine (M2M) communications which promise to connect billions of sensors/ devices. Upgradation to 5G networks will connect wearable computers, a vast array of sensors, and other devices, leading to better health, economic gains, and other advantages. 5G networks not only addresses Internet of Things (IoT) deployments on a massive scale, but also of applications previously not possible that depend on ultra-reliable and low-latency communications.

7. The convergence of the digital and physical products through M2M and IoT services and applications is paving the way for Fourth Industrial Revolution (Industry 4.0). It represents a transition to a new set of systems that bring together digital, biological, and physical technologies in new and powerful combinations. The Industry 4.0 is being built around the IoT/ M2M infrastructure and services for which the availability of global and digital communications; low-cost processing and high-density data storage; and an increasingly connected population of active users of digital technologies are pre-requisite. Therefore, just like physical form of connectives like Roadways, Railways, Airways, and Waterways, telecommunication networks i.e. Iways are also becoming essential infrastructure for industrial development. To keep pace with these developments, it would be necessary to formulate policies that would encourage development of networks especially suited for IoT, data centers and associated services, data analytics, cloud computing, and home-grown digital platforms and applications. As these services can be delivered remotely, India can become global hub for such systems and services.

TRAI has rightfully noted in its consultation paper that:
- "*The convergence of voice, video and data services has also become a reality now*".
- "*Convergence of networks can ensure efficient utilization of the available resources. The convergence of information, communication and broadcasting services are*

creating vast new capabilities that are benefiting individual, businesses and society as a whole."
- *"The convergence of the digital and physical products through M2M and IoT services and applications is paving the way for Fourth Industrial Revolution (Industry 4.0)."*
- *"Regulatory policies and their governing institutions are striving to keep pace with technological developments happening in the sector to address complex issues that include convergence of ICT and media, coordination with other sectors for IOT, and ensuring privacy and security".*
- *"By restructuring of legal, licensing and regulatory frameworks for reaping the benefits of convergence".*

The convergence of network, services and devices is inevitable and is being adopted globally. It is important that the policy should recognize and implement full convergence including removal between IP and PSTN across all current and future licenses. This has been long due calling for unshackling of restrictions.

8. In spite of development of telecommunication sector at rapid pace during the last two decades, there are number of challenges that need to be overcome. India is still ranked much lower in international indices relating to network readiness and connectivity. The gains from increased connectivity have been inequitable, with the full benefits not reaching those who need them most. Further, the average speed of the internet in India is still much lower than the global average. Regulatory policies and their governing institutions are striving to keep pace with technological developments happening in the sector to address complex issues that include convergence of ICT and media, coordination with other sectors for IoT, and ensuring privacy and security.

9. For achieving the inclusive socio-economic growth in the country, it is essential that benefits of health, education, and digital services reach to the population of urban as well as rural areas. Connectivity plays a vital role in extending such benefits. While the physical connectivity - Roadways, Railways, Airways, and Waterways - requirements are dealt with by respective Ministries, this policy shall be aimed to meet the digital connectivity requirements. Access to secured data connectivity at affordable prices to every person, enterprise, and industry can help in extending such benefits to every Indian citizen across the country.

10. Therefore, National Telecom Policy-2018 (hereinafter, referred to as, the NTP-2018) can have twin goals viz. (i) facilitate development of communication infrastructure and services to achieve inclusive socio-economic growth in the country, and (ii) to propel India to become the front-runner in the Fourth Industrial Revolution. This policy would set the mission and objectives to be accomplished by the end of calendar year 2022, when India will be celebrating its 75 years of independence. It would also specify the strategies to accomplish such objectives as well as capacity building in general.

The policy needs to encourage innovation in service offerings by adopting current and emerging / new technologies. This will help provide new services to customers. The need is to evolve a licensing / regulatory framework which engages with complexity, new technology and designs with a nimble approach.

B. Mission:

- To fulfil the communication needs of the people, enterprises, central and state governments and industries at affordable prices and sustainable basis in long and medium term
- To enable state-of-the-art secured, technology neutral digital communication infrastructure for delivering high-quality quality services to man and machines in urban as well as rural areas;
- To establish India as global hub for internet and data communication systems and services in a net-neutral environment;
- To establish India as a global hub for research and development and standardization in telecom technologies and services
- To promote and support a culture of innovation and experimentation of technologies and services in the communications sector
- To promote competitive markets in the telecommunications sector to promote affordability and improved quality of services
- To reduce barriers to market entry by reducing regulatory costs incurred in deploying networks and delivering services
- To make available ubiquitous, ultra-reliable, and secured connectivity with extremely low latency for IoT/ M2M applications;
- To develop home-grown digital platforms and services for meeting the specific need of the country;
- To promote research, development, and deployment of the widest range of technologies, services and business models to increase consumer choice and welfare
- To aim for self-sufficiency in telecom equipment manufacturing;
- To promote and support a culture of innovation and experimentation of technologies and services in the communications sector
- To holistically promote overall electronics manufacturing eco-system within the country which should be plugged into the global supply chain i.e. products made for India and for the world
- Focus on telecom licensing reforms which embrace migration from voice telephony and mandatory infrastructure creation to SDNs, virtualization and cloud platforms
- Enable a light touch regulatory framework as against licensing for emerging services like IoT, M2M and Cloud. International best practices to be followed for these services thereby preserving the global nature of such services with no restriction on cross border data flow, no mandate on data localization and seamless roaming across globe for economic and trade development.
- The policy needs to be realistic based on market conditions to support technological innovation rather than be a prescriptive set of rules. One of the ways to do that would be to recognize global standards and international best practices.

C. Objectives:

The following may be targeted for achievement by 2023:

(a) To increase rural tele-density to 100 %;

(b) To provide data connectivity of at least 1 Gbps speed to all the Gram Panchayats;

(c) To enable access for wireline broadband services to 50% households in the country;

(d) To enable access for high-quality wireless broadband services at affordable prices to 90% population;

(e) To achieve 900 million broadband connections at a minimum download speed of 2 Mbps, out of that at-least 150 million broadband connections at a minimum download speed of 20 Mbps;

(f)To develop 10 million public Wi-Fi hotspots in the country;

(g) To attain average speed of 20 Mbps for wireless, and 50 Mbps for wireline internet connectivity;

(h) To leapfrog India amongst top-50 nations in international rankings in terms of network readiness, communications systems, and services;

(i) To enable access for connecting to 10 billion IoT/ M2M sensors/ devices;

(j) To attract an investment equivalent to USD 100 billion in communication sector;

(k) To become net positive in international trade of communication systems and services;

(i) To move to a regime where individual licenses are necessary only in cases when they are accompanied by exclusive rights to spectrum or rights of way

(g) To bridge the digital gender divide and promote digital empowerment of women by increasing the proportion of female mobile users

(h) To ensure availability of mission critical communications to every state and central public safety and disaster relief agency, including broadband communications in all major cities.

D. Common Strategies to leapfrog India amongst top-50 nations in international rankings in terms of network readiness, communications systems and services, to attract an investment of USD 100 billion in telecommunication sector, and to attain average speed of 20 Mbps for wireless and 50 Mbps for wireline internet connectivity:

(a) By recognizing communication systems and services as essential connectivity infrastructure for development of India;

(b) By making available finance for communication infrastructure projects (iways) at par with other connectivity infrastructure sectors like Roadways, Railways, Waterways, Airways etc.

(c) Review of license fee, USOF levy, and SUC keeping in view importance of communication infrastructure in socio-economic development;

(d) By identifying and removing and restructuring legal, licensing and regulatory barriers frameworks for reaping the benefits of convergence

(e) With the separation of network and service layers, requiring licenses/permissions only for rollout of networks, and not for provisioning of services

(f) By permitting and enabling services providers to deploy networks and services based on market conditions

(g) By easing grant of licenses/ permissions processes for spectrum, wireless apparatus, and SACFA clearance to improve efficiency, innovation, and research;

USISPF Comment: We request TRAI to elaborate on the above (g) point by including the strategy for a "shift to online processes". Electronic document management and submission is highly needed to achieve the government stated policy objective of achieving ease of business. A complete shift from manual hard copy submissions to online is needed for achieving comprehensive benefits in terms of faster turnaround times, ease of tracking, transparency and overall efficiency.

Secondly, we would like to highlight the need for easing grant of licenses/ permissions for Other Service Providers as well. There is an urgent need to simplify multiple redundant requirements in OSP licenses such as need for location-based bank guarantee and document submission, and prohibitive work-for-home provisions. For instance, we request change in the OSP Terms to allow Company-based Licensing and Bank-Guarantee. Locations (sites) and their related documents could be updated with DoT at the time of submission of annual reports. Similarly, we request relaxation of the regulation for the need for individual leased lines for home working capabilities and allow option of technologies such as Virtual Office with an always-on, secure connection to the corporate network.

This should accordingly be modified as ""By easing **and making online** grant of licenses/ permissions processes for spectrum, wireless apparatus, **other service providers** and SACFA clearance to improve efficiency, innovation, and research;"

(h) Review of license and regulatory compliance costs on licensees keeping in view the international practices;

(i) By allowing broadcast services using cellular mobile networks;

(j) Integrated regulation of ICT and broadcasting sector led by economic and social policy goals of the country;

(k) By Restructuring of TRAI as converged regulator for Communications and Broadcasting infrastructure

(l) Review of SATCOM policy for communication services keeping in view the international developments, and social & economic needs of the country;

(m) By engaging with the State Governments and Local Bodies for faster rollout of communication infrastructure;

(n) For ensuring non-discriminatory time bound RoW permissions - a nation-wide common portal for application and approval.

(o) By developing a network readiness index for States/ UTs to address RoW challenges;

(p) By mapping telecom infrastructure assets like OFC cables, common service ducts and towers on NIC's National GIS Platform;

(q) By making provisions for establishment of common service ducts for underground telecom infrastructure in the Indian Telegraph Right of Way Rules, 2016.

(r) By reviewing the objectives of spectrum management to maximise socioeconomic gains;

(s) By monitoring efficient utilization of spectrum by conducting regular audit of the spectrum allocated to both commercial as well as government organizations;

(t) By declaring roadmap for availability and auction of spectrum in different bands in ensuing period;

(u) By ensuring adequate availability of contiguous, broader and globally harmonised spectrum.

(v) By encouraging innovation in unlicensed spectrum for non-exclusive use - By earmarking unlicensed frequency bands periodically for operation of low power devices for public use;

(w) By reduce entry barriers to promote R&D, innovation, and Start-ups in the sector;

(x) By developing digitally skilled human resources in the country;

(y) By establishing an independent apex institute for policy practitioners, industry, researchers, academicians - By establishing NTIPRIT as an apex institute for policy practitioners, industry, researchers, academicians

(z) By strengthening consumer grievance redressal mechanisms through awareness & protection

(aa) By establishing office of telecom ombudsman and centralized web based compliant redressal system

(bb) By increasing international coordination

(cc) By recognising the investments already made in country with existing manufacturing units, R&D, etc., of a global OEM's for telecom products in India be recognized as an Indian manufacturer and qualified for all the government procurement.

(dd) Amend Indian Telegraph Act 1885, if so required and include IP-1s in RoW Rules 2016.

(ee) Separate the Infra Layer from Service Layer.

(ff) Redefine Active and Passive Infrastructure to Common Telecom/Digital Infrastructure and include every equipment/component (but not limited to Tower/Pole, OFC, Antennas, Feeder cable, RF Cable, Node B, RAN & Transmission System, Coaxial cable, Combiners, Splitters, Couplers and BTS etc.) as Common Telecom Infrastructure (Infra Layer) and allow IP-1s to own, install, maintain and share with Service Providers (Service layer).

(gg) Delink the Infra layer (Common Telecom Infrastructure) from the licensing regime and allow IP-1s to provide the same under their existing Registration without any additional Fees & levies.

(hh) Mandate uniform & common Infrastructure development Policies, Guidelines and nominal one time permission fees for installation, aligned to RoW Rules across all Departments, States, Municipalities and Panchyats etc. for seamless implementation and development of Common Telecom Infrastructure across India.

(ii) Define Common Telecom Infrastructure as Critical Infrastructure and provide strict Penal Provisions for Safety & Protection against any damage, vandalism, thefts, and disruption of services.

(jj) Reaffirm Common Telecom Infrastructure including Telecom Towers as moveable Plant & Machinery and keep out of the provisions of Property Taxes.

(kk) Include Telecom Towers in the list of items for availing input tax credit under the current GST regime.

(ll) Incentivize indigenous production & deployment of energy efficient solutions at Tower Sites to reduce carbon emissions.

E. Strategies to increase rural tele-density to 100% and to provide data connectivity of at least 1 Gbps speed to all the Gram Panchayats:

(a) By further developing institutional capacity to improve focus on execution of Universal Service Obligation Fund (USOF) schemes for equitable development;

(b) By promoting sharing of telecom infrastructure among telecom service providers;

(c) By incentivizing the telecom service providers for faster roll-out of services in remote and rural areas;

(d) By facilitating sub-marine cable connectivity to the inhabited islands of Andaman and Nicobar Islands and Lakshadweep Islands; and

(e) By promoting use of satellites to provide telephony and broadband services in remote and inaccessible areas through–

i) rationalization satellite transponder and spectrum charges; and

ii) making available additional transponders, and new spectrum bands (such as Ka band) for satellite-based commercial communication services.

F. Strategies to enable access for wireline broadband services to 50% households in the country; to enable access for high-quality wireless broadband services at affordable prices to 90% population; to develop 10 million public Wi-Fi hotspots in the country; and to achieve 900 million broadband connections at a minimum download speed of 2 Mbps, out of that at-least 150 million broadband connections at a minimum download speed of 20 Mbps:

(a) By adopting a National Broadband Plan (NBP) for enabling access to at least 90% household using wireline, wireless, and satellite resources optimally;

(b) By facilitating development of Open Access Networks to improve access and affordability of communication services;

(c) By promoting sharing of telecom infrastructure amongst telecom service providers;

(d) By upgradation of cable TV networks for delivery of converged broadcast and broadband services;

(e) By incentivizing fixed-line broadband services;

(f) By devising enabling provisions for sustainable development of public Wi-Fi hotspots;

(g) By facilitating content delivery networks for improved quality of experience;

G. Strategies to enable access for connecting to 10 billion IoT/ M2M sensors/ devices:

(a) By removing regulatory and licensing barriers to the deployment of IoT/M2M services

(b) By earmarking of suitable licensed and unlicensed spectrum for IoT/ M2M services;

(c) By creating appropriate institutions for coordinated development of 5G services, IoT/ M2M systems, and their security framework;

(d) By closely working with sector specific industry councils for preparing roadmap for transformation of each sector to Industry 4.0;

Common strategies to ensure availability of mission critical communications to every state and central public safety and disaster relief agency, including broadband communications in all major cities.

    (a) By requiring all licensed telecom service providers to implement Next Generation 112 service availability in all areas and provide on line access to caller location and details to the authorized central and state agencies.

    (b) By doing away with the need for captive licenses for emergency communications services providers

    (c) By making available necessary spectrum as needed by the public safety agencies in accordance with regional and global standards on administrative cost basis only.

    (d) By facilitating the ecosystem for non-terrestrial access and backhaul technologies like Satellites and High-Altitude Platform Stations which may prove vital for disaster recovery communications when terrestrial networks are down.

H. Strategies to establish India as a global hub for data communication systems and services:

(a) By facilitating the deployment of flexible cloud service solutions to expand storage capacity and enable access to a wider number and range of services

(b) By broadly defining data privacy, protection, and security laws;

(c) By continuing to facilitate cross-border data flow

(c1) By tapping the enormous potential of the Internet economy by encouraging unfettered provision of and access to internet content and applications.

(d) By enacting net-neutrality laws;

(d1)   By recognizing that differential pricing – more specifically, zero rating – can be offered in a non-discriminatory manner that is both consistent with the principles of net neutrality and beneficial to consumers especially in emerging markets.

(e) By incentivizing setting up of International Data Centers (IDCs) in India;

(f) Internationally comparable bandwidth capacity and costs for businesses to encourage Data Centre localization in India;

(g) By facilitating establishment of interconnect exchanges for data services;

(h) By expeditious availability of land, electricity, and security for data centers; (i) Human capital for data analytics and product development;

I. Strategies to become net positive in international trade of telecommunication systems and services:

(a) By facilitating set-up of 'Special Technology Zones (STZs)' for experimental products to invite product and technology innovation and development in India;

(b) By allocation of spectrum for demonstration and experimental purpose on expeditious basis;

(c) By establishing Telecom Research and Development Center for identification, customization, and development of digital products and services in the country to substitute imports;

(d) By facilitating development of required infrastructure for research and development, incubation centres, standardization, testing, and certification of digital communication systems, products and services;

(e) By earmarking 40% of incremental USOF for financing R&D, Innovation, and development of communication systems and services as per indigenous needs;

(f) By providing financial incentives for the development of Standard Essential Patents (SEPs) in the field of telecommunication services and systems;

(g) By encouraging partnership between industry and academia for development of human capital;

(h) By incentivising local manufacturing of network equipment and devices;

USISPF Comment: We request TRAI to elaborate on above recommendation by revisiting it in the following manner – "By incentivising local manufacturing of network equipment and devices **for exports and domestic markets**".

It is essential that for Indian manufacturing policy to succeed, an equal impetus is given to manufacturing for exports as well as for local markets. It is worth noting that India's Domestic Demand for electronic goods was approximately $64 billion in 2014-15. In comparison, the world market in 2014 was $2 trillion. The need for large market and scale directly translates into the necessity for providing incentives not just for producing for domestic markets but for exports as well.

(i) By becoming global hub for remote management of telecommunication networks;

(j) By coordinating with EXIM Bank and Telecom Export Promotion Council (TEPC) to facilitate international trade of telecommunication systems and services;

(k) By making TEC and TSDSI responsible for development and enforcement of standards for telecom products and services;

USISPF Comment: We request TRAI to also specify that TEC and TSDSI should "increase participation in international standard development process." It is important that Indian agencies contribute to international standard-making. This will enable India to become an equal beneficiary of global innovation/ standards and provide an opportunity for Indian manufacturers to participate in global markets.

(l) By developing own test labs and certification infrastructure;

(m) By upgrading the manufacturing PSUs under DoT to actively exploit their strategic and operational synergies;

*******<END OF CHAPTER 2*******

Q.1 Stakeholders are requested to give their comments on structure and contents of the proposed inputs for National Telecom Policy, 2018, clearly outlining the specifics along with justification.

Q.2 Stakeholders may also suggest any other issue related to Policy Framework which stakeholders feel is important for growth of telecom sector, along with justification.

We are particularly encouraged by TRAI's mission statements and objectives, including the goals of establishing "India as a global hub for internet and data communication systems and services in a net-neutral environment" and leapfrogging "India amongst the top-50 nations in international rankings in terms of network readiness, communications systems, and services." TRAI recognizes further that a critical component of reaching those goals is "restructuring . . . legal, licensing and regulatory frameworks for reaping the benefits of convergence." We would like to raise the following important issue for growth of innovative telecom services.

I.   **IP-PSTN MIXING**
Current policy of not allowing IP-PSTN mixing undermines growth and innovation and prohibits India from reaping the full benefits of convergence.

Government of India prohibits any mixing between PSTN endpoints and IP endpoints, except in relatively narrow cases subject to licensing requirements. The policy, created originally to combat toll bypass and advance innovation, now produces the opposite result of undermining TRAI's core goal of propelling "India to become the front-runner in the Fourth Industrial Revolution."

Reasons for allowing IP-PSTN mixing:

a) **Innovative, converged services mix IP and PSTN streams**

A wide array of innovative offerings often depend on enabling IP and PSTN endpoints simultaneously, particularly in order to extract maximum benefits. A good example of this is collaborative videoconferencing, where multiple end users join a single meeting in which they meet via video, chat via electronic message, and work on documents and virtual whiteboards in real time. For a variety of reasons, including bandwidth limits for some users and physical equipment limitations for others, many participants connect their audio to the meeting via PSTN endpoints, while many others connect directly via IP from laptops and smartphones. Prohibiting IP-PSTN mixing vastly limits the reach and effectiveness of this kind of collaboration service.

The prohibition also impacts many Internet-of-Things services. While the core of most IOT services rests on machine-to-machine communications, many applications include a communication layer that enables factory managers or other observers to interact with each other in real time based on the data the IoT service delivers. As with collaboration services, this capability is most valuable when it is open to all end users, including those that do not have ready access to an IP endpoint.

There is little doubt that the IP-PSTN barrier will impact a wide array of innovative services that are still on the drawing board. These include applications ranging from connected homes, to connected classrooms, to healthcare, and to autonomous vehicles. The future scale of the potential impact is immense.

b) **The IP-PSTN Barriers drive away innovators**

For the reasons discussed above, India's current IP-PSTN barrier poses a significant challenge to the innovators developing these services and to the consumers and enterprises that use them. This impacts Indian consumers and enterprises directly, as they are often forced to use significantly pared back versions of the services. It also impacts India more broadly and more indirectly, as service providers and innovators will increasingly consider developing and testing new advanced services in other countries.

c) **The barrier is not aligned with global technological convergence**

While different transmission technologies were once distinct in their capabilities and uses, they are now virtually interchangeable. Indeed, TRAI's Consultation Paper recognizes the positive changes in access and opportunity that convergence delivers. The IP-PSTN barrier reinforces a distinction that is no longer applicable to advanced technologies; the result is that Indian consumers are not getting the full benefits of technological possibilities as in other countries that allow IP-PSTN mixing.

d) **Removing the barrier will allow advanced telecom services to flourish**

For these reasons, we urge TRAI to reconsider the prohibition. While it may have served a valid purpose when first crafted, it is now a barrier to India's advancement as a world leader in advanced communications technologies.

Suggestions:

While eliminating the barrier altogether would be the most effective approach, we request that TRAI considers narrowing its scope of applicability in the first stage. At present, the barrier is almost total, prohibiting IP-PSTN mixing in virtually any context (except for rare applications which anyway require licensing or authorization). To the extent the original purpose was to address toll bypass, TRAI could consider applying the barrier only to point-to-point voice because they are the communications most directly responsible for toll bypass losses. Limiting the prohibition to point-to-point calling – but freeing IP-PSTN mixing in other contexts – would allow innovative collaboration and IOT offerings to thrive in India, securing its place as a world leader in tech innovation.

We also suggest that TRAI add a point of "removing policy barriers to innovative telecom solutions and services" under Chapter II Section D on Common Strategies.

II. Recommendations for NTP on New Technologies

a) OTT Issues - Encourage unfettered provision of and access to internet content and applications

India is the only market with over 25 on-demand content OTT players[9]. The emergence of OTT has led to a blurring of lines between content creators and platforms[10]. OTT has increased the viewing of creative content, including educational ones, online[11], has driven up data usage[12], and gone a long way in on-boarding more users. We therefore recommend the following:

> OTTs today are contributing significantly to the Indian GDP and consumer surplus:
> - a recent report by ICRIER shows that OTTs contributed a minimum of USD 20.4 billion (Rs. 1357.6 billion) to India's GDP in the year 2015-16, which will increase to USD 270.9 billion (Rs.18275.9 billion) by the year 2020.
> - a recent report by WIK shows that OTT usage saves on average 803.9 minutes per week, which translates into an annual consumer surplus of US$98 billion in 2017.

NTP 2018 must incentivise collaboration between telecoms and established OTTs to further internet reach[13] but at the same time provide space for the same OTTs to market independently. NTP 2018 must make an explicit recognition of the difference between the network layer and the services layer[14]. OTTs, which make use of the latter, and have already caused a flourishing of the digital ecosystem in India, will be impeded by stringent licensing

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[9] http://indianexpress.com/article/technology/tech-news-technology/ott-players-could-drive-data-consumption-in-india-telcos-try-their-best-to-seal-this-new-deal/;

[10] Taken from Telecom Post, available at http://www.televisionpost.com/technology/the-ott-growth-potential-in-india/;

[11] Between 2016-2020, consumption of video content as part of India's total mobile data traffic is forecasted to rise from 49% (2016) to 75% (2021). Source: CISCO VNI Forecast 2016-2021, available at http://www.cisco.com/assets/sol/sp/vni/forecast_highlights_mobile/#~Country;

[12] http://indianexpress.com/article/technology/tech-news-technology/ott-players-could-drive-data-consumption-in-india-telcos-try-their-best-to-seal-this-new-deal/;

[13] Note: Telecos can themselves be part of the OTT market, and compete on fair grounds, in addition to hosting OTT on their own networks. For ex, UK teleco O2's TuGo app.

[14] Deconstructing the "Level Playing Field" argument, Brian Williamson, May 2017: http://static1.1.sqspcdn.com/static/f/1321365/27575015/1495793366237/LPFMay24.pdf?token=AxPym8wn4wb%2BAPW BXfxpyAkgLUE%3D

regimen, at par with those currently subject to the network layer. Further, unlike OTTs, network layer operators have exclusive right to acquire spectrum, numbering resources, interconnection with the PSTN, and the right of way to set up infrastructure.

b) Device related standards & compliances

Analysts and the industry estimate high-speed data services with cross-industry IoT applications, M2M, & AI-driven services, could open up close to 20% of additional revenue opportunity[15]. Estimates suggest that there will be approximately 275 million connected devices in India by 2020[16]. India is assumed to be in possession of 5-6% of the estimated global IoT industry by 2020[17], and it is expected that about 10-15 million jobs will be created through IoT in India[18]. Encouraging an IoT friendly environment can be beneficial to everyone. Indian Telecoms too are in a unique position to enhance their business value by offering their carrier infrastructure to provide connectivity to millions of devices in the IoT space. Further, data collected from IoT devices – provided it is in a consumer-consensual and transparent manner - can be very valuable to the telecoms for offering customised business services[19].

In order to be a full participant in the global IoT industry, India must standardize its norms for telecom devices, including M2M and smart tech, and harmonize it with the international standards ecosystem. Additionally, Indian standardization norms must also be revised to allow for devices certified in foreign labs to enter the domestic market without being subject to further domestic accreditation. The lack of such synchronism in technology standards and protocols will limit the benefits derived from this, leaving the industry unable to achieve scale and affordability[20].

NTP 2018 could consider the following suggestions that will ensure the unfettered proliferation of the IoT device ecosystem in India:

> ### ➢ M2M/IoT Services - Licensing, Spectrum, Roaming
A majority of IoT/M2M devices operate over unlicensed spectrum (PAN/LAN) such as WiFi or Bluetooth or others. Such devices are already widely sold in the market and the ecosystem is flourishing. Fetters to this ecosystem in the form of licensing and registration obligations must be removed.

It may be noted that security considerations for such devices are already adequately addressed since the WiFi/Bluetooth access points is already required to be verified as per existing regulations. We further suggest that we continue with eKYC requirements for SIMs

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[15] https://www.indiatimes.com/technology/news/8-things-govt-s-national-telecom-policy-claims-will-achieve-to-get-1-3-billion-indians-online-329603.html;

[16] Garter Report, as quoted in TRAI M2M consultation paper (2016), available at http://www.trai.gov.in/sites/default/files/Consultation_Paper_M2M%20_18_October_2016.pdf;

[17] Ibid

[18]https://economictimes.indiatimes.com/articleshow/60516455.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst;

[19] http://www.thehindubusinessline.com/opinion/imprisoned-in-the-box/article7992618.ece;

[20] Capitalizing Connected World - India m2m + iot Forum 2017 (4th Edition), available at https://smartnet.niua.org/sites/default/files/resources/forum_report-india_m2miot_forum_2017_1.pdf;

based M2M devices and permit the usage of existing International Roaming Agreements as per GSMA for M2M services.

Globally, there are commercial models between TSPs that provide practical solution for accommodating and facilitating international use of IMSIs and MSISDNs on a bilateral commercial basis. Foremost among them is the International M2M Roaming Framework that addresses the issue of transparency in international roaming for M2M services. This roaming framework enables use of home carrier's IMSI & MSISDN to provide services on global basis through single SIM architecture.

➢ 5G Related issues

India currently enforce a blanket (all 5Ghz wifi channels except 1 outdoor channel) Equivalent Isotropic Radiated Power Limit of 23dBm which is one of the lower than many regions including Europe, Asia and the Americas. This low EIRP limit is impacting the devices wireless links range especially in India indoor environments where concrete is the material of choice for buildings.

Though this impact might not be very apparent in India's wireless consumer electronics industry yet due to the fact that 5 GHz band is underutilized, we believe that 5Ghz band usage will increase as the throughput demand is increasing (Ex. HD/4K streaming). If this EIRP limit is relaxed a bit and allowed devices to transmit higher power, wireless devices will provide better range coverage on 5GHz band in indoor environments.

➢ Take effective steps to protect consumers

It is important to introduce Consumer Broadband Labelling to help inform users in a simple manner about key metrics. Further, TRAI's recommendations on creation of a Telecom Ombudsman for redressal of Consumer Grievances must be accepted.

It is also important to promote inclusive access to Internet by removing barriers due to gender, language, physical disabilities etc. (following e.g. W3C recommendations, where appropriate) and permit incentives like free data to enhance broadband coverage/usage especially to low income consumers.

III.   Licensing & Registration

The Telecom sector is expanding, both in terms of consumer base, as well as in terms of the products and services created. The new NTP is expected to be a forward-looking policy that is more application driven rather than connectivity driven[21]. It must be more inclined towards 'light touch' regulation[22] which is more enabling than restricting since it leaves doors open for innovation. It must be encouraging of emerging tech such as M2M systems, Cloud Services and OTT.

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[21] http://www.communicationstoday.co.in/13641-tech-giants-to-have-say-in-new-indian-telecom-policy;
[22] Note: Light touch is used to describe regulatory frameworks that are not strict or onerous, rather more along the lines of guidelines, essentially prescribing a 'wait & watch' approach, but leaving the ecosystem open to regulation should the need so arise.

Import license and ETA for unlicensed bands based prototype devices: Currently, businesses cannot import devices to India without an import license, and an Equipment Test Approval certification. While this is usually not a problem for finalized products, it poses a bottleneck during development phases of products where businesses need to ship prototype devices to India.

    i.   Since the product is not finalized both on the hardware and software sides, obtaining a full ETA certification during early development phases can be challenging.

    ii.   We suggest that NTP 2018 allow for WPC process reforms that enable the import of prototype devices without the need for experimental license.

    iii.   This could be enabled by ensuring provision of less onerous processes such as issuance of an early testing reports from accredit labs that demonstrate the devices are using unlicensed band only, and are prototypes allows for obtaining an import license with an exemption of obtaining full ETA while devices are in prototyping phases.

IV.   Spectrum, E &V Bands

At present, spectrum is the most expensive 'raw material' in use in the telecom industry. The present use and pricing of spectrum is unsustainable, causing telecom profits to plunge. Given the potential for future tech like IoT, 5G and M2M, the government must look into freeing more spectrum. For instance, spectrum for M2M can fall within either unlicensed or licensed bands, or both[23]. In a cash strapped telecom environment, Telecoms are in a unique position to enhance their business value by offering their carrier infrastructure to provide connectivity to millions of devices in the IoT space[24]. Further, telecom operators can benefit from the E & V bands spectrum, based on the international best practices on licensing, as it allows them more bandwidth for inter-site connectivity to LTE sites with traffic back-haul and front-haul, facilitate future 5G deployment, small cells for broadband and wi-fi services. Releasing new bands of spectrum such as E &V bands can also accelerate last mile solutions in urban areas, since these bands are expected to decrease interference between the mobile sites and reduce pressure on fibre based services to provide backhaul solutions[25]. Additionally, the NTP policy must expound on the efficient use of spectrum, its trading, sharing and also surrendering it[26]

V.   Make in India

- India's manufacturing has to be addressed as a complete ground up ecosystem. Easy availability to quality components and raw materials is possible if global raw material suppliers are incentivized to manufacture domestically.
- This will accelerate manufacturing and build widespread manufacturing capability, jobs.

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[23] Note: In India 2.4GHz, 5.8GHz, 5.25GHz and 5.725-5.825GHz are License exempt bands for indoor and outdoor applications. In addition TRAI has recommended to the Government for de-licensing the V-band (57-64GHz) too. Source: Garter Report, as quoted in TRAI M2M consultation paper (2016), available at http://www.trai.gov.in/sites/default/files/Consultation_Paper_M2M%20_18_October_2016.pdf;

[24] http://www.thehindubusinessline.com/opinion/imprisoned-in-the-box/article7992618.ece;

[25] Accelerating Growth & Ease of Doing Business – Telecommunications (August, 2017), KPMG, available at https://assets.kpmg.com/content/dam/kpmg/in/pdf/2017/08/Accelerating-growth.PDF;

[26] http://www.moneycontrol.com/news/business/will-the-new-telecom-policy-be-the-answer-to-the-many-ills-plaguing-telecom-sector-2395149.html;

- The Government should encourage companies who have a long-term vision, commitment for the country and technology.
- Giving preferential treatment will help in eventually nurturing a product vision, further investments in R&D.
- Sustainability of business plays a pivotal role in manufacturing, unless, the economies of scale comes in to play with large scale production for export, besides the domestic consumption.

VI.   Investor Facilitation Cell/ SPOC to support MNC's at DoT

We request to appoint **a DDG/ Jt. Secretary level officer f**or all investments handholding services, facilitate investment proposals, Single window clearances, licenses, mandatory tax registrations, regulatory filing besides supporting on many doing business challenges; representing the foreign investors.

VII.   Proposed mandatory testing of all telecom equipment by TEC lab in India

- Notification on "Mandatory Testing", of all telecom equipment's is a new procedure for certification of telecommunication equipment.
- This policy intends that all products to undergo testing and certification prior to sales.
- In addition to existing various regulatory measures of testing of products in India,
  - this mandatory local screening will create potential supply chain disruptions, increase the cost of telecom services, hurting end consumers
  - add delays in supplies due to non-availability of test infrastructure, as was seen in CRO (Compulsory Registration Order) of Ministry of Electronics.
- While we appreciate and respect the sovereign needs, we request if Indian Government could consider:
  - having a holistic study conducted by an independent research arm on policy & regulatory challenges faced by the industry in the form of various existing and new testing regimes
  - review and adopt global best practices from US, Europe and other countries on testing such as OEM self-certification in US or Supplier Documentation of Conformity, SDOC (with test reports from globally reputed test labs)

VIII.   *Licensing and Regulatory Framework for Cloud Service Providers (CSPs)*

India's cloud environment and economy is progressing strongly. By 2018, at least half of IT spending in the country is projected to be cloud-based, reaching 60% of all IT infrastructure, and 60–70% of all software, services, and technology spending by 2020[27]. IDC predicts that public cloud will account for the majority of this spending (60.5%), while off-premises private cloud environments will represent 14.9% of spending. The growth of this sector will have a significant multiplier effect on the Indian economy through massive cost savings, growth avenues for small and medium businesses as well as creation of new jobs in India.

To ensure the cloud industry can continue to grow and boost the wider Indian economy, a light touch regulatory approach that provides clarity and certainty to encourage further

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27 IDC FutureScape: Worldwide IT Industry 2016 Predictions — Leading Digital Transformation to Scale
https://www.idc.com/research/viewtoc.jsp?containerId=259850;

investment is suited for India. TRAI in its own recommendations on cloud computing in August 2017 acknowledged this.[28] CSPs are already bound by regulations such as Information Technology Act 2000 ("IT Act"), the IT Act (Reasonable Security Practices and Procedures) Rules or Intermediary Guidelines, etc. Once a data privacy law is enacted, it shall also be applicable to CSPs from a data controller/processor perspective. In this scenario, a parallel regulatory framework with additional licensing and reporting requirements for CSPs will result in confusion and undue burden arising out of multiplicity of laws, and risk dampening economic growth that is derived from the cost savings and scalability that cloud brings.

Other countries have also taken an extremely cautious approach to licensing and regulatory requirements for CSPs, given the huge ramifications of cloud regulation on other sectors of the economy. Many countries with more developed cloud computing industries such as US, Singapore and New Zealand have also opted for a self-regulation model for CSPs. Countries like China and Saudi Arabia are now exploring licensing requirements for CSPs but that is pursuant to their unique political ethos and can nowhere be compared to India.

Given that India's cloud industry is at a nascent stage and requires huge investment in infrastructure to bring in economies of scale and meet increasing demand for cloud based services, the government needs to ensure ease of doing business in India for CSPs. Any heavy handed approach to regulate the sector or increased entry barriers in the form of onerous licensing will be a huge impediment for the growth of the industry and the digital economy as a whole.

IX.   Incentivizing setting up of International Data Centers (IDCs) in India

The Indian data center infrastructure market was valued at $2.2 billion in 2016 and is poised to be the second largest market for data center infrastructure within the Asia/Pacific region by 2020[29]. Increased penetration of internet (including in rural areas) and rapid emergence of e-commerce are the main drivers for continued growth of data center co-location and hosting market in India[30]. Across the world, where data centers and cloud services have been able to flourish, the multiplier effects on jobs, productivity of local companies using cloud services, and on tax revenues have all been highly positive. A study in the state of Washington in the US, for example, found the job multiplier effects of data center investment to be 3.54, meaning that for every job directly created in a data center, an additional 2.54 jobs were created in the surrounding economy, and this coincided with a significant increase in tax revenues.[31]

 Generating investment in data centers in India will involve developing a regulatory regime that incentivizes private companies to invest in India. A comprehensive incentives package that goes hand-in-hand with an enabling policy framework can help to ensure the best build

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28 TRAI Recommendations on Cloud Services, August 2017
http://www.trai.gov.in/sites/default/files/Recommendations_cloud_computing_16082017.pdf
29 Conducive Policy & Regulatory environment to incentivize data centre infrastructure, IAMAI,
http://www.iamai.in/sites/default/files/position_papers/make-in-india.pdf;
30 IT & Ites Industry in India, IBEF, https://www.ibef.org/industry/information-technology-india.aspx
31 Washington Research Council (2013) 'Economic Impact of Data Centers on Central Washington',
https://researchcouncil.org/files/docs/2013/08/datacenterssept2013.pdf

environment possible, leading to increased competitiveness of the Indian cloud computing market segment. Potential incentives include:
1. Favourable electricity rates.
2. Rebate on land costs.
3. Secure and reliable access to water.
4. Special economic zone (SEZ) incentives packages, including a commitment to expedite SEZ designation and approval for desired sites without current SEZ status, with prerequisite import and income tax holidays for a reasonable period of time.
5. Waiver of import restrictions & duties on equipment that is essential to the operations of a data center
6. Reimbursement of Stamp Duty, Transfer Duty, and Registration Fees paid on sale/lease deed transactions.
7. Waiver of residency requirements for employees.
8. Favorable GST (Goods & Services Tax) rate and other relevant tax rebates, where applicable.
9. Expedited IT/ITeS incentive approval (Maharashtra IT/ITeS policy as a model).

X. *Internationally comparable bandwidth capacity and incentives for Businesses*

Cloud computing services require a highly reliable, low latency, redundant IP-protocol network. CSPs face significant regulatory challenges in building such a network in India, including:

1. **Inability to access dark fiber:** CSPs can currently only access the telecom infrastructure through a licensed partner as there is no alternative license category available for CSPs. Leasing dark fiber is not possible without a license, even though there is available under-utilized network capacity, provided by utilities such as the national railway. A less stringent license regime which allows CSPs to own or lease dark fiber would help CSPs to be self-reliant and will go a long way to ensuring high quality telecom infrastructure and data center investment in India.

2. **Imports of dual use equipment:** CSPs are restricted from importing certain dual use equipment that could be used to provide public telecommunications services. No distinction is made in the purpose of purchase, such as using dense wavelength division multiplexing (DWDM) and optical switches in a closed-user group (CUG) corporate network which does not interconnect with a public network. Import restrictions and duties on equipment that is essential to the operations of a data center can only hinder innovation in, and the efficiency of, data centers in India. CSPs need an exemption from current restrictions on buying and installing dual-use network equipment for use in data centers through a properly outlined framework.

3. **Submarine cable landing charges:** Large data service providers cannot buy Indefeasible Rights of Usage (IRUs) or build their own submarine cable networks with landing rights. Co-location charges and additional fees at the landing station are astronomically high in India as compared to other countries (e.g. the US, Japan, Singapore and European countries) and significantly add to interconnection costs. TRAI cut the submarine landing charges by 90% in 2012, which was challenged in court by the cable landing station

owners. Until now, the new pricing guidelines put forward by TRAI have not been enforced by the cable landing station companies, who have cited pending litigation. There is a need to resolve this issue urgently to make India globally competitive in this respect.

4. **Less control on network:** CSPs require network connections at two distinct levels: the metro-network (through the internet exchange point (IXP)) and the national level. Both levels are currently limited to only licensed carriers in India, significantly limiting the ability of CSPs to configure and manage a network optimized for customers and unnecessarily driving up the cost of CSP services. CSPs should be permitted to access both levels of network connection, which would have the effect of improving connectivity and incentivizing investment in network infrastructure in India.

The above regulatory restrictions are not encountered – or at least to the same degree – by CSPs in other countries (e.g. in the US, Japan and Singapore), and can be lifted without causing harm to the reliability of either the publicly switched telephone network or key national internet infrastructure. Indeed, most of the regulated infrastructure would be paid for and used exclusively by the CSPs themselves, and are not part of the public network that directly serves customers. Therefore, these restrictions should be removed in order to incentivize companies to establish data centers in India, and to help establish India as a global hub for data communication systems and services.

XI.   *Establishment of interconnect exchanges for data services*

The National Internet Exchange of India (NIXI) was established in 2003 as a carrier-neutral Internet Exchange Point (IXP) and is present at 10 locations across India. To connect to NIXI, CSPs can only lease a circuit from a carrier. In our opinion, a truly open exchange model must be implemented for all CSPs to interconnect, in a manner similar to the AMS-IX exchange (in Amsterdam) and other large and successful peering systems. Such a model supports more robust and lower cost exchange of data between content providers and Indian customers and end consumers. A successful exchange will not only make an India investment more attractive to data center businesses, but will also bring more local content and allow greater performance.