ANNUAL
REPORT

2018-19

BIF

BROADBAND INDIA FORUM

"Think Tank for Digital Transformation"

TABLE OF Contents

संजय धोत्रे
SANJAY DHOTRE

राज्य मंत्री
संचार, मानव संसाधन विकास
एवं
इलेक्ट्रानिकी और सूचना प्रौद्योगिकी
भारत सरकार
Minister of State
for Communications, Human Resource Development
and Electronics and Information Technology
Government of India

Message

I am happy to note that IPTV Society has successfully completed its 12 years of operations. Broadband India Forum has completed 5 years and is contributing significantly to the national goal of Broadband proliferation to every nook and corner of the country.

The modern era is a digital era in many respects. Fast, almost exponential developments in the ICT field – both in hardware and software – have necessitated the present generation to adopt a digital life style. Progressive miniaturization of computers (including laptop and mobile devices) as well as their vast memory and computing powers, along with their continuously decreasing relative cost, have facilitated adoption of the digital life. It has greatly facilitated the government-to-Citizen (G2C) interaction as well as B2B (Business-to-Business) transactions, besides inter-personal communication among people. Large scale Machine-to-Machine (M2M) Communications, Internet of Things (IoT) and extremely large number of sensors in the network, would greatly enhance the data communication requirements.

Customers in the modern telecom scenario require connectivity 'anytime, and anywhere' along with ever increasing data speeds and greater mobility. The progressive mobile telecom systems – initially analog to digital, and then different generations of digital systems – known as 2G, 3G, 4G and now 5G are being rolled out by various countries. A judicious mix and large capacity of all telecom media – be it physical medium (including Optical Fiber Cable) or wireless (both terrestrial and space), are essential to meet the gigantic needs of the country.

'Digital India', a progressive and highly beneficial program, aims to bring inclusive empowerment for the country and its citizens. 'Broadband for all', Optical Fiber Cable (OFC) Network for 250, 000 Village Panchayats, Aadhaar (digital identity for citizens), Smart Cities and plans for Wi-Fi Hotspots at large number of important public places, are some of the efforts to achieve these objectives.

Creation of such large capacity, modern networks would necessitate massive investments. Besides large Government of India funding for the OFC Network and other digital infrastructure equally large or even higher investments would be necessary by various Telecom Service Providers to bring the benefit of these modern systems to customers. The service providers would have to evolve progressively innovative business models to sustain their operations. Also, the various vendors of customer equipment would have to provide affordable and user-friendly sets to serve the Indian customers. The extremely vast market provided by India, with the benefit of 'economy of scale', can be a savior in this regard.

I would like to compliment BIF and its members for their continuous efforts to enhance and spread broadband in the country. I wish them success for their Annual General Meeting.

(Sanjay Dhotre)

Room No. 102, Sanchar Bhawan, 20 Ashoka Road, New Delhi - 110 001
Phone : 011-23372414, 23372565, Fax : 011- 23372277

डॉ॰ आर एस शर्मा
Dr. R S Sharma

अध्यक्ष
भारतीय दूरसंचार विनियामक प्राधिकरण
Chairman
TELECOM REGULATORY AUTHORITY OF INDIA

MESSAGE

I extend my best wishes to the Broadband India forum for their Annual General Meeting 2019.

Digital India requires broadband connectivity across the length and breadth of the country. The wireless and data subscribers are growing at a rapid pace in India. The acceleration of 4G deployments during past one year has brought staggering growth in mobile data consumption. Still Broadband is elusive to more than 50 percent population of the country. The challenge now is to take broadband to far flung, rural and remote areas. To do this, India needs to embrace all the elements of digital infrastructure. The combination of Fixed-line and mobile broadband, Public Wi-Fi and Satcom have to be used judiciously to make broadband service available to rural, remote and far flung areas of the country, at affordable cost.

There is an urgent need to strengthen the core access network and backhaul, reducing the network congestion and providing unhindered internet access which would be possible only through improvement of the backhaul processes of networks. Strategic shift towards 5G is in progress. 5G's ultra-high throughput, ultra-low latency and massive capacity will significantly transform our lives and improve work efficiency.

TRAI has always endeavoured to work with the industry for implementation of the policies of the Government to ensure new technologies are brought in for the benefit of consumers and the industry.

I take this opportunity to congratulate BIF for being an effective interface between the regulator, policy makers, academia, industry and the consumers. I once again wish BIF all success for its Annual General Meeting and congratulations on the release of the Annual Report of BIF for the year 2019.

(R.S. Sharma)

महानगर दूरसंचार भवन, जवाहर लाल नेहरू मार्ग, (पुराना मिन्टो रोड), नई दिल्ली-110002
Mahanagar Doorsanchar Bhawan, Jawahar Lal Nehru Marg, (Old Minto Road) New Delhi-110002
Tel. 23211236/ 23213409/ Fax 91-11-23236026/ E-mail cplftrai.gov.in/www.trai.gov.in

अंशु प्रकाश, आई.ए.एस.
सचिव
Anshu Prakash, I.A.S
Secretary

भारत सरकार
संचार मंत्रालय
दूरसंचार विभाग
Government of India
Ministry of Communications
Department of Telecommunications

Message

I am happy to learn that Broadband India Forum is holding its 12th Annual General Body Meeting (AGM) on 20th August 2019 at New Delhi and on this occasion the Annual Report for the year 2019 is being released.

Proliferation of broadband in India is one of the key priorities of the Department of Telecommunications. It is heartening to note that Broadband India Forum is actively working towards this objective. Proliferation of broadband will help us in bridging the digital divide, increasing income and employment opportunities, enhancing ease of doing business and empowering our citizens.

Broadband India Forum plays an important role of articulating views on various policy imperatives and focussing attention on urgent issues affecting the Telecom Industry.

I wish Broadband India Forum all success in its future endeavours.

14|8|19

(Anshu Prakash)

संचार भवन, 20, अशोक रोड, नई दिल्ली-110 001 / Sanchar Bhawan, 20, Ashoka Road, New Delhi-110 001
Tel. : +91-11-23719898, Fax : +91-11-23711514, E-mail : secy-dot@nic.in

Annual Report 2018-19

5

Smt. Aruna Sundararajan, IAS (Retd.)
Immediate Past DoT Secretary &
Immediate Past Chairman,
Digital Communications Commission

I compliment Broadband India Forum for having this Annual Function. I am very pleased that BIF is playing a strong role as a Policy Think Tank for Digital Transformation. It is always a pleasure to join Broadband India Forum for their events and functions as they always provide extremely insightful and useful information and I value their inputs. I am sure BIF will continue to do so now that they have set such a high standard and I wish them all success for the future.

The sector has seen the play of several new technologies in M2M, IoT, AI, Blockchain etc. I am very happy to note that BIF is playing an active role in the development of all these.

The National Digital Communications Policy (NDCP) brought out with the involvement of stakeholders, lays out a policy roadmap for the growth of the sector in a holistic manner to Connect, Propel and Secure the entire telecom ecosystem. It is indeed a very unique policy in many ways. The Telecom sector is set to become a fundamental infrastructure sector which will be the platform for development of other verticals in the economy.

I wish BIF all the very best in all its ongoing endeavours and a bright future ahead.

FOREWORD BY BIF CHAIRMAN

M F Farooqui, IAS (Retd.)
Chairman, BIF &
Former DoT Secretary

Broadband India Forum (BIF) is committed to proliferation of Broadband in all echelons of Indian Society. Though the broadband connections have already reached over half a billion, there is a lot of scope in terms of unique connections and half the population still needs to be tapped. There are many ongoing schemes aiming to better broadband connectivity. The realization of the Digital India dream will also depend to a very great extent on our ability to quickly bridge the gap in broadband connectivity. India is standing today at the cusp of a great new opportunity. We can leverage the potential of the Fourth Industrial Revolution and also usher a new paradigm of socio-economic empowerment on the back of this drive for digitization.

BIF's mission is to support and enhance all policy, regulatory & standards initiatives for the proliferation of hi-quality broadband in the country in a technology-neutral and all-inclusive manner. BIF therefore effectively functions as a think tank and policy forum. We have, in the short timeframe of less than five years, contributed significantly to regulatory and policy consultations and have been working closely with all concerned government agencies providing credible inputs on Broadband to assist and facilitate the process of policy expeditiously.

In its continuous efforts, the forum has consistently strived to promote policies by taking up the issues such as 5G, fibre, satcom, Public Wi-Fi, machine -to-machine, AI, spectrum, etc. We have been striving at all times to generate debate on the important issues, not just to bring out the problems that the sector is mired in, but to suggest solutions so that the Digital Communications success story continues. We have commissioned studies on important issues, released quarterly Newsletters and also taken a series of other sustained initiatives. We want to sustain this momentum in the coming days and a number of new initiatives have been lined up for the near future.

We, in the forum, are thankful to all the supporters and contributors who have always been pillars of strength for us. We do sincerely hope that we will continue to fulfil the expectations of need for timely, accurate and path-breaking information.

THE YEAR
2018-19
FOR BIF

FROM THE PRESIDENT'S DESK

I. Effective Functioning

An important decision of having representation from all category of Members in the Executive Council (EC) for a more effective functioning of the BIF was discussed at the EGM organised on 11th June, 2019 in New Delhi. The EC recommended and the EGM supported and approved the resolution passed to this effect on 11th June 2019 to restructure the EC - All Patron Members joining by 19th August 2019, 7 members from Corporate and 3 Members from Professional, Academia and Start-up Category will be a part of the Executive Council elected through an election process till the AGM in 2020.

II. Events, Activities and Meetings

1 **First DoT-BIF interaction on NDCP 2018 implementation:** New Delhi, 9th July at the Constitution Club of India:

❖ First interaction with DoT was on the implementation of strategies on Connect India: Creating Robust Communications Infrastructure & Propel India: Enabling Next Generation Technologies & Services. The session on Connect India was chaired by Shri. Amit Yadav, Jt. Secretary, DoT & on Propel India by Shri. Anil Kumar Sanghi, Advisor & Head, TEC with Mr. Vipin Tyagi, Executive Director, C-DOT being the Special Guest of Honour.

❖ More interactions being planned to touch upon other important topics in NDCP 2018.

2 BIF event to bring out the **"Positive Impact of IoT & AI on job creation in rural India with special focus on Agriculture and Healthcare"**: New Delhi, 3rd July, 2019, at the Taj Mahal Hotel:

❖ The Skill Councils of India in Agriculture (ASCI), Electronics (ESSCI) and Healthcare (HSCI) sector were Skill Partners at this event. Mr. Yaduvendra Mathur, Special Secretary, KIH, NITI Aayog graced the occasion as the Chief Guest. A number of use cases were presented at this event.

❖ BIF is coming out with a White Paper with the help of Feedback Consulting on job creation potential in the Indian Agriculture and Healthcare Industry with the adoption of IoT & AI. ESSCI, ASCI & HSCI have provided their guidance and advice towards a White Paper being prepared by BIF.

3 BIF celebrated the **World Wi-Fi Day** supported by Wireless Broadband Alliance in New Delhi, 20th June, 2019 at the Constitution Club of India:

❖ BIF was privileged to welcome Shri Sanjay Shamrao Dhotre, Hon'ble Minister of State for HRD, Communications & Electronics & IT, Government of India as the Chief Guest, this was MoS first public meeting after the formation of the New Government.

❖ The event focussed on bringing in big opportunities to attract large investment and promote local entrepreneurs with the liberalisation of Public Wi-Fi.

4 An important workshop on **"Future Spectrum Roadmap for Satellite Broadband Services in India"** in New Delhi, 11th June, 2019 at the Taj Mahal Hotel:

❖ At the workshop, a brief of Agenda Items on WRC-19 Satellite Related Issues Chapter 1,2,3,4,5,6 were discussed.

❖ The Workshop also saw a discussion on National Perspective on 28 GHz and National Perspective on other Spectrum bands for WRC-19.

❖ Ms Aruna Sundararajan, Secretary, Telecom and Chairperson, DCC was the Chief Guest. Ms Anuradha T K, Director – SNCP, ISRO was the Special Guest of Honor.

6 BIF organised an event on **'OTT: A win-win for all'** in New Delhi, 5th April, 2019 at the Taj Mahal Hotel:

❖ The event was presided over by the Chief Guest, Mr. Yaduvendra Mathur, Special Secretary, NITI Aayog and other industry luminaries including Mr. Rajat Kathuria, Director and Chief Executive, ICRIER.

❖ The event focussed on the Regulation and Substitutability of OTT Services with Telecom Services through a panel discussion.

❖ The event was crucial in determining the development of synergies between TSP networks and OTT players. OTT and Telecom Service Providers (TSP) provide different services and experience different sets of challenges. Thus, arises the need to further enhance collaboration between TSPs and OTT players, which was the key discussion theme at the event.

❖ Findings about Analysys Mason Study on "Infrastructure Investment by Online Service Providers" was presented at the event by Mr Ashwinder Sethi, Principal, Analysys Mason.

5 BIF celebrated **50 Years of World Telecommunication and Information Society Day (WTISD-19)** with the theme: 'Bridging the Standardisation Gap' **in association with PHD Chamber of Commerce & Industry:** New Delhi, 17th May, 2019 at the Le Meridien.

❖ At this event, BIF came up with a 10-point agenda to enhance collaboration between multiple stakeholders around bridging the standardisation gap while working together with TSDSI.

7 An event was organized on the 'Benefits of DoT's Gazette Notification on **de-licensing of 5GHz for Proliferation of Public Wi-Fi'** in New Delhi on 15th February, 2019 at the Le Meridien:

❖ A White paper on "Democratisation of Public Wi-Fi in India with delicensing of 5Ghz Spectrum band" was also released during the event.

❖ There was panel discussion on Technology Evolution, New Use Cases and Global trends on 5Ghz band chaired by Mr U K Srivastava, Principal Advisor, TRAI. The eminent panellist included Mr Gulab Chand, Sr. Dy. Wireless Advisor, WPC, DoT and Mr. K Manohar Raja, ED (EB)/CO (Enterprise Business, Railtel Corporation) along with industry speakers from Qualcomm, Bluetown and XiFI Networks.

❖ Ms. Aruna Sundararajan, Secretary, DoT & Chairperson, Digital Communications Commission was the Chief Guest.

8 TSDSI-BIF-5GIA organized a **two-day India – EU Stakeholders' Workshop on 5G Technology Landscape** in New Delhi on 5-6th February, 2019 at the India Habitat Centre:

❖ This workshop focussed on the paramount importance of creating the digital communications infrastructure that is required to be put in place which is essential for 5G to take off and the concurrent adoption of optimally harmonized global standards.

9 BIF organized a closed-door **meeting for its Members with Dean Yoshino, ADBI Japan** in New Delhi on 11th January, 2019 at Hotel Shangri-La with senior representatives from the Industry following the event on Digital Infrastructure in December, 2018:

❖ Dean Yoshino also met Smt. Aruna Sundararajan, Secretary, Telecom after the meeting with the Industry representatives.

10 BIF organised a Conference **on Digital Infrastructure for Transforming India in collaboration with ADBI Japan and ICRIER** in New Delhi on 6th December, 2018 at the Taj Mahal Hotel:

❖ BIF along with ICRIER released a report titled "Growth Dividends of Digital Communications: The Case for India' that highlights the impact of Digital Communications Infrastructure on Economic growth in India. The ICRIER-BIF study revealed that 10% increase in Investments in Telecommunications Infrastructure will increase India's GDP by 3.3%.

❖ The event was inaugurated by the Chief Guest, Shri Amitabh Kant (IAS), CEO, NITI Aayog. Smt. Aruna Sundararajan, Secretary, Telecom and Chairperson, Digital Communications Commission was the Special Guest of Honor. Dr N Yoshino, CEO & Dean, ADBI Japan, the inspiration behind the Conference, gave a keynote address on International Perspective of Digital Infrastructure.

11 BIF organised an event to release a report on Smartphone Performance in India by PhiMetrics Technologies Pvt. Ltd in **New Delhi, 27th November, 2018 at the Shangri-la:**

❖ The report captured details of the variance in customer experience across different smartphones.

13 BIF's Round Table Discussion on **"Artificial Intelligence (AI) to work for India's Development: Opportunities and Safeguards"** in New Delhi, 10th October 2018 at Le Meridien. Microsoft made a presentation on Transforming Social Impact: AI for good.

12 Fourth International Annual Conference: India-Satcom 2018 organised in New Delhi on 20-21st November, 2018 at the Le Meridien:

❖ One of BIF's flagship event which brings together the national and international players in the Satellite industry.

❖ CTO Roundtable on Opportunities and Challenges in Indian Satcom Sector was organised on Day 1 with senior DoT representatives.

❖ Day 2 – The theme of the event was Mainstreaming Satcom: Connected the Unconnected. The event included discussions on India 2020-Economic Potential and Ease of Doing Business in Satcom & Broadcasting Sector in India; Drivers for Next Generation Satcom Applications & Services & Satellite Broadcasting in Converged Era Satellite Broadcasting in Converged Era.

❖ There was participation from senior level officials from DoT, TRAI and DOS.

14 BIF organised a panel Discussion on the draft Bill on Data Protection in New Delhi on 5th September, 2018 at the Imperial:

❖ The panel of experts at the meeting welcomed the opportunity for public consultation extended by the Ministry of Electronics and Information Technology (MeitY) before drafting the final bill.

❖ The panel felt that having to store vast amounts of data within the country, whether exclusively or as a copy, would have an adverse socio-economic impact on innovation, information and technology access, and trade. Several members of the panel believed localisation could place a huge financial and operational burden on India's start-up and small business ecosystem.

❖ The panel meeting was well-attended with over fifty representatives from the media, high-profile authors, policy experts, industry and consumer rights groups.

❖ The panel recommended that the final bill includes checks and balances for when the government can access an individual's data, and provide options for recourse for affected individuals.

15 Event on **My India Wi-Fi India Summit & Awards 2018** organised in New Delhi, 6th September 2018 at the Imperial:

❖ My India Wi-Fi India Summit & Awards 2018 is an annual initiative focused on highlighting key trends and technologies in the Wi-Fi segment.

❖ The event was organized by DigiAnalysys Media along with support from various industry associations and research organizations.

❖ The Conference aimed at bringing together the industry eco-system yet again to deliberate and chart out a progressive roadmap for transforming India's digital society. The theme of the Conference was "Achieving 10 million Wi-Fi hotspots by 2022".

❖ BIF played a major role in the Conference as knowledge partner and also prepared a White Paper which was released in the Conference.

As regards future events, BIF plans to hold its Annual Satcom event - India Satcom 2019 on 27-28th November in New Delhi.

III. BIF's Committees

One of BIF's strength is its Committees which have been recently restructured with the feedback from Members.

TWO NEW COMMITTEES HAVE BEEN FORMED:

➤ Telecom, Media & Technology (TMT) Committee formed to discuss broadcast aspects to advance the interests of this growing sector which is a big pull for broadband.

➤ Device Smart Phone Manufacturing Committee formed recognising that the Smart Phone is the ultimate broadband device.

Work undertaken as of now:

❖ Two White Papers have been commissioned by the Committee.

❖ Working to increase the Committee's recognition with concerned ministry's viz MeitY and DPIIT.

❖ The membership for the committee also needs to increase for which handset and component manufacturers have to be contacted.

❖ Submitted inputs to MeitY on Handset Manufacturing against their consultation for making India into a Global Manufacturing Hub.

GENERAL POLICY AND REGULATION (GPR) WORKING GROUP:

This Group is working with DoT for Implementation Strategy for NDCP-2018, the first interaction was held on 9th July on Connect India - Creating Robust Communications Infrastructure and Propel India Presentation on Promoting Next Generation Technologies in India - AI/IOT application in Health and Agriculture Sector and creation of new jobs in rural areas. The other aspects of NDCP will be dealt in subsequent interaction with DoT.

The BIF working group on GPR is chaired by Mr Umang Das. Mr Arun Mukarji, Director – Operations, BIF is the Convenor.

IV. Membership

Membership is of key importance. BIF's Membership has been growing steadily over the years. It saw a 75% increase from last FY's Membership.

No. of Members
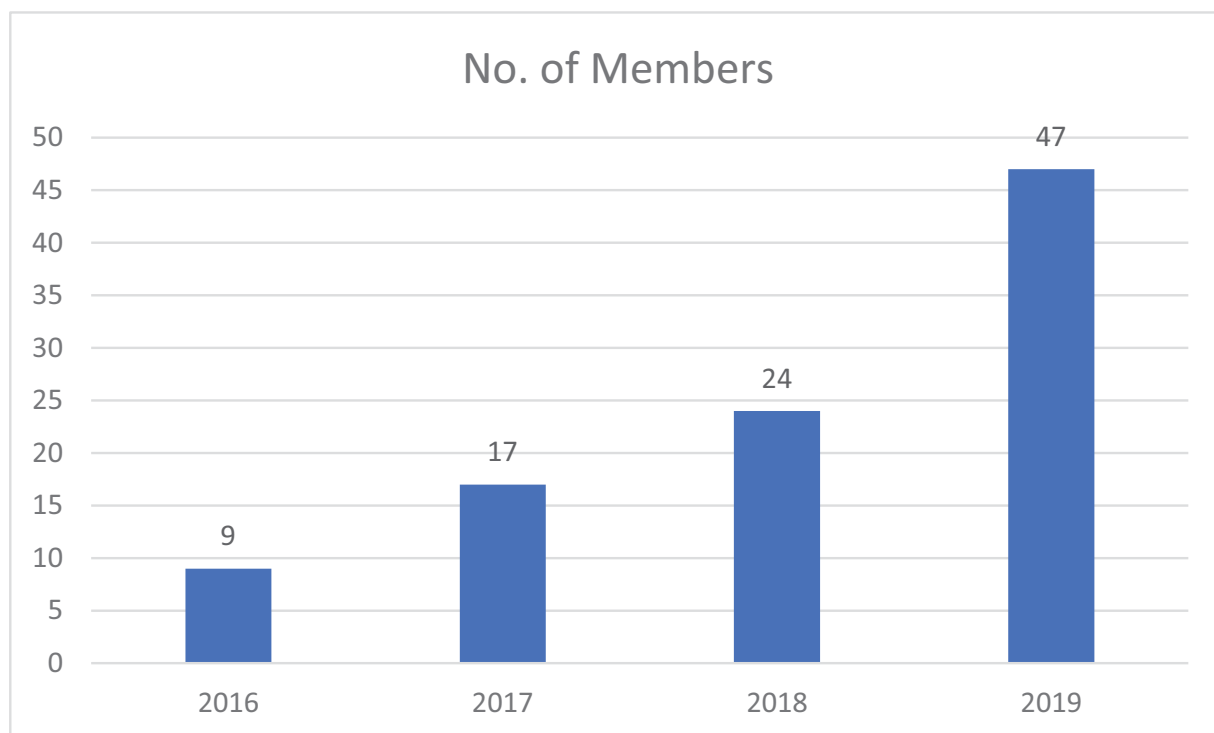
New Patron Members who joined this year are:

New Corporate Member who joined this year is:

New Start-up Members who joined this year are:

Our Esteemed Members

No. of BIF Members - 2019

- Patron — 14
- Corporate — 18
- Academia/Professionals/Startups — 15
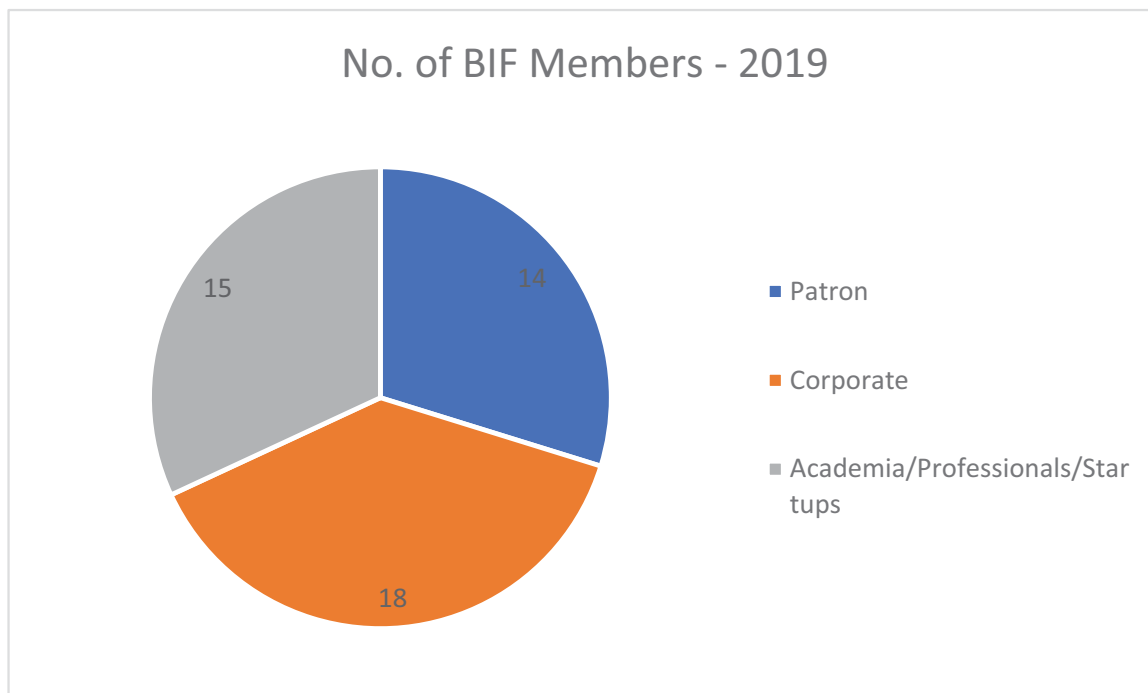
V. Research Reports & Publications

BIF undertakes extensive research to remain up-to-date on opportunities and issues concerning the sector. Since April 2018, about 12 reports have been released.

Publications	Month	Partners
2018		
Standards and Welfare Maximisation - Towards a Competitive and Innovative 5G Ecosystem in India	May	CUTS - BIF
Global Benchmark Analysis of 5G Policies and Initiatives	May	Policy Impact Partners - BIF
Roadmap for 5G in India	May	BIF
White Paper on Virtual Network Operators (VNOs) In India	May	BIF
V Band (60 GHz): The Key To Affordable Broadband in India - A 2018 update	May	BIF
FTTx: Connecting the way to Industry 4.0	Sep	BIF
White Paper on Wi-Fi Liberalisation	Sep	Digi Analysys - BIF
Customer Experience: Variance Due to Smartphones	Nov	Phimetrics - BIF
Growth Dividends of Digital Communications - The Case for India.	Dec	ICRIER - BIF
How to leverage a robust IP ecosystem to monetise investments	Dec	National Research Development Centre & K&S Partners
2019		
Evaluating Spectrum Auctions in India	Apr	ICRIER
Democratisation of Public Wi-Fi in India with delicensing of 5GHz Spectrum Band	Feb	BIF

Here is also a list of White Papers planned to be published before December 2019:
1. White Paper on Data Center with Koan Advisory
2. IoT & AI – Impact on Job Creation potential in Rural India with the adoption of IOT & AI with special focus on Agriculture and Healthcare with Feedback Consulting
3. White paper on Fibre Grid
4. India Satcom Paper with ICRIER
5. Report on Rural Digital Initiatives with ICRIER
6. 5G Procurement & Market Access inputs provided to DOT

VI. Articles for Advocacy and Creating Awareness

BIF has published numerous articles on a number of subjects on Telecom Policy & regulation. These articles have clear underlined principles of being technology, service and company neutral. At the same time, it has brought out the nuances of how a combination of the right technology with right regulation and policy formulation with a view to have fair, transparent and non-discriminatory approach to all the stakeholders and to promote the spirit of fair competition amongst all so as to make broadband more ubiquitous, affordable and more accessible.

This has helped boost the image of BIF and helped in placing BIF in an important position in the overall landscape of policy formulation & regulation on all Telecom, Satcom & IT related subjects.

VII. MoUs and Engagements

BIF has signed MoUs with the following organisations this year:

TSDSI:

❖ BIF is working very closely with TSDSI at different levels.

❖ At the event organised by BIF to celebrate 50 years of World Telecommunication and Information Society Day with the theme of Bridging the Standardisation Gap on 17th May, 2019, BIF has come out with a 10 point agenda to work with TSDSI in bridging the Standardisation Gap.

❖ BIF has been introduced by TSDSI to WWRF to partner for the WWRF 5G Huddle being organised in India in February 2020. The other key participant is ITU-APT.

ETSI:

Mr Anil Prakash met Mr. Luis Jorge Romero, CEO ETSI & Ms. Margot Dor, Director Strategy on 8th May 2018 to discuss the ongoing cooperation and MoU with ETSI.

The key takeaways of the meeting were:

❖ BIF and ETSI MoU be brought in to implementation mode.

❖ ETSI will send expert or use case for BIF AI/IOT & Technology Conference.

❖ Suggest adding a session on Standardisation at India Satcom-2019 where ETSI may send an Expert.

3GPP:

❖ As a Market Representation Partner of 3GPP, BIF will participate in main 3GPP meetings and special events for various standardisation activities.

Skill Development:

❖ BIF has signed an MoU with the Electronics Skill Council of India.

❖ BIF organised a very important event on 3rd July, 2019 to create awareness of the Positive Impact of IoT & AI on the job creation in Rural India with involvement from the National Skills Foundation of India and the Sector Skills Council in Agriculture, Electronics and Healthcare.

This is just the beginning and BIF plans intensive association with these associations to work in the area of Skill Development.

VIII. Increased Engagement with MeitY, MIB, DPIIT, DoS other than DoT

❖ MoCI-DPIIT
- ◆ Draft National E-Commerce Policy

❖ DGFT
- ◆ Draft Trade Policy softwarization

❖ MeitY
- ◆ Data Privacy & Protection Policy
- ◆ Draft Intermediary Guidelines
- ◆ National Software Policy
- ◆ Draft Manufacturing Policy for Electronics

❖ MIB
- ◆ Draft National Broadcasting Policy

❖ MoF
- ◆ Pre-Budget and Post-Budget Considerations for the Sector
- ◆ Policy for Indigenous Manufacturing

❖ DoS
- ◆ Inputs to the Implementation of the IFMC License Service Providers
- ◆ Opening of Ka Band for Satellite Providers

❖ DoT
- ◆ 5G Experimental Spectrum Policy
- ◆ 5G Regulatory & Policy
- ◆ 5G Spectrum Standing Committee
- ◆ Inputs to all the WGs of NPC for WRC-19
- ◆ Draft Guidelines for M2M Service Providers

IX. BIF's Engagement with Wider Industry Chambers like FICCI, PHDCCI, CII and ASSOCHAM

BIF has engaged dedicated resources to work with these industry bodies:	
CII	Mr. Debashish Bhattacharya
FICCI	Mr. Arun Mukarji
PHDCCI	Ms. Neema S Kumar/ Mr. Anil Prakash
ASSOCHAM	Mr. Anil Prakash

X. Engagement with Diplomatic Missions

BIF has established its contacts with the EU, US, Japan and UAE Diplomatic missions and are engaging with them at appropriate time. They are special invitees to all BIF events and meetings.

XI. Website

The Society is having a dynamic website www.broadbandforumindia.com which has been providing information to the members and the general public by and large. BIF revamped its dynamic website. The website has been enabled for use for People with Disabilities (PwDs).

XII. Newsletter

Broadband Bits & Bytes is our quarterly newsletter on trends and perspectives related to Broadband sector in India. The Newsletter focusses on all the key areas such as 5G, spectrum and licensing, content and applications, Satcom, infrastructure, security, new technologies and innovations, which could lead to proliferation of Broadband in India.

This newsletter is an excellent source of information of BIF activities.

XIII. PR

A lot of PR activities were undertaken by the Forum throughout the year. These included media releases on key subjects such as 5G, Public Wi-Fi, spectrum, digital infrastructure, standardization, etc. A series of interviews with Journalist and Telecom experts also formed part of PR activities. Articles and opinions in various magazines and journals were also published. More details are covered in section on BIF in Media.

XIV. Social Media

BIF is actively visible in Social Media such as Facebook, YouTube, Twitter and Linkedin etc.

XV. Accounts

The Society Audited Statement of Accounts for the year 2018-2019 will be discussed at the AGM on 20th August, 2019 in New Delhi.

XVI. Directorate

The Society Directorate is located at Suites 215-216, 1st Floor, DBS Business Centre, World Trade Tower, Barakhamba Lane, New Delhi-110001.

I place my thanks and gratitude to all the Executive Council members who have guided the Forum with their leadership and special thanks to Mr. Anil Prakash, Director General - BIF and the team whose dedication is highly commendable.

I wish the Forum and its members all the success and assure my continued participation and support in all the future activities of the Society.

T V Ramachandran
20 August, 2019, New Delhi

KEY CONTRIBUTIONS AND OUTCOMES

1. NATIONAL DIGITAL COMMUNICATIONS POLICY (NDCP)

BIF worked assiduously with DoT & TRAI for more than a year in helping shape many areas of the Policy in the form it has appeared:

❖ Continuous engagement with DoT and TRAI over 12-14 months.

❖ Recommendations in form of high level policy statements – actionable and measurable developed through a bottom-up multi-stakeholder process.

❖ Broken into 5 capsules mapped onto various DoT Working Groups and detailed input submitted for 10 DoT Working Groups out of 12 in sessions held over a week's time.

❖ Followed by a detailed explanatory memorandum.

❖ BIF welcome the New NDCP, issued in September 2018, aimed at making India a prospering Digital Economy. BIF's GPR Working Group working on the implementation of NDCP 2018.

2. BIF's INTERACTION WITH DOT ON NDCP 2018 IMPLEMENTATION STRATEGIES

❖ DoT-BIF interaction on the NDCP implementation of strategies on Connect India & Propel India was organized on Tuesday, 9th July, 2019 at the Constitution Club of India, New Delhi.

❖ Interaction on Connect India focused on Creating Robust Communications Infrastructure.

❖ Interaction on Propel India focused on Enabling Next Generation Technologies & Services.

❖ More interactions being planned to touch upon other important topics in NDCP 2018.

3. 5G INITIATIVES

❖ Member of the Government's 5G Forum set up to develop the vision, mission and goals for 5G India 2020 - 5G enabled Digital India, Smart Cities & Smart Village missions transforming India into a Knowledge Society. The Forum in its final report in August 2018 made some stellar recommendations on several key issues including:

▶ **Spectrum availability & pricing**

▶ **Regulatory & Policy**

▶ **Education & Awareness**

▶ **Applications & Use Cases**

▶ **Major Trials & Technology demonstrations**

▶ **Development of Domestic Standards**

▶ **Participation in International Standards activities**

❖ Member of the Government's 5G Spectrum Task Force Committee.

❖ Member of the Government's Standing Committee on Spectrum Policy for 5G.

❖ Comprehensive work on 5G roadmap, ecosystem and strategies for India.

❖ Final Report on 5G has been submitted by the 5G HLF to DOT on 25th August 2018.

4. SPECTRUM MANAGEMENT AND HARMONIZATION

❖ **Spectrum for In-flight connectivity**

The Department of Telecommunications (DoT) has notified the rules for enabling in-flight Wi-Fi and calls. This is in accordance with the BIF submission.

❖ **Delicensing of E & V Band**

BIF submitted its Recommendations on the 100 days DoT Action plan.

❖ **Future Spectrum Roadmap for Satellite Broadband Services in India (WRC 19)**

Broadband India Forum organized a workshop as a preparatory process for the WRC 19 to highlight the importance of Spectrum related to Satellite services for the ubiquitous broadband connectivity in India.

❖ **Benefits of Delicensing of 5GHz**

BIF organized a Conference on delicensing of 5GHz band in February 2019 and also celebrated World Wi-Fi Day on 20th June 2019 emphasizing on the benefits of Liberalisation of Public Wi-Fi in accordance with the Gazetted Notification by DoT.

5. SPECTRUM PRICING

❖ Since the announcement of National Digital Communications Policy, one of our key asks from the Government and the Regulator has been 'optimal' auction design and 'optimal' spectrum pricing. As a key action item of the Meetings of Spectrum, Regulatory and Standardization Committee in the past few quarters, regular follow up was undertaken with DoT as well as TRAI for rationalizing the spectrum prices.

❖ TRAI had come out with recommendations on Auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz Bands in August 2018. The reserve prices suggested for various bands are still high and these recommendations assume special importance when India is getting ready for 5G. Spectrum, Regulatory and Standardization Committee, led by Shri Parag Kar, has made presentations to DoT Secretary, Additional Secretary, DoT and TRAI to highlight the issues related to auction design and unreasonable reserve prices. As a follow-up of our recent meetings at DoT, BIF submitted written representation to DoT and TRAI seeking their urgent intervention in the matter. It is now noted that DoT has refered back to TRAI its recommendations on spectrum pricing for review.

6. INDIA SATCOM

- ❖ BIF is majorly involved in regulatory and policy activities related to Satcom Sector.

- ❖ Four Editions of International Satcom Summit have been organized since 2015. The Summits have been graced by Shri Manoj Sinha, Hon'ble Minister of State for Telecom, Shri R S Sharma, Chairman, TRAI and Smt. Aruna Sundararajan, Secretary, DoT. The Summits of 2016 & 2018 have had the blessing of the Secretary, Dept. of Space (DOS) & Chairman, ISRO.. All these Summits also saw participation of domestic and international delegates from global satellite service operators, global inflight connectivity firms as well as top VSAT operators in India.

- ❖ White Papers have been launched each year recommending the regulatory and policy interventions required for the growth of the sector.

- ❖ The key highlight in the last two editions have been the CTO roundtable that gives opportunity to senior leadership of the industry to present their views to DoT.

- ❖ The 5th Edition is scheduled to be held on 27- 28th November, 2019 in New Delhi.

INDIA SATCOM 2018

The 4th International Summit - India SatCom

India SatCom 2018 – 4th International SatCom Summit – organized by the Broadband India Forum along with ICRIER was held at Le Meridian, New Delhi on Nov 20-21, 2018.

7. INTERNET OF THINGS

- ❖ BIF partners with the Institution of Engineering and Technology's (The IET) IoT Panel – an independent and neutral visionary think-tank led by select industry leaders.

- ❖ BIF partnered with Aeris Communications, TCIL, IITH, and the Sector Skill Councils in India of Electronics, Agriculture and Healthcare to organise a Conference to bring out the positive impact of IoT & AI on Job Creation in Rural India with focus on Agriculture & Healthcare.

- ❖ BIF is working with Feedback Consulting to release a study on the job creation potential for Indian Agriculture and Healthcare Sector through adoption of IoT & AI.

8. REGULATORY FRAMEWORK FOR OTT COMMUNICATION SERVICES

❖ BIF participated in the TRAI Consultation process which involved filing of detailed comments, followed by Counter Comments and then two rounds of Open House Discussions, one in Bangalore followed by Delhi.

❖ BIF was able to put its point of view across clearly and cogently across to the Authority, despite there being a full house with many speakers from different sections of the ecosystem who also spoke.

9. STANDARDIZATION

❖ BIF acts as a credible and reliable knowledge platform for Industry, Government, Regulatory and Standards Agencies. BIF has entered into a collaborative MoU with two standards development organisations – TSDSI, the Indian SDO and Organization partner to 3GPP & OneM2M and ETSI, a global SDO that has been very active in India. BIF is already a Market Representation Partner (MRP) of 3GPP.

❖ As a next step, BIF has taken up the task to create an implementation plan to establish a collaborative working model with TSDSI and ETSI. Discussions are ongoing on the scope and working model of the collaboration with TSDSI. Initial definition on the collaboration with ETSI has been evolved and now ready to bring to bring into practice. Additionally, BIF is in the process of signing a MoU with another Global SDO- IEEE.

❖ On the occasion of World Telecom & Information Technology Day, BIF has taken Standardisation Gap Project (SGP) with 10-point action plan. The further work on SGP is planned to be taken up through BIF Committees on Academia Industry Collaboration, & Standardisation with support of start-ups & research institutions.

10. TELECOM INFRASTRUCTURE

Based on the the National Digital Communications Policy 2018 which has indicated in its Connect India Mission the following:

Encourage sharing of active infrastructure by enhancing the scope of Infrastructure Providers (IP) and promoting deployment of common sharable, passive as well as active, infrastructure

❖ BIF has initiated an independent report which suggests Light licensing for Active & Passive Infrastructure for the growth of Digital Infrastructure in India. Such licenses to be provided only to the Telecom Operators, Government Operators and not to any end-user as mentioned under the Indian Telegraph Act 1885. Also, the sharing shouldn't include Spectrum & Numbering resources.

❖ BIF has submitted its report to Department of Telecommunications as well as Telecom Regulatory Authority of India for their valued consideration.

11. INPUT FOR UNION BUDGET 2019-20

❖ BIF submitted to the Government a number of recommendations covering a wide range of topics in the sector for the Union Budget. T.V. Ramachandran, BIF President, was invited to present his thoughts and views during the pre-Budget Consultations with the industry by the MoF.

❖ The thrust of the recommendations was to enhance Digital Infrastructure and Role of Government in enabling the same.
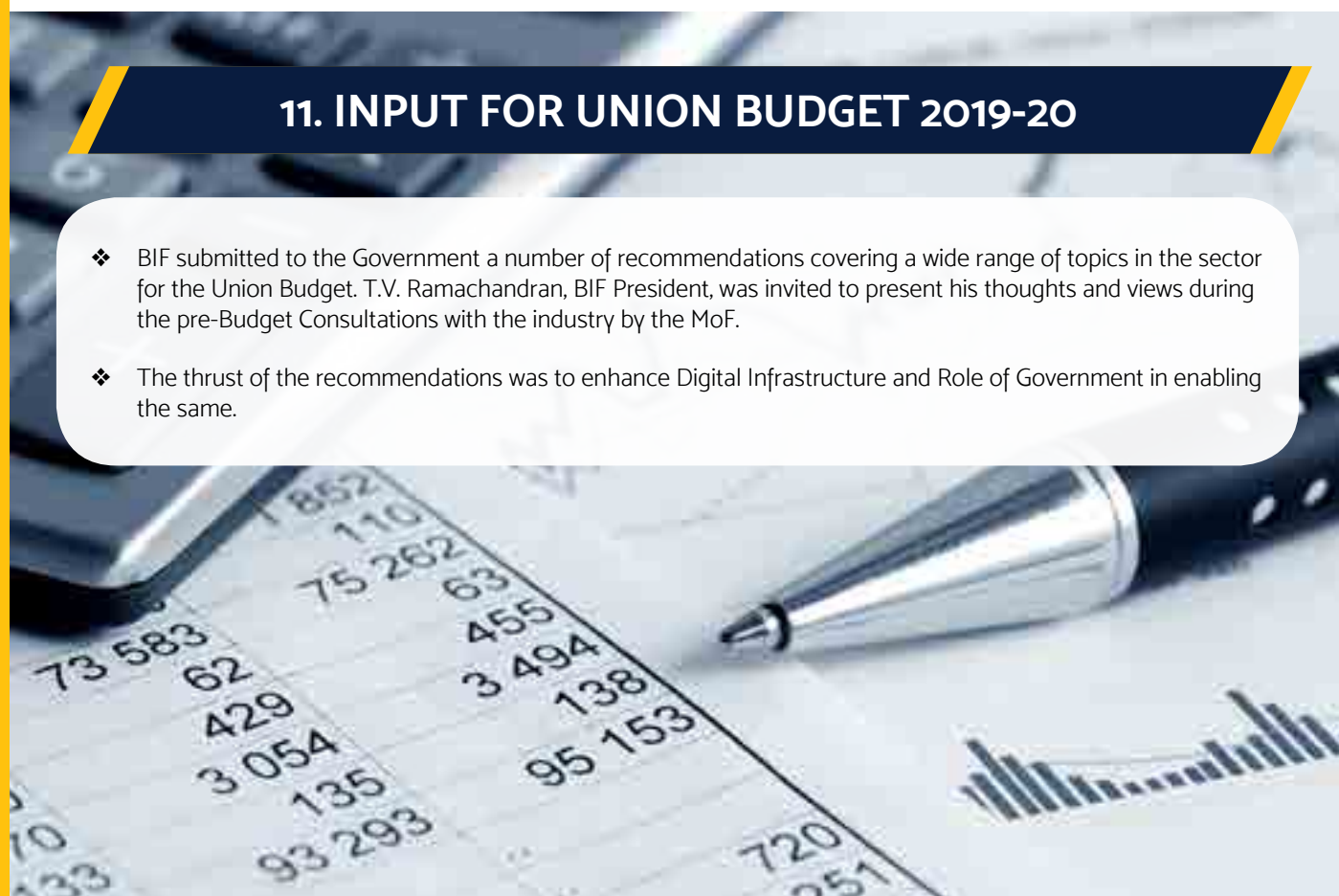
12. FOREIGN TRADE POLICY (FTP) 2015-20

❖ Directorate General Foreign Trade would be reviewing the current policy to facilitate current and futuristic developments domestically and globally to improve and ensure Ease of Doing Business in India.

❖ In response to their consultation, BIF has given its detailed submission comprising member inputs towards creating a globally competitive and business friendly environment for making India a global manufacturing and export hub.

13. INTERVENTION WITH MeitY (MINISTRY OF ELECTRONICS & IT)

❖ BIF submitted its detailed response to the 231 questions posed by the Justice Srikrishna chaired Committee on a Data Protection Framework for India.

❖ BIF was present in all the Four Open Consultations held at Delhi, Hyderabad, Bangalore & Mumbai and actively participated during the proceedings.

❖ BIF submitted its inputs for the draft National Policy of Electronics in Nov 2018. The policy was approved and released in Feb 2019.

❖ BIF also participated in a Consultation on how to make India a Global Marketing Hub for ESDM products including Mobile Handsets. We are also interacting with those concerned with Mobile Handsets manufacturing in MeitY (Jt Secy Mr Sanjay Kumar Rakesh and team) for issues concerning the BIF Committee for Device manufacturing.

EVENTS

UPCOMING EVENTS

India Satcom 2019:
27-28th November 2019

National Digital Communications Policy 2018 -
9th July 2019

IoT & AI Impact on Jobs in Rural India "Special focus on
Agriculture and Healthcare" - 3rd July 2019

**Celebrating World
Wi-Fi Day -
20th June 2019**

**Workshop on "Future
Spectrum Roadmap for
Satellite Broadband
Services in India" -
11th June 2019**

**Celebrating World
Telecommunication
and Information
Society Day 2019 -
17th May 2019**

PAST EVENTS

Celebrating International Girls in ICT Day - **25th April 2019**

Conference on "OTT: A win-win for all" - **5th April 2019**

De-Licensing of 5Ghz for Public Wi-Fi - **15th February 2019**

PAST EVENTS

India-EU Stakeholders' Workshop on 5G Technology Landscape - 5th-6th February 2019

Digital Infrastructure – 6th December 2018

Smart Phone & Customer Experience - 27th November 2018

PAST EVENTS

**India Satcom 2018 -
20-21st November 2018**

**2nd Edition FTTH India
Summit 2018 –
28th September 2018**

**My India Wi-Fi India –
6th September 2018**

PAST EVENTS

**White Paper on
V Band -
31st May 2018**

**V band (60 GHz) is
the Key to Affordable
Broadband in India -
31st May 2018**

**5G India 2018 –
International Conference
& Exhibition –
17-18th May 2018**

Reports & Publications

5G Policies and Initiatives

5G in India

MOBILE DEVICES

DIGITAL INFRASTRUCTURE

GROWTH DIVIDENDS OF DIGITAL COMMUNICATIONS

RADIO FREQUENCY

V band - 60 GHz: The Key to Affordable Broadband in India

THE KEY TO AFFORDABLE BROADBAND IN INDIA

Reports & Publications

OTT APPLICATIONS

PUBLIC WI-FI
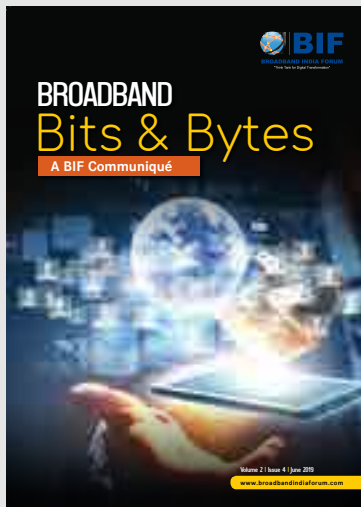

SATCOM

COMPENDIUMS
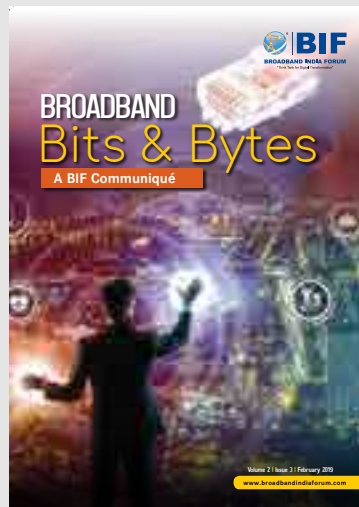

OTHERS BROADBAND RELATED REPORTS
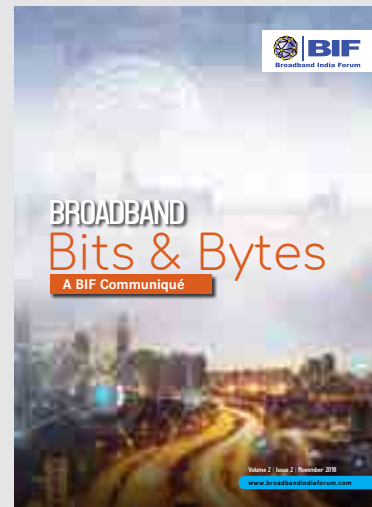
Newsletters

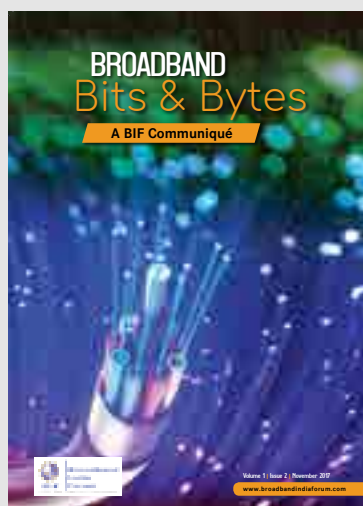JUNE 2019

FEBRUARY 2019

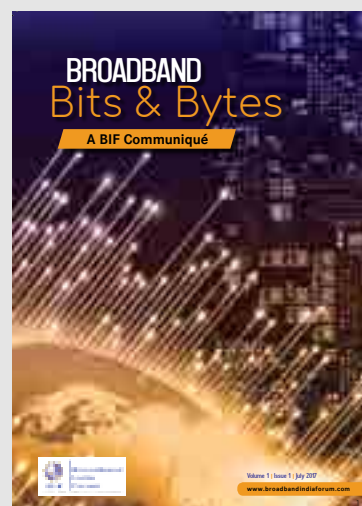NOVEMBER 2018

AUGUST 2018

MAY 2018

MAR 2018

NOVEMBER 2017

JULY 2017

BIF in Media

Chairman, BIF & President, BIF featured in several interviews which were carried over several issues in leading media journals viz. Voice & Data, Tele.net giving their views on the role of BIF and their views of Broadband penetration in India.

Chairman, BIF & President, BIF was also invited to several round table and panel discussions in other events organised by other forums to present their views on Broadband proliferation in India and the enabling role of BIF in this mission.

Broadband Priority

Key to the country's digital transformation

By T.V. Ramachandran, President, Broadband India Forum

India can become digitally empowered only by using broadband connectivity. According to the report, "Growth Dividends of Digital Communications: The Case for India", by the Broadband India Forum and the Indian Council for Research on International Economic Relations, a 10 per cent increase in internet subscribers delivers on average 1.08 per cent increase in GDP output. India is on the verge of a digital tsunami but is underprepared to cope with the onconing deluge. The new National Digital Communications Policy (NDCP), 2018 has given the clarion call to connect all Indians through its "Broadband for All" proposal. Further, digital infrastructure has been accorded the highest priority as it is the lifeline on which all next-generation services will run.

Investment in 5G, AI, IoT and analytics

In recent times, we have seen the Department of Telecommunications taking many proactive steps specifically to address policy, regulatory and spectrum-related issues through its 5G High Level Forum. The forum has taken the right steps in identifying and optimally pricing globally harmonised spectrum to avoid delays related to ecosystem readiness. The Telecom Regulatory Authority of India has already taken up consultation on sub-6 GHz 5G spectrum and its auction. India needs spectrum in sub-6 GHz and mmWave bands (>26 GHz) for 5G-based enhanced mobile broadband to be successful. Specifically, India is taking a position on mmWave bands for IMT on various forums in line with the global ecosystem. A radically changed spectrum auction policy/spectrum usage charge policy is a must for 5G to become a reality.

Investment in digital infrastructure

The availability of more than one type of digital infrastructure at any given place helps ensure that there is no dependency on a single system in case of emergencies or disasters, natural or otherwise. This is essential for India, and will require all necessary elements of digital infrastructure – optical fibre, mobile towers, Wi-Fi hotspots, E and V bands, and satcom. The need of the hour is to invest in high quality infrastructure such as new optical fibre networks, upgrading/replacing existing defective cables, and laying bend- and pressure-resistant fibre cables to increase FTTH capabilities.

Fibre

Mobile access has so far led the broadband growth in the country, with fixed access trailing far behind. A strong fibre backbone not only serves as an alternative technology but also supports wireless access. India has a lot of catching up to do in terms of the total fibre deployed-to-population ratio. India's ratio stands at just 1x as compared to the US at 14x and China at 9x. Additionally, a broadband density of just 13 per cent, compared to China's 81 per cent, presents a huge opportunity for infrastructure planners to design a shared common fibre infrastructure.

Fiberisation of towers

If 5G is to succeed in India, at least 70-80 per cent of mobile towers will have to be fiberised (against less than 20 per cent at present), failing which severe data speed limitations will continue as existing backhaul networks in India use microwave spectrum.

Satcom

There is little realisation that 10 Gbps of data bandwidth is going waste all over India from satellites, while rural India remains starved of connectivity. Satcom is quick and economical to deploy in rural areas as compared to terrestrial technologies. Satcom can become far more affordable through the adoption of modern technologies and through optimised policies and regulations. For the first time, this unexploited sector has received elaborate and fair treatment in the NDCP.

Public Wi-Fi

The fastest way to scale initial internet access is through public Wi-Fi hotspots. One hotspot in India currently serves a whopping 37,500 people, while in the US, there is one for every 2,000 people, South Africa has one for every 3,500 people and Nigeria has one for every 13,800 people. India's goal is to grow to 10 million hotspots in the next five years. If India does not take the giant leap of digital progress, it risks being left behind in the global digital race.

E and V bands

Alternative and cost-effective technologies are the only solution to build an inclusive Digital India. E and V band technologies are being rolled out world over to build high-capacity broadband networks in both urban and rural areas.

Other key factors

The proliferation of broadband services to every nook and corner of the country will depend on the availability of content and data apps in vernacular languages, which can benefit the youth to enhance their capabilities and earnings as well as take health, agriculture, education and other government and social services to the entire country, for a truly inclusive society. ▲

(The author is an Honorary Fellow of IET [London]. The views expressed here are his personal views. The article includes research inputs by Garima Kapoor and Abhijit Panicker.)

FINANCIAL EXPRESS

Fibre to Everything

FTTx emerges as the network of the future

Fibre-to-the-x (FTTx) is emerging as the ideal solution for providing last-mile connectivity. In light of the growing digitalisation efforts and rising data demand, FTTx deployments have become imperative for building future-proof telecom networks. However, to achieve widespread fibre penetration in the country, challenges related to right of way (RoW) need to be addressed. Industry experts share their views on the current state of FTTx deployments in India and the outlook for the segment…

What promise does FTTx technology hold for the Indian market?

Murtuza Onali Kachwala, Managing Director, Telecom, Media and Entertainment Industry Practice, Protiviti, India

The increasing demand for higher bandwidth, optic fibre in backhaul, and triple- and quad-play services are the key factors driving the FTTx market growth. Governments across Asia are encouraging investment in high capacity networks. For developing countries in Asia, such as India, with their rapidly increasing data traffic, it will be critical to continue investing in broadband infrastructure in order to remain economically competitive.

T.V. Ramachandran, President, Broadband India Forum

India is marching towards digitalisation and the national objectives of Digital India and Broadband for All are focused on providing high capacity multi-gigabit access and backbone networks everywhere. Wireless networks alone cannot handle massive data volumes and need to be complemented with fibre owing to its high bandwidth carrying capacity. The three key drivers for the deployment of fibre are increasing demand for data, move towards 5G and the government's growing digitalisation thrust. The fiberisation of towers is a must if India has to usher in 5G. All major telcos in India have introduced low-cost fibre-to-the-home (FTTH) plans, which are expected to create and boost demand.

Thus, the market for FTTx is extremely vibrant and holds enormous promise.

What is the current state of FTTx deployments in India? What are the key challenges that the market faces?

Murtuza Onali Kachwala

India is far behind many countries in FTTH penetration. FTTH connections account for a mere 0.5 per cent of the total broadband connections in the country. According to a report by iDate Research, Singapore has 95 per cent FTTH penetration, South Korea 82.9 per cent, Hong Kong 71.4 per cent and Malaysia 16.4 per cent. China has seen 70 per cent growth in FTTH subscribers in the past one year alone. A major challenge that FTTx deployments face is obtaining permissions for RoW. There is an immediate need to bring a policy initiative to address RoW challenges so that multiple clearances at local levels can be eliminated.

In the past few years, there have been excessive changes, which have created a data-addicted environment that is supported by high speed internet. As a result, FTTx has become an integral part of telecom infrastructure. Operators are heavily investing or planning to invest in fibre-based technology for supporting speeds of up to 1 Gbps and more. The most common technology used is GPON, which ensures efficient and cost optimal FTTx deployments.

T.V. Ramachandran

The total fibre deployed to population ratio of India is 1x, far behind comparable regimes like the US and China, where the fibre deployment ratio stands at 14x and 9x respectively. We are at least four to five years behind China in terms of last mile connectivity. Further, there are only 1.25 million FTTx connections in India, and the fiberisation of towers is at a bare minimum level of 22 per cent. In addition, an overall broadband density of around 30 per cent (fixed broadband at a low level of below 4 per cent), compared to China's 81 per cent overall (fixed broadband density at over 60 per cent), presents a huge opportunity for infrastructure planners to design a shared common fibre infrastructure for all kinds of service providers.

Fibre roll-out in India has been slow due to several challenges such as limited policy support, lack of skilled workforce, high RoW charges (which range from Rs 0.1 million to Rs 5 million per km), high cost of customer premise equipment and optical line terminal, lack of relevant applications and content to support business case for FTTH, and lack of awareness in the rural segment. Moreover, the faulty interpretation of the RoW rules by different state and local municipal bodies has resulted in cost variances and delays.

How has the competitive landscape of the FTTH market changed post the entry of Jio GigaFiber?

Murtuza Onali Kachwala

Reliance Jio Infocomm Limited (RJIL) recently announced the launch of its much-awaited FTTH broadband services in India, called RJIL's GigaFiber. The project has been in development for a few years now with pilot programmes running in select areas. Jio's entry will spark competition in the broadband business and boost

TV RAMACHANDRAN

The author is honorary fellow of the IET (London), and president of Broadband India Forum. Views are personal

Getting spectrum prices right

Consumers and the economy lost at least ₹5 lakh crore due to earlier auctions. If we can get spectrum prices right, we can ensure India does not miss its golden chance to get on the digital highway with 5G spectrum not lying 'idle' but put to 'ideal' use. Else, the loss to the economy and consumers could mount by several lakhs of crores of rupees more

(Research inputs by Garima Kapoor and Kartik Berry.)

'To be a digital sovereign power, we need 5G'

RAJESH KURUP
Mumbai, July 4

The telecom industry is on the cusp of another revolution, and this time 5G is the buzzword. The industry, which is reeling under a massive ₹4-lakh-crore debt, has placed its bets on mobile data explosion for its revival.

In an interaction with *BusinessLine*, TV Ramachandran, President of Broadband India Forum (BIF) — a think-tank working for the development of broadband ecosystem — throws light on India's 5G readiness.

Ramachandran was the Chief Executive Officer of one of the first cellular ventures in India — Sterling Cellular (Essar Cellphone) — and also the first Chairman of the India Interest Group of GSM MoU Association.

TV, as he is popularly known, had set up the industry body Cellular Operators' Association of India and led it for 12 years. Excerpts:

Why is there is a hype around 5G, and what can it offer that 4G couldn't?
The fact is that 4G is very good. It's mobile broadband and can do a lot of things. The way data is exploding in India, with an annual growth rate of 23 per cent from 4.6 exabytes recorded in 2018, a lot of that being video traffic, the crunch in capacity is becoming dense.

Although 4G is much more efficient than 3G, a more energy efficient technology, there are certain applications that cannot be met with 4G.

In an economy like ours, which is so deficient in healthcare, it is difficult to increase the number of surgeons and doctors overnight.

5G makes robotic surgery possible, especially in rural areas, which is a desperate need in India.

It comes with low latency, a blessing for critical manufacturing, and also enables industries to set up more units in rural areas with cheaper plans.

Better traffic management and higher speeds enable downloading of a two-hour movie in just 5 seconds or so.

To be a digital sovereign power, we need 5G.

It is inevitable for a country like India.

What would be the band on which India will roll out 5G?
We expect 5G rollouts on a combination of bands; nobody can work on a single band.

We need multiple-input and multiple-output (MIMO), Millimetre Wave (MM Wave) and also sub-Giga Hertz wave.

We need coverage and capacity, so it would begin with 600 MHz, which is broadcasting spectrum, and go up to Millimetre Wave (2.4 GHz and above).

How about using E and V band

5G makes robotic surgery possible. It comes with low latency, a blessing for critical manufacturing, and enables industries to set up more units in rural areas

TV RAMACHANDRAN
President, Broadband India Forum

spectrum for last mile connectivity?
E band (71-76 GHz and 81-86 GHz) is what I term as wireless fibre due to its fibre-like capacity, even as it retains wireless capabilities.

It has the ability to carry 1-2 GBPS of data.

We have E and V band (57-66 GHz) spectrum, of which E is more suitable for backhaul.

These would help in eliminating Right of Way and last-mile connectivity issues.

The telecom industry is already saddled with a debt of about ₹4-lakh crore and needs to spend another ₹1-lakh crore in the next 2-3 years for fiberisation to support 5G?
The overall costs of 5G roll outs would be at least ₹4-5 lakh crore in the next 3-4 years.

This is not only for fiberisation but also for overall costs that include spectrum charges, infrastructure and roll out plans.

And this need not be per operator as the entire expense could be shared by the industry.

We need to share active and passive infrastructure, spectrum and radio access network among others; without active sharing, it would be difficult to meet these challenges.

In the short term, the industry needs at least ₹5-lakh crore to take 5G seriously, and this is only for some select

rural areas.

The roll outs would happen more across metros but there will be select rural locales, where it's a challenge to provide any of the essential services.

How ready is India for 5G?
In June, the government had promised to allocate 5G trial spectrum within 100 days.

Some of our vendors were ready as early as December last year and January this year to start 5G trials.

We are ready with infrastructure and equipment, and following the trials it would take 6-9 months, can't be less than that, for the commercial roll out.

There are some spectrum held by Government (Defence), which was also to be vacated for 5G…
There were some challenges on certain bands of satellite spectrum, which have been resolved.

Articles

Public Wi-FI

Hotspots for All: Public Wi-Fi could provide ubiquitous broadband access

Liberalised Wi-Fi could trigger over Rs 1,00,000 crore of national economic activity

Public Wi-Fi: The next giant digital leap India needs to take or risk being left behind

Spectrum

Getting spectrum prices right

Telecom trouble: Spectrum usage charge or surely unjustified charge?

Telcos Still Starved of Spectrum

Broadband forum asks govt to allocate spectrum in 700 MHz, 850 MHz for 5G (just a news update)

5G

The great Huawei conundrum – Why India can't afford to fall behind in 5G technology on speculative fears

Digital India will have little meaning without 5G

5G can happen only if fibre connectivity is increased manifold in India

Changing the Game: Implications of 5G for other verticals

TRAI's 5G auction guidelines fall short

Over the Top - OTT

Future-Proofing Indian Telecom – Content Delivery Networks

OTT streaming explodes in rural India thanks to Jio

Why cut off one's nose to spite one's face??

Why telcos and OTTs need to band together to drive digital future

IoT

Blockchain is the best vehicle for IoT

India must get on the IoT highway fast

India's digital pathway: Not roses all the way, thorns aplenty, too

Is India up for the IoT challenge?

Data Localisation

India may be wrong in insisting on storing user data locally; storage not same as control

The negatives of data localisation

Data Protection

Innovation in the age of data protection

Srikrishna committee report: Draft privacy Bill impractical and protectionist

Other Articles

The Hyper-Connected Enterprise

Broadband Priority: Key to the country's digital transformation

Broadband for all: Why we aren't talking about the quality of digital infra?

Telcos may take Rs 6,000 crore knock on import duty hike

Why telcos must ring in blockchain tech

TRAI's little-known pro-customer ruling is a tech-based trailblazing measure to end menace of pesky calls and SMSs

IPR in Digicomms era: An essential constant amidst welcome changes

Digital Infrastructure Comprises Several Vital Elements

Many hills to climb before Digital India

Govt wants to know from telcos if social media apps like WhatsApp, Facebook can be blocked

India ranks below Kenya, Bangladesh, Pakistan in urban-rural mobile ownership

Trai has failed to suggest ways to make India a global telecom R&D hub: BIF

Telcos' demand for V-Band spectrum auction is anti-consumer and anti-Digital India: BIF

The Need for Upgraded Quality Optic Fibre Cables for High Bandwidth
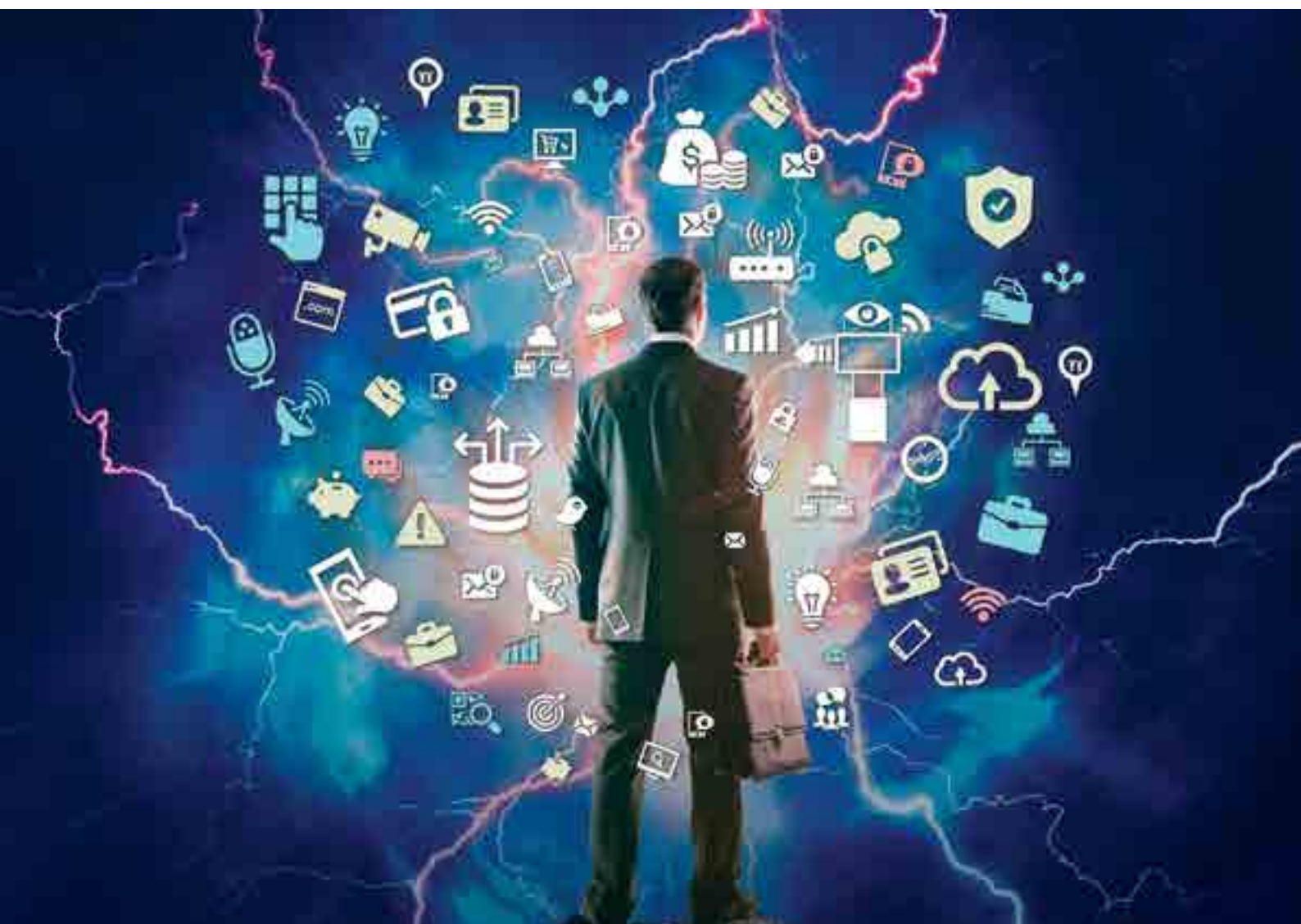
BROADBAND
SECTOR DATA
OVERVIEW

BROADBAND SECTOR DATA

I. BROADBAND SUBSCRIBERS COMPOSITION
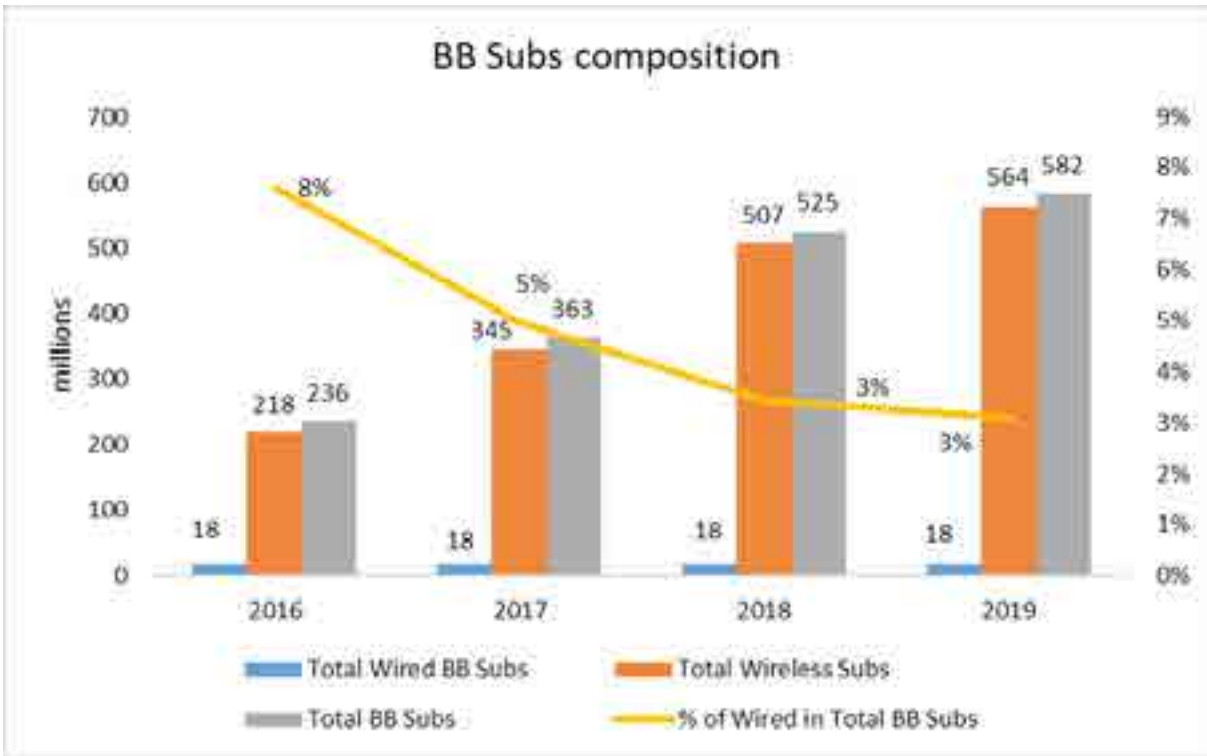
Source: TRAI

II. BROADBAND SUBS COMPOSITION- TECH. WISE
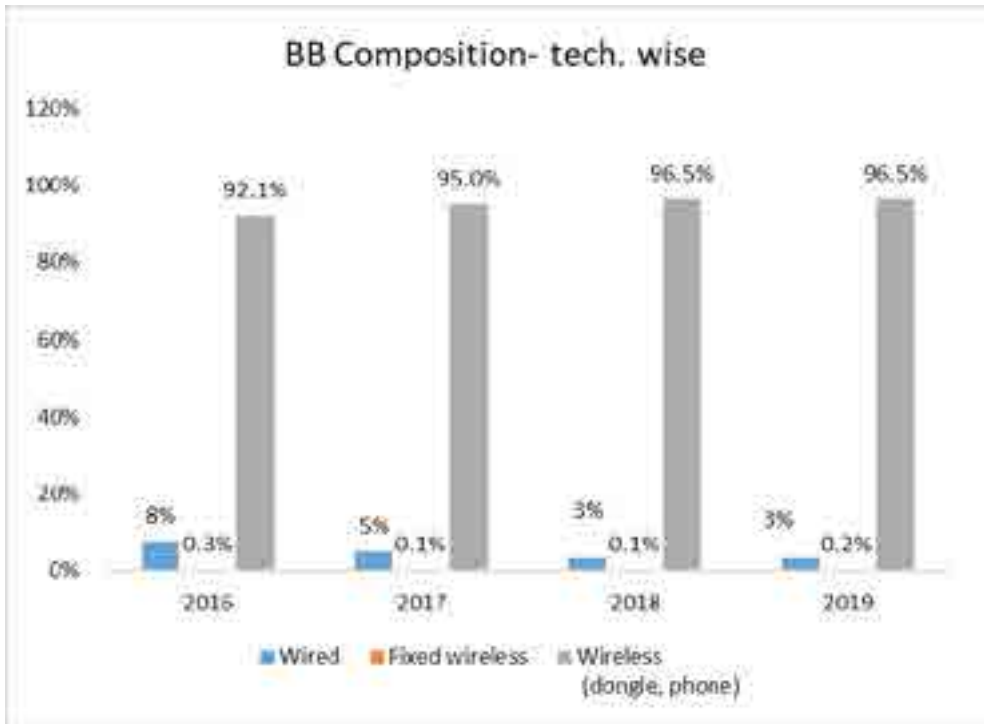
Source: TRAI

III. TOTAL INTERNET SUBSCRIBERS
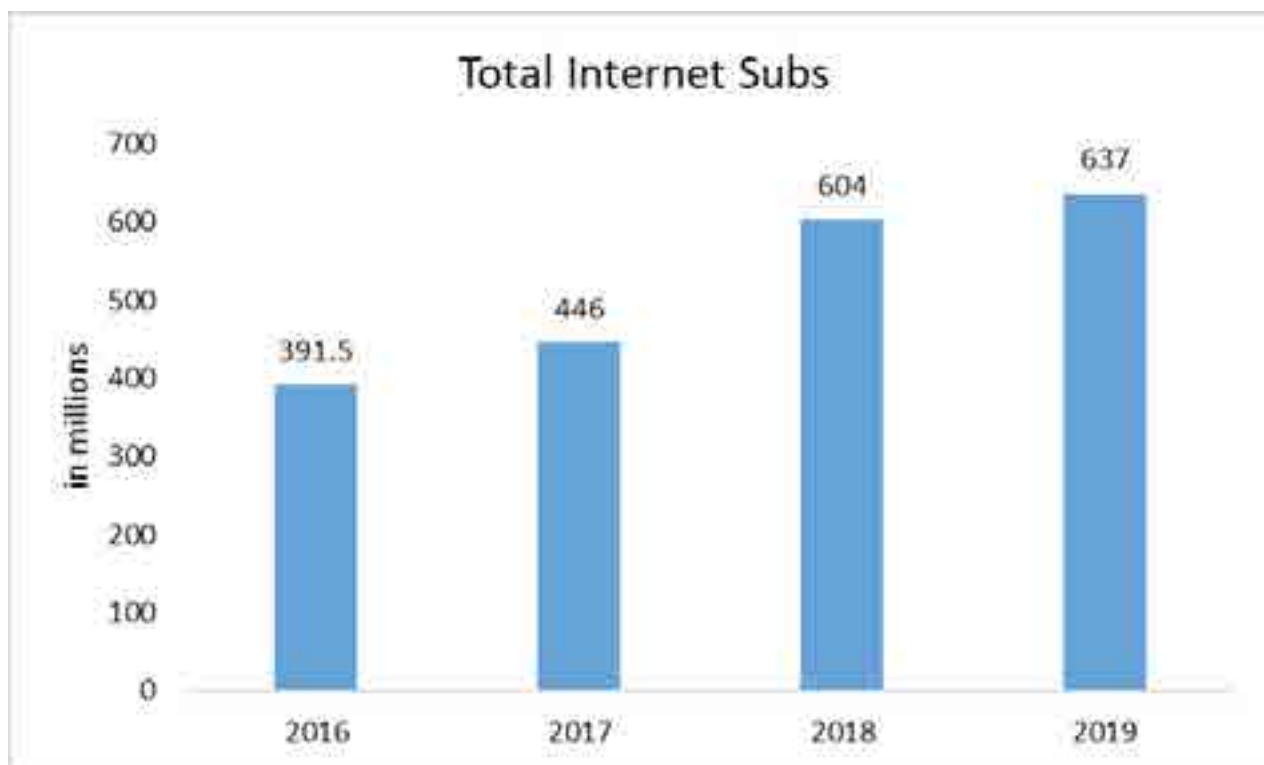
Source: TRAI

IV. DATA USAGE PER SUBS PER MONTH
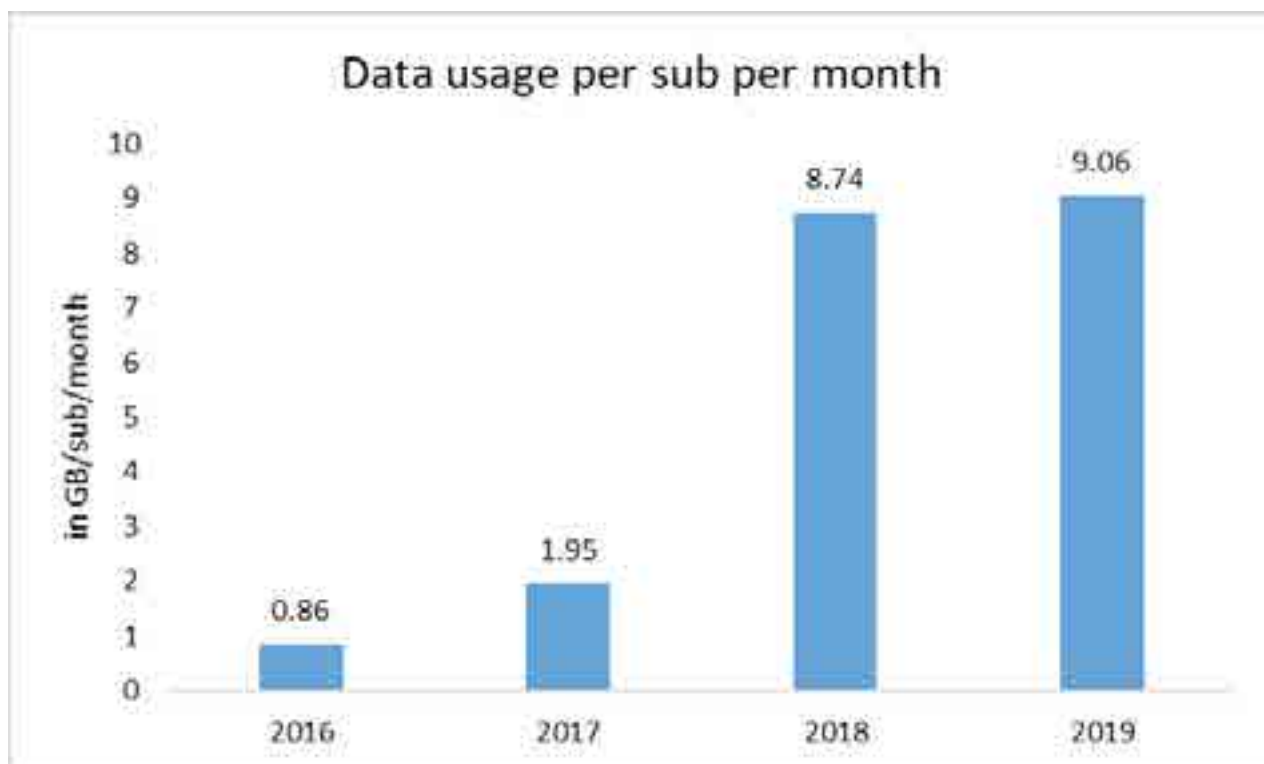
Source: TRAI

V. WIRELESS ARPU

Wireless ARPU
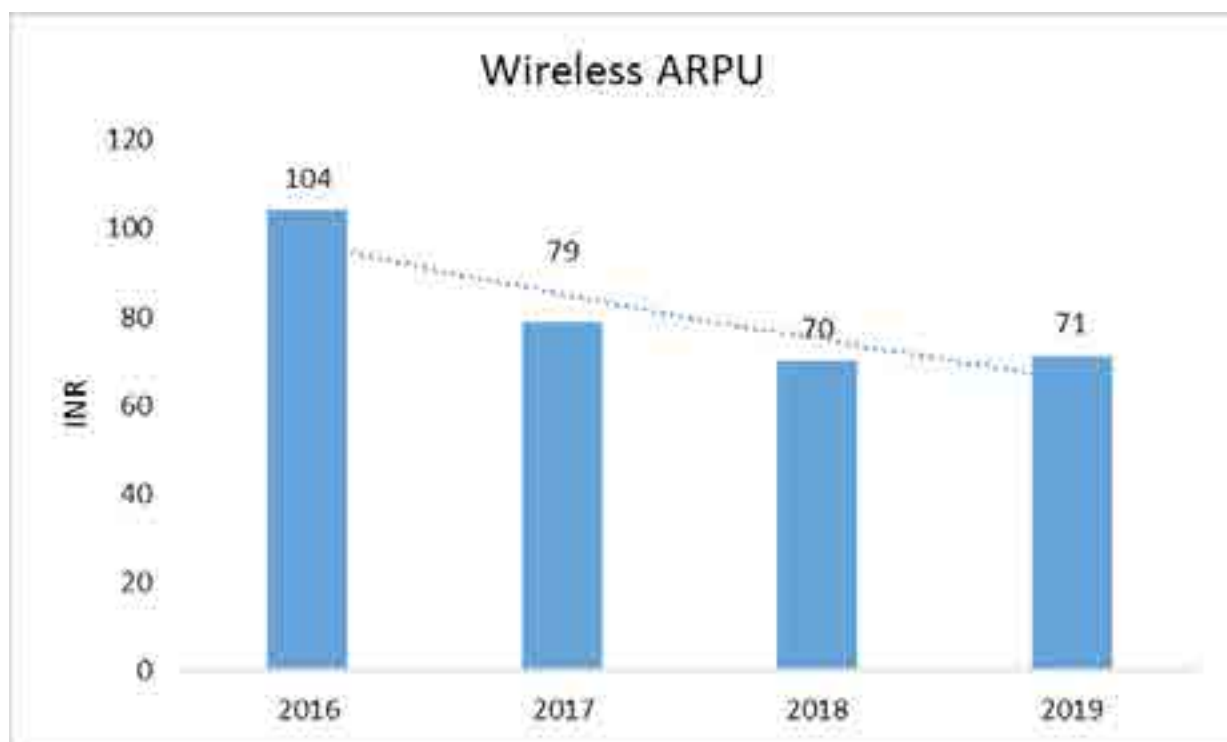
Source: TRAI

VI. GSM MoU PER SUBS PER MONTH

MoU GSM
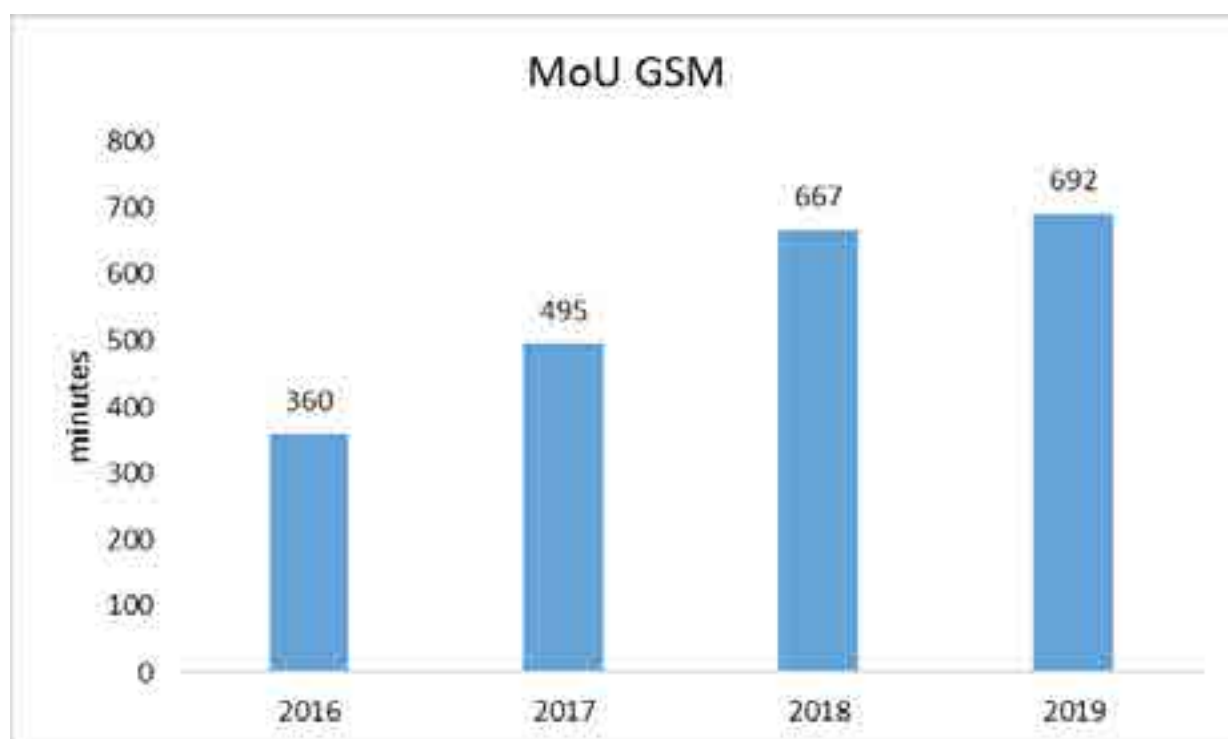
Source: TRAI

VII. HOURS SPENT IN TOP 5 STREAMING APPS
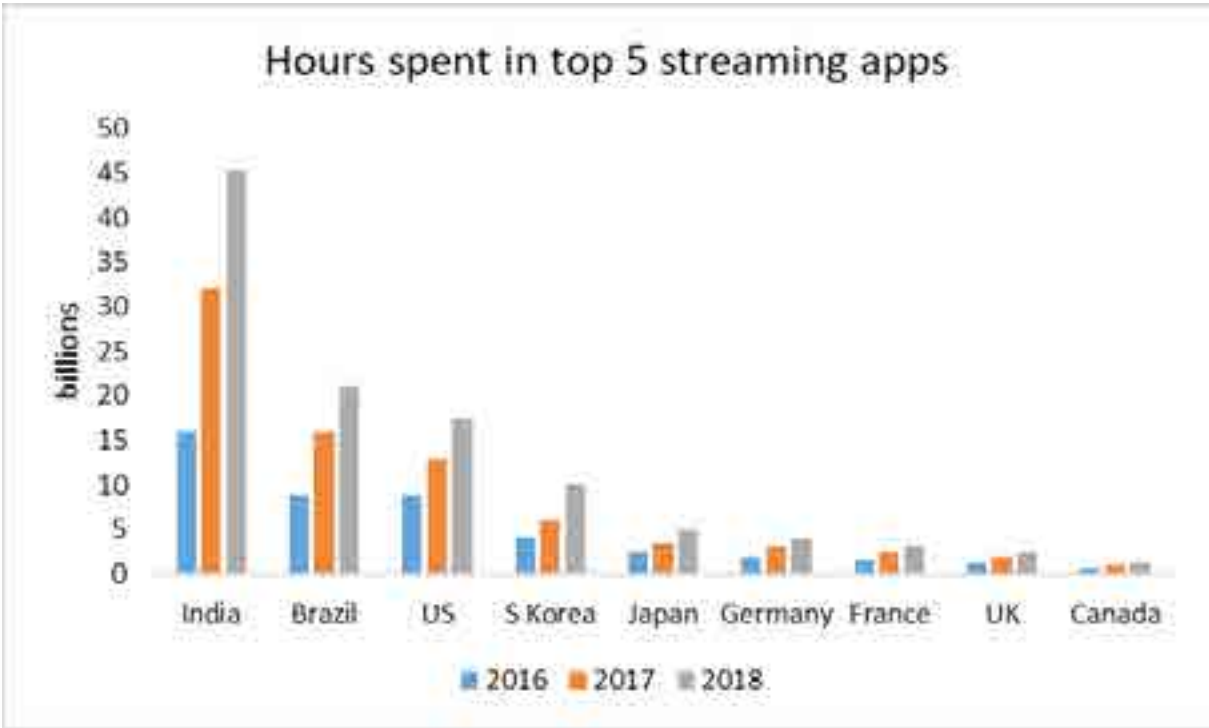
Source: App Annie 2019

VIII. MOBILE DATA TRAFFIC PER SMARTPHONE
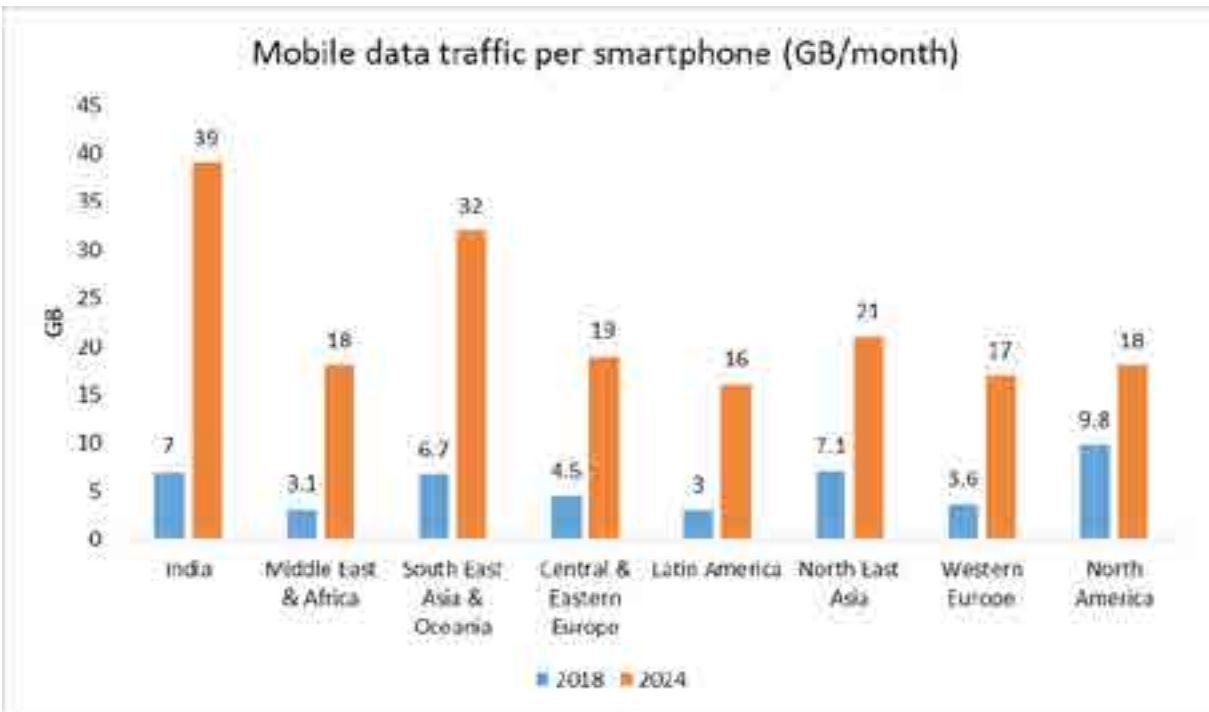
Source: Ericsson Mobility report

IX. REGIONAL MOBILE DATA TRAFFIC
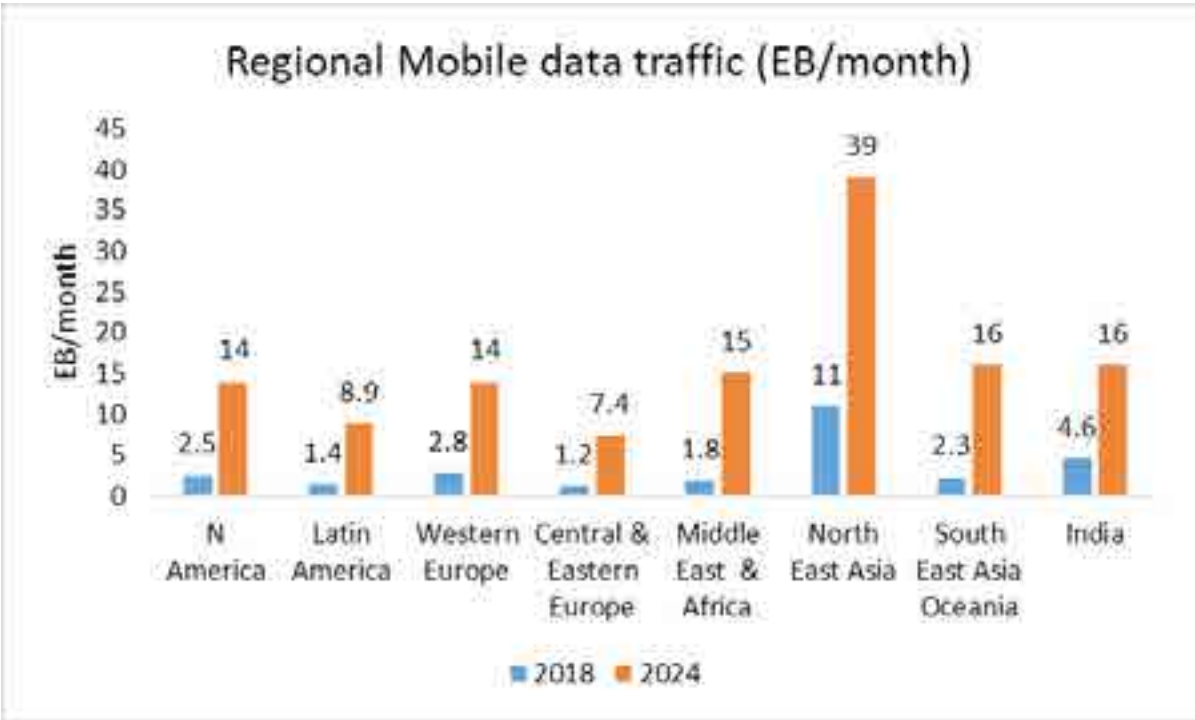
Source: Ericsson Mobility report

X. AVERAGE MOBILE DATA USAGE PER MONTH vs BB PENETRATION
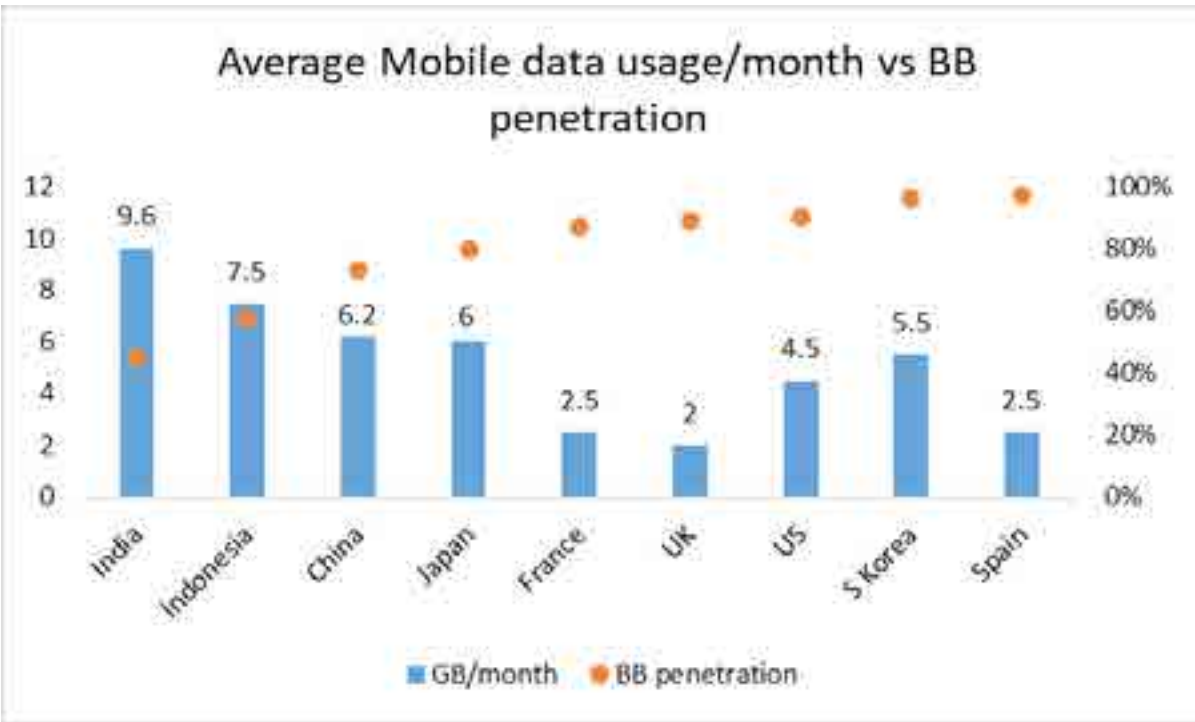
Source: Nokia MBiT report

ABOUT
THE FORUM

About Broadband India Forum

Broadband India Forum (BIF) functions as a policy forum and think-tank that works for the development & enhancement of the entire broadband ecosystem in a holistic technology-neutral and service-neutral manner. BIF seeks to be a thought leader and a credible and effective voice to help propel the nation to achieve the country's ambitious vision of creating a Digital India. To achieve this, BIF works to promote the rapid development of policies to promote affordable and high speed ubiquitous broadband throughout the country.

Registered as IPTV Society, its brand - BIF was formed in October 2015 and is a fairly nascent but dedicated Forum with participation from all stake holders, including Technology Providers, Telecom Operators, Internet Service Providers, Value-Added Service Providers, Satellite Operators and service providers, MSO, Broadcasters, startups and professional entities as well as seasoned Industry professionals who are familiar with different technologies, operations, regulations and policies.

The Forum's senior leadership team includes renowned and respected professionals from background of Industry, Regulator and Government.

1. Mr. Shyamal Ghosh, Former Secretary-Telecom and co-founder of IPTV Society, is the Chairman Emeritus.

2. Mr. M. F. Farooqui, IAS (Retd.), former Secretary-Telecom, is the current Chairman.

3. Mr. T. V. Ramachandran, Hon. Fellow of the IET (London), former Resident Director-Regulatory Affairs and Government Relations, Vodafone, and first Director General of COAI, is the President of the Forum.

4. Mr. Parag Kar, Sr. VP Govt. Affairs, India and South Asia-Qualcomm and Mr. Ashwani Rana, Head Connectivity Policy-Facebook are current Vice Presidents.

5. Mr Anil Prakash is the Director General.

6. Mr. S. N. Gupta, seasoned technocrat and senior luminary who has worked in DoT and as a Principal Adviser to TRAI (Regulator) is the Treasurer.

BIF functions through many specialist committees for the advocacy, coordination, facilitation and promotion of all activities with the objective of furthering the goals of the National Telecom Policy in Spectrum, Licensing and Standardisation, Broadband Infrastructure, Manufacturing Rural Digital Initiatives, Content & Applications, SatCom & Broadcasting, 5G, New Technology & Innovations, IoT and ICT for Inclusive Ability.

The activities of the Forum broadly relate to coordination, promotion and formulation of expert opinion on topical subjects related to Broadband. To act as a bridge between Industry on one side and Government and the Regulatory Bodies on the other, front ending several issues related to policy & regulation.

Online Presence

🌐 www.broadbandindiaforum.com

f www.facebook.com/broadbandindia forum

▶ www.youtube.com/ broadband india forum

in https://in.linkedin.com/company/broadband-india-forum

🐦 @connectbif

BIF
BROADBAND INDIA FORUM
"Think Tank for Digital Transformation"

Members

Senior Leadership

The Senior Leadership Team comprises of renowned and respected professionals from both the Industry and the Government.

Shyamal Ghosh IAS (Rtd)
Former Secretary - Telecom & IT Govt. of India and first Administrator of the USO Fund, Chairman Emeritus, BIF

M.F Farooqui, IAS (Rtd.)
Former Secretary - Telecom of the Govt. of India
Chairman, BIF

T.V Ramachandran
Founder & CEO of advisory@TVR, President, BIF

Anil Prakash
Director General, BIF

Other notable leaders who lend their knowledge and acumen to BIF include:

Ashwani Rana
Vice President - BIF

Parag Kar
Vice President - BIF

S.N Gupta
Treasurer - BIF

C S Rao
Chief Mentor - Technology

Arun Seth
Chief Mentor

Umang Das
Chairman, WG on GPR

Panel of Honorary Principal Advisers

Abhishek Malhotra

Air Cdre S.S. Motial

A.K Bhatnagar

B K Syngal

D P Singh

Dr. B M Baveja

Dr. Kuldip Singh

Dr. Mahesh Uppal

Rajesh Mehrotra

J. V. Ramamurthy

K V Seshasayee

P K Garg

Pranjal Sharma

Sudhir Gupta

Valsa Williams

Ravi Kant

Directorate

Dr S M Sharma
Sr. Advisor (Radio Regulation)

Krishna Sirohi
Sr. Advisor (Technology)

Debashish Bhattacharya
Sr. Director - Technology & Policy

Arun Mukarji
Director - Operations

Neema Sunil Kumar
Director - Project & Coordination

Garima Kapoor
Consultant

Kartik Berry
Consultant

Anand Gupta
Dy. Director - Govt. Relations

Abhijit Panicker
Sr. Analyst – Research

Swapnil Shukla
Executive - Membership & Programmes

Committees

5G	AI & IoT (Big Data, Data Analytics, MTC)
Broadband Infrastructure	Content & Application
ICT for Inclusive Ability (PwDs)	Industry-Academia Cooperation for Capacity Building
Manufacturing - Mobile Devices	Manufacturing - Network
New Technologies & Innovation (Robotics & Cloud Computing)	Rural Digital Initiatives
Satcom	Spectrum Regulatory Framework & Standardisation
Technology, Media & Telecom (TMT)	Working Group on GPR

Partnerships & Engagements

CUTS International	**Co-operation Agreements with CUTS**
IET The Institution of Engineering and Technology	**Co-operation Agreement with Institution of Engineering & Technology (IET)**
ETSI	**MoU signed with ETSI**
tsdsi	**MoU signed with TSDSI**
5G IA INFRASTRUCTURE ASSOCIATION	**Engagement with 5GIA**
ESSCI	**MoU signed with ESSCI**
3GPP A GLOBAL INITIATIVE	**3GPP's Market Representation Partner. Participation in Standardisation Activities-ITUWP5D, APG Prep Meeting for WRC-19 & 3GPP Plenary #79**
Department of Telecommunications	**President, BIF was nominated as member in the "High Level Government Forum for 5G India 2020"**
MACQUARIE University	**Engagement with Macquarie University**
IEEE Advancing Technology for Humanity	**Engagement with IEEE**

SNAPSHOTS OF BIF'S AGM (2015 - 2018)

8th AGM & Round Table Discussion:
Telecom Infrastructure – Backbone of Digital India
28th September, 2015 at the Hotel Le Meridien, New Delhi

Mr. T V Ramachandran took over as President, BIF from Colonel Mahesh Khera

Chief Guest – Smt Aruna Sundararajan, Administrator, USOF
Special Guest of Honor – Late Shri Peeyush Agarawal, Member (T), DoT

9th Annual General Meeting of BIF
14th October, 2016 at the NMS Wellness Center, New Delhi

10th AGM and 10 year celebration

14th July, 2017 at the Shangri-La Hotel, New Delhi

At the 10th AGM, BIF celebrated its 10th Anniversary. On the occasion, a report by ICRIER on 'Estimating the Value of Next Generation Internet based Applications in India' was released.

Chief Guest - **Hon'ble Shri Manoj Sinha,** MOS (IC), Ministry of Communications was the Special Guests of Honour - **Smt. Aruna Sundararajan,** Chairperson DCC & Secretary, Telecom
Shri Anil Kaushal, Member, TRAI
Dr. Rajat Kathuria, CE, ICRIER

11th AGM marked the Celebration of

'Digital Transformation of the Indian Telecom Sector'
18th July, 2018 at the Hotel Le-Meridien, New Delhi

Chief Guest - **Dr. R.S . Sharma,** Chairman, TRAI
Special Guests of Honour - **Smt Aruna Sundararajan,** Chairperson DCC & Secretary (Telecom)
Dr. Rajat Kathuria, Chief Executive, ICRIER

Notes

Notes

Notes

Notes

BROADBAND INDIA FORUM

"Think Tank for Digital Transformation"

Annual Report Development Team:

Garima Kapoor, Abhijit Panicker and Neema S Kumar