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An Exclusive Whitepaper by Frost & Sullivan on
**Industry Outlook for the Indian
Telecom and Broadcast Industry**

Digital India takes on a new meaning as accelerated connectivity and over-the-top applications power the market

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F R O S T  S U L L I V A N

Foreword

- ❖ India is poised to be among the top five economies in the world by 2020. Home to over a billion mobile subscribers and the second largest Internet user base in the world, it will become a key force of reckoning for global business, policy, and technology advancement.
- ❖ Due to the proliferation of smart devices and reasonable broadband speed at competitive prices, the Indian consumer is now hooked to virtual applications—from digital payments to over-the-top (OTT) video, from social networking to personal well being. Mobile devices are gaining currency, literally and figuratively. To drive this further, the Indian Government has embarked upon a journey of establishing a connected ecosystem for its people and industries. Deploying a country-wide fibre network and providing public Wi-Fi connectivity are crucial mandates for driving the Digital India and Make in India initiatives.
- ❖ The forecasts for ‘Digital India’ look good. 4G smartphones will comprise 75% of 170 million phones to be shipped in 2017. Wireless connectivity will become ubiquitous over the next five years. Rural Internet users will grow by 40% annually for the next three years, and video consumption on the Internet will grow five-fold by 2020. In addition, the IoT market in India will grow to \$16.7 billion by 2022, as per Frost & Sullivan estimates.
- ❖ Such rapid development will come in but at a significant cost to the industry. The balance sheet of most stakeholders in the telecom and broadcast industry is strained by investments in infrastructure development (4G and fibre) and content development. The other primary challenges for industries today are digital transformation and automation. With technologies such as artificial intelligence, machine learning, and analytics permeating every single application and process, there are large-scale disruptions, requiring industrialists to re-engineer their entire approach to product innovation and services.
- ❖ This rapid evolution requires enterprises and industries to advance with a sound digital transformation strategy for existing business lines, new business models, and technology. This Frost & Sullivan-Convergence India outlook report provides insights on the trends impacting the telecom and media sectors.

Vidya S. Nath

Research Director,

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Executive Summary



Connectivity Moot to the Digital India Dream

The ubiquity of connectivity in consumer and business segments requires a future-proof and reliable communication network infrastructure.

Exhibit 1: Connectivity and Device Facts, India, 2016

60% of the of total Internet users in India have access to the Internet on their mobile phones.



The number of smartphone users in India grew to 239 million by the end of 2015; expected to be 702 million by 2020.

4G/LTE device shipment reached 5.7 million units in India during April–June 2015 with a 154% Q-o-Q growth.



There are more than 114.63 million mobile subscribers in India who access 3G/4G.



The number of wearable devices in India will reach 4.1 million by 2020.



69 million people in India use Facebook daily, of which 64 million access the platform through their mobile devices.

As on 1 July, 2016 34.8% of the population in India accessed the Internet.

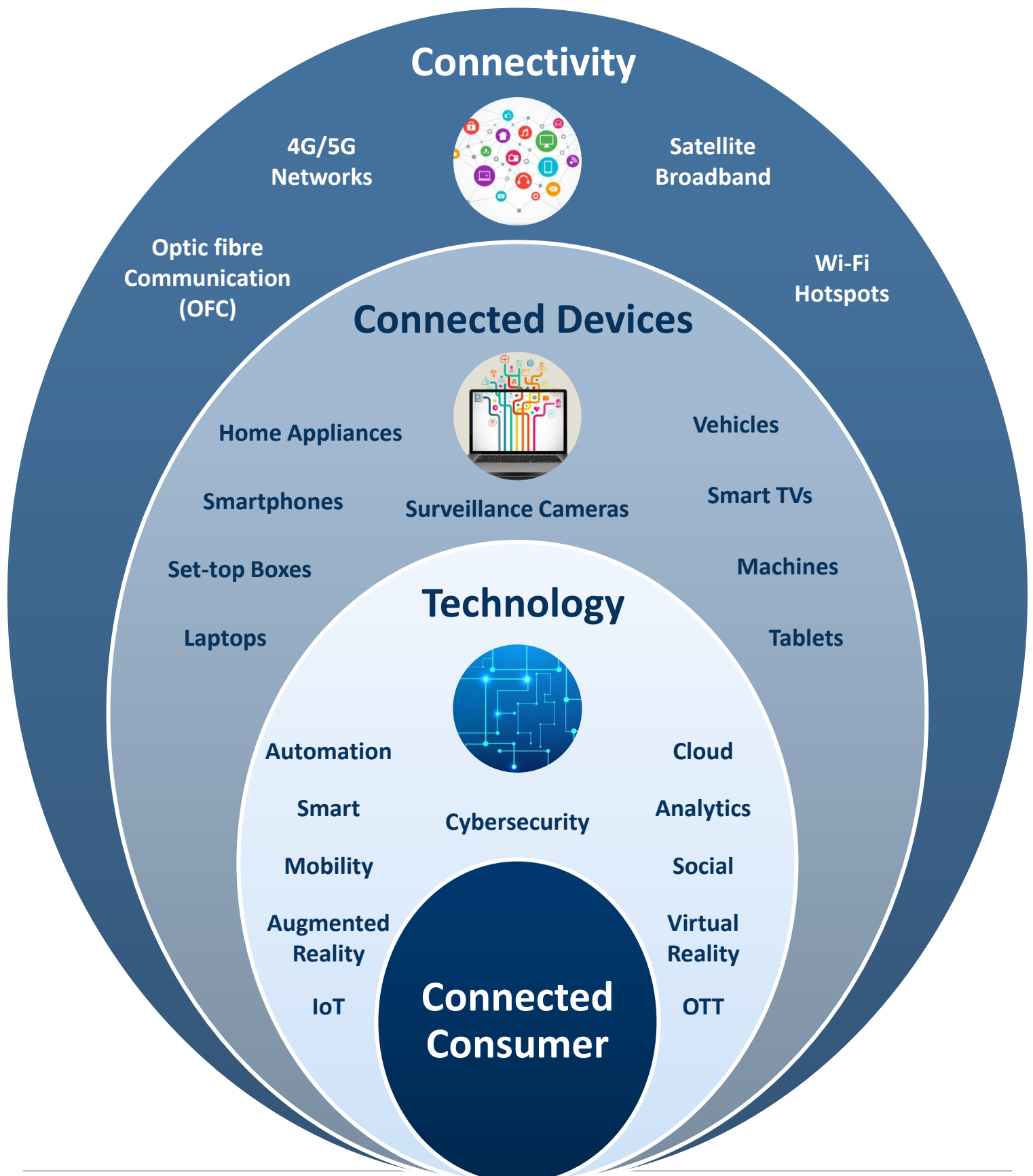


Source: Cisco VNI; TRAI; Akamai; Internet Live Stats; Frost & Sullivan

Merging the Telecom and Broadcast Sectors

Connectivity, devices and application trends are changing the dynamics of the telecom and broadcast sectors. The establishment of a digital ecosystem is underway; the telecom sector is facilitating the process while the broadcast industry is leveraging the advantages.

Exhibit 2: Establishing a Digital Ecosystem, India, 2016




Major Trends Redefining the Sector

The industry will thrive on national and international investments, while driving major trends around consolidation as well as business model innovations.


Exhibit 3: Major Trends in Telecom and Broadcast Sectors, India, 2016–2018

Consolidation



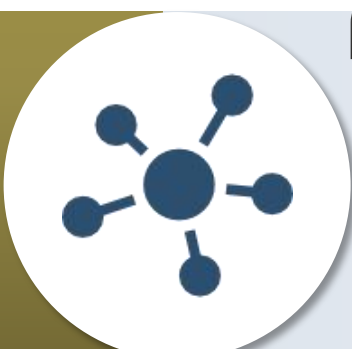
Both the industries are undergoing a consolidation phase where major stakeholders are planning to merge or acquire each other to leverage the mutual opportunities and strengths.

Infrastructure Investments




With the demand of new age consumers for services anytime, anywhere, the stakeholders have to invest in advanced technologies, despite an immediate strain on their balance sheet and poor visibility of RoI.

Diversification into Multiple Services for Business Opportunities



Companies in this market are trying to monetize all opportunities available to them and are stepping out of their core business. From OTT services, to wallets, to app development, everybody is trying to get into everything.

Regulations



The regulatory environment is redefining itself from becoming an agency that addresses disputes to being an agency that takes proactive decisions to tackle the challenges of new-age technologies and devices and the relationships between the stakeholders.

Source: Frost & Sullivan

Rural India in the Digital Race

Middle class individuals will account for 69% of India's population (934 Million) in 2020, with lower middle class emerging as the biggest middle class segment at 38%

Exhibit 4: Urban/Rural Breakup of Internet Users, India, 2016

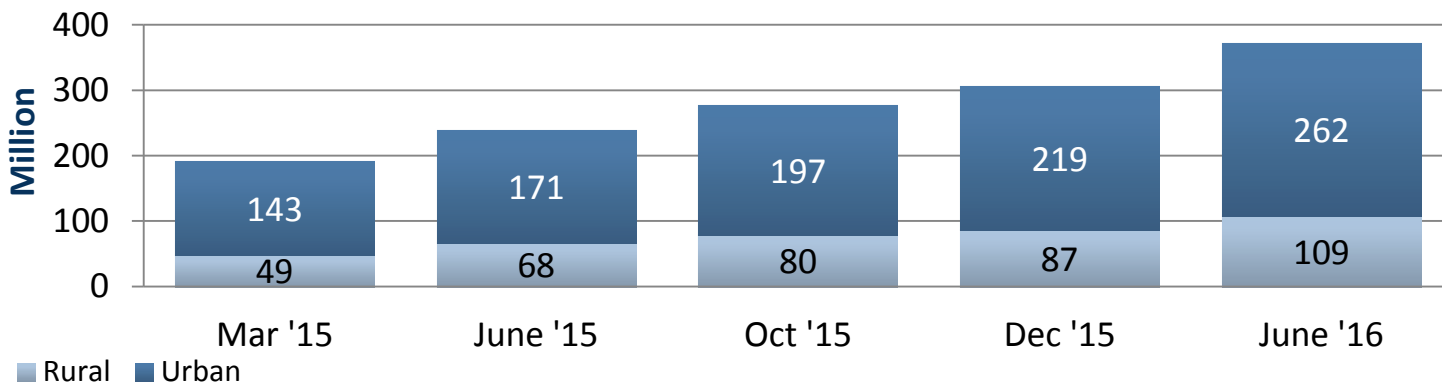


Exhibit 5: Rural Connected India Facts, India, 2013 and 2018

Factors	2013	2018
Demography	60% under 25 years	54% under 25 years
Population	29% rural	40-50% rural
Gender divide	2.6 men per 1 woman	1.9 men per 1 woman
Mobile	60%–70% users	70%–80% of users
Content	45% use vernacular content	70%–90% do not speak English, less than 1% of primary speakers

- Owing to large-scale efforts (e.g., the Bharat Net) rural connectivity has been ramped up. A lot of private players are also riding this wave to bring about holistic digitization in the country, especially Reliance Jio.
- The number of rural Internet users will reach 280 million by 2018 as against 60 million in 2014, growing at 40% per annum. This new class of tech-savvy population indicates a significant growth in middle aged, rural, gender-balanced, mobile, and vernacular-speaking population. They are actively embracing technology and increasingly depending on mobile Internet for banking, education, entertainment, e-Commerce and other activities due to enhanced awareness of developments, ease of work, accessibility, and cheaper devices.

Source: IAMAI; BCG; Frost & Sullivan

Level of Wi-Fi Penetration in India, 2016

Mobile data traffic constitutes more than 50% of overall Internet consumption in India. Data packages are still expensive, restricting the amount consumed. There is a need for proliferation of Wi-Fi networks to combat this and offer a more scalable, cheaper option to bring the Internet to the masses.

Exhibit 6: Wi-Fi Landscape, India, 2016



Wireless fidelity (Wi-Fi) is used to connect Wireless Local Area Networks, which provide Internet access to mobile phones, personal computers, laptops, tablets, and also build hotspots.



There are only 31,518 Wi-Fi hotspots in the country, catering to over a billion people. Growth in the number of Wi-Fi zones has been a paltry 12% against the global average of 568%. India will have to set up at least 8 lakh additional hotspots to catch up.



Low cost of Wi-Fi delivery should also translate to lower prices per megabyte (Mb), faster speeds compared to mobile data, thereby allowing access to data-intensive applications, video streaming, and other content. However, the infrastructure required to set up hotspots is quite exorbitant.



The Indian Railways recently launched public Wi-Fi services in the Mumbai Central Railway Station as part of the largest public Wi-Fi project in India. This is expected to be extended to across 100 railway stations this year and another 400 in the future.



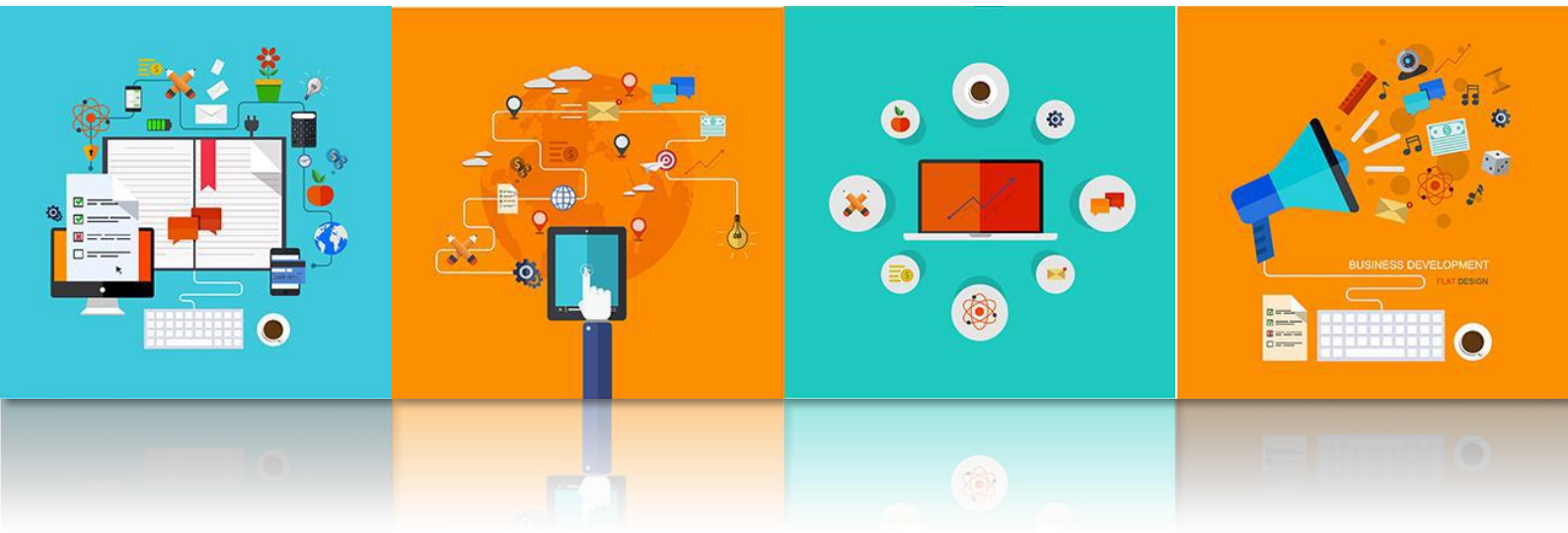
The cost of mobile data, on an average, is about 23 paise per Mb. This could be slashed by 90% by converting to Wi-Fi services are estimated to cost less than 2 paise per Mb.



Wi-Fi spots are widespread in cafes, airport lounges, malls, business centers, etc. They could be offered either as a paid service (charged on the basis of time/data) or free (the cost will be borne by the host). Wi-Fi aggregators also provide standard network packages with a minimum monthly/pay as you go fees which can be used in affiliated spots or Wi-Fi zones.



Source: Nokia; TRAI; Business Standard; Frost & Sullivan



Telecom Sector – Market Landscape and Major Trends

“The telecom sector continues to be at the epicentre of digitization growth, innovation, and disruption for virtually any industry. Mobile, Cloud, analytics and broadband/IP connectivity continue to be more and more embedded in the fabric of society today, and they are key to driving the momentum around some key trends such as video streaming, Internet of Things (IoT), and digital payments. The number of 'connected things' continues to grow as connectivity/broadband proliferates beyond urban and suburban subscription bases, mobile and smart device price goes down, and penetration expands; this will ultimately shape and define the IOT space.”

Sanjay Kaul, Managing Director, Cisco India and SAARC

Market Landscape

Telcos are now trying to capitalize on data consumption for more revenue. Reliance Jio's entry in 2016 intensified competition in 4G services. Wireline broadband subscriptions will increase from 2017 onwards.

Exhibit 7: Wireless Subscribers, India, FY2011–FY2016

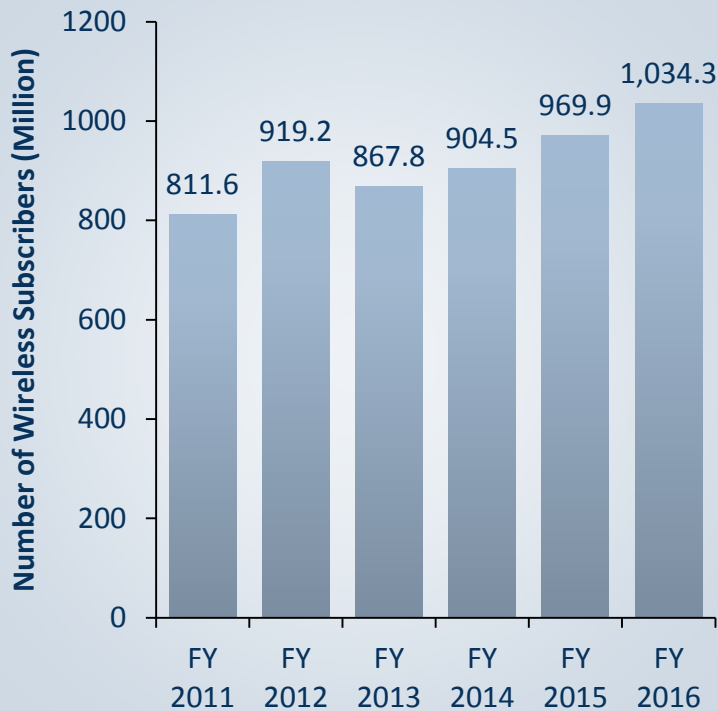


Exhibit 8: Wireless Subscribers: Market Share, India, FY2016

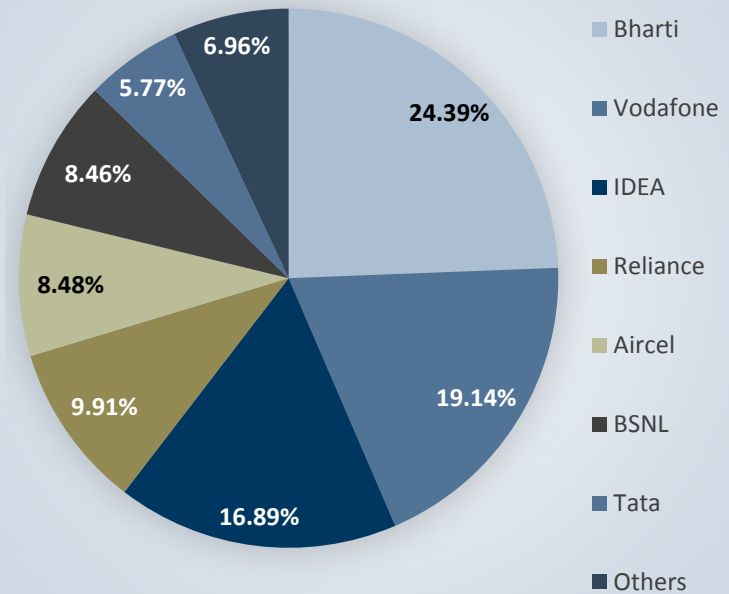


Exhibit 9: Wireline Subscribers, India, FY2011–FY2016

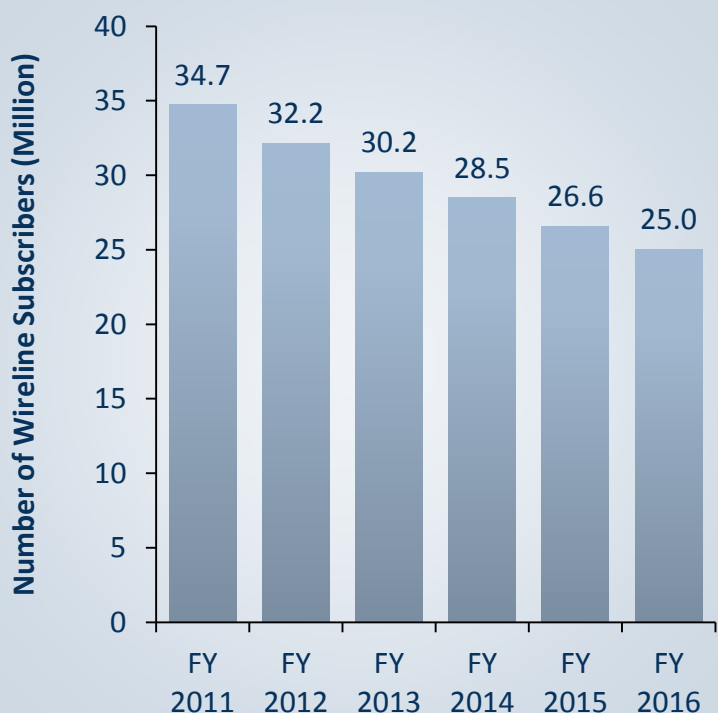
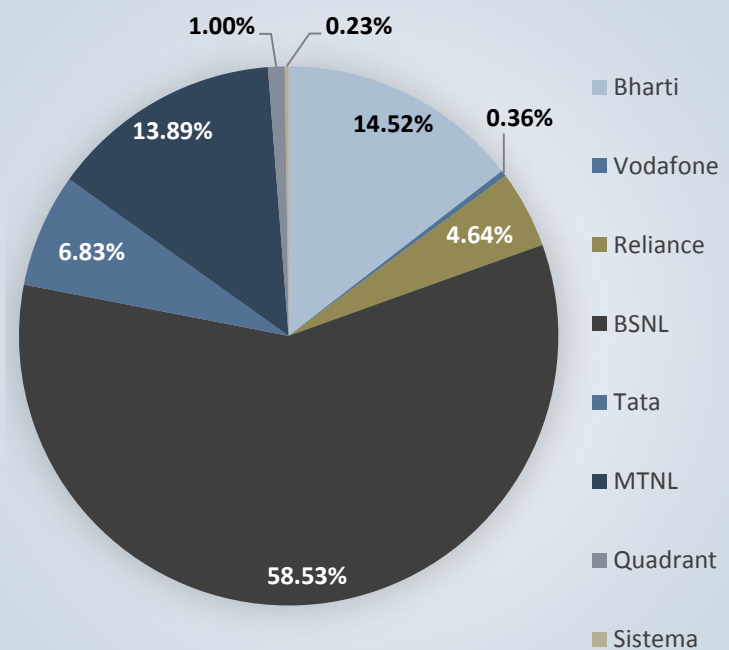


Exhibit 10: Wireline Subscribers Market Share, India, FY2016



Note: FY 2016 refers to April 2016 to March 2017

Source: Telecom Regulatory Authority of India (TRAI); Frost & Sullivan

Major Trends in Telecom Sector, India

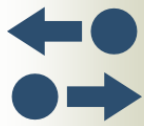
Network experience is the most essential factor that controls churn in the already mature telecom market



More Consolidation to Follow

The telecom market is mature (in terms of revenue from voice); hence, all telecom operators are focused on offering high-speed broadband. However, broadband services require significant investment in spectrum and infrastructure, which many telco operators are unable to commit to. Therefore, consolidation is imminent.

A trend in this direction was triggered by the merger in 2016 between Reliance Communications and Aircel to give birth to an entity with assets worth ₹65,000 crore.



Shift from Value-added Services to Network Experience

In order to gain market share, telecom operators have come up with attractive plans and packages. But now, network congestion is a big menace, impacting quality of service with call drops and packet loss. Optimal network experience is vital for an increased user base.



Co-opetition to Become the New Normal

Telcos are trying to partner with major app providers to facilitate the use of data on their network. Similarly a number of partnerships for developing both 4G networks and optic fibre networks have emerged. This includes network sharing, circle sharing, leveraging the advantages of one another and so on. This does not just ensure uniform presence, but it reduces the strain of deployment and management of infrastructure for an operator throughout a country.



Dwindling Data Monetization Options

With high infrastructure costs involved in the development of 4G and fibre broadband, telcos are trying to monetize data through each and every opportunity available. Telecom operators are partnering with specific apps and also developing a separate app ecosystem for themselves to monetize data capabilities that will emerge from 4G. Telcos are making efforts to launch payment banks in this direction. However, due to the presence of mobile apps for almost all functions including payments, it will be highly challenging for telcos to increase their revenue from non-core services.

Source: Frost & Sullivan

4G – Telco Activities

Telcos are concentrating on increasing subscriber base and ways to monetize the 4G network.

Exhibit 11: Telco Activities for 4G, India, 2016

Company	Coverage	Key Differentiators
Airtel	<ul style="list-style-type: none"> • 350 cities across 15 circles • Operates on the 2300MHz frequency and has access to 20MHz of bandwidth, along with a license to offer data on the 1800MHz frequency in six circles 	<ul style="list-style-type: none"> • First to launch 4G services • User base of over 2.5 million subscribers as of the first quarter of 2016
Reliance Jio	<ul style="list-style-type: none"> • Nationwide license on the 2300MHz frequency, along with airwaves in the 1800MHz band and 10MHz spectrum in the 850MHz frequency that's purchased from RCOM in ten circles: Assam, Bihar, Haryana, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Mumbai, North East, Odisha, and Uttar Pradesh (East) 	<ul style="list-style-type: none"> • Offers VoLTE, which allows for high-definition voice calls to be placed over the data network • Investment in app ecosystem; slated to offer digital content services that include streaming music, video-on-demand, and a digital payments solution. • Obtained a multi-service operator license, which allows it to introduce live TV as well as television-on-demand services on its network
Idea	<ul style="list-style-type: none"> • Offering 4G in over 575 cities and towns in 10 circles, installing up to 14,000 4G base stations in the process 	<ul style="list-style-type: none"> • User base of 680,000 users actively using its 4G services • Aggressively increasing coverage, with plans to have 4G available in 750 towns across the country

Source: Androidcentral; Frost & Sullivan

4G – Telco Activities (continued)

Vodafone and BSNL have also geared up their operations, though they are late entries into the battle.

Exhibit 12: Telco Activities for 4G, India, 2016 (continued)

Company	Coverage	Key Differentiators
Vodafone	<ul style="list-style-type: none"> Offers 4G services on the 1800MHz frequency in Kerala, Karnataka, Mumbai, Delhi & NCR, and Kolkata 	<ul style="list-style-type: none"> Plans to invest in 4G services in the rest of the circles after assessing the demand Offers international roaming for Vodafone's 4G customers when they travel abroad to the U.K., Romania, Spain, and the Netherlands; plans to add more countries to the list
Reliance Communications	<ul style="list-style-type: none"> Has signed an agreement with Jio to let the latter use its 850MHz frequency in ten circles: Assam, Bihar, Haryana, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Mumbai, North East, Odisha, and Uttar Pradesh (East) 	<ul style="list-style-type: none"> Plans to switch its CDMA customers to 4G once the network goes live
BSNL	<ul style="list-style-type: none"> Has announced that it will offer 4G in 14 circles; network holds 20MHz liberalized broadband wireless access (BWA) spectrum in the 2500MHz band. 	<ul style="list-style-type: none"> Is in talks with Reliance Jio for a strategic tie up

“Unlimited free data” Who is offering what?

Exhibit 13: 4G Plans of Telcos, India, 2016

	Amount (₹)	Unlimited calling within network	Unlimited calling to all networks	Free data
Airtel	145, 354	Y,Y	N,Y	300MB, 1GB
Vodafone	144-149; 344-349	Y,Y	Y,Y	300MB, 1GB
Idea	148, 350	Y,Y	N,Y	300MB,1GB
Reliance Comm	149	Y	Y	300MB
BSNL	339,149	Y,Y	Y,Y	1GB,300MB
Reliance Jio	149	Y	Y	300MB
Tata DoCoMo	348	Y	Y	5GB

- Reliance Jio arrived in the Indian telecom sector as a disruptive player offering customers free domestic voice calls and zero national roaming charges till 31 March 2017.
- This move has forced Airtel, Vodafone and other telecom operators to launch new plans and recharge packs of their own, offering unlimited voice calls, and various data benefits, in order to retain users.
- Telecom operators are trying to refresh their value-added service (VAS) offerings, including partnerships with VAS providers and start-ups.

Note: Plans and tariffs per 31 December 2016.

Source: Company Websites; Frost & Sullivan

4G and 5G

Higher data speeds are the new normal in India. While 5G is yet to gain ground, the penetration of 4G services will increase multifold over the next 24 months.



- The infrastructure for 4G is being rolled out in India since 2012.
- Major telecom companies have introduced 4G plans in the past two years, but there are a number of issues related, such as network congestion and delay in data monetisation ideas among telcos that is preventing the increase in the number of 4G connections in India.
- 4G has become a favourite of consumers with dual SIM cards, where 4G is used as an auxiliary service while 3G is still the major services.
- With the launch of Reliance Jio, telecom operators are investing heavily in network infrastructure to mitigate the issues of network congestion.
- Telcos are leveraging both TDD-LTE and FDD-LTE standards to offer 4G connectivity in the country.



- 5G is the new generation of radio systems and network architecture delivering extreme broadband, ultra-robust, low-latency connectivity, and massive networking.
- The immediate benefits that are guaranteed by industry stakeholders are:
 - Enhanced mobile broadband speeds
 - Scale: Internet of Things, Machine-to-Machine and data explosion as a consequence
 - Low latency cases with single millisecond latency, which will create use cases that do not even exist today (e.g., virtual reality with extremely low latency to have the real-time experience over a 5G network).
- Establishing a strong backhaul network for building future proof 5G networks will be essential.

- The Indian market continues to have challenges such as limited availability of spectrum; the lowest average revenue per user globally; and, complicated Right of Way (RoW) approval procedure to deploy optic fibre cables..
- Companies like Nokia and Ericsson are in talks with telecom operators over the feasibility of deploying 5G.

Source: Frost & Sullivan

Optic Fibre Networks

High investments, lack of standard regulations and policies act as major deterrents to fibre deployment.

- 👉 In India, optic fibre networks are prominently used for fibre to the node and backhaul.
- 👉 The last mile is still provided by copper cable, coaxial cables, or aluminium-clad copper cables.
- 👉 The latest technologies used by the cable segment for OFC is DOCSIS 3.0 and GPON.
- 👉 Investment in building up OFC infrastructure along with the RoW charges is high when compared to other network infrastructure set ups.
- 👉 The range for cost of deployment of fibre in every state is very wide and varies from state to state. The fees are so high that sometimes the cost of deployment becomes greater than the cost of fibre itself.
- 👉 The process of getting approvals and no objection certificate (NOC) is very cumbersome and again varies from state to state. This is adversely affecting all flagship projects of the country, from Digital India to development of smart cities.
- 👉 In order to monetize the investments in fibre optics, operators are offering triple-play services (Voice, data, and TV).

DRIVERS

- ◆ Demand for high-speed data networks
- ◆ Proliferation of next-generation broadband technologies (e.g., 5G)
- ◆ Government initiatives, such as NOFN and BharatNet
- ◆ Cable TV digitization efforts
- ◆ Development of smart cities

- ◆ The need for high investment required
- ◆ Lack of infrastructure planning
- ◆ Non-standardized regulations
- ◆ The huge cost of Right of Way (RoW)
- ◆ Disparities between policies from state to state

RESTRAINTS

Source: Frost & Sullivan

Internet of Things (IoT)

In India, trends such as smart cities, the Make in India campaign, Digital India, Start Up India and Industrial corridors are creating tremendous opportunities for the development of an IoT ecosystem

- ➔ The Internet of Things (IoT) is the network of physical objects—devices, vehicles, buildings, and other items embedded with electronics, software, sensors, and network connectivity—that enables these objects to collect and exchange data. It refers to an open connectivity framework that connects machines with other machines, with various application systems, and with the people to derive data-driven decisions.
- ➔ The major components include hardware, software platforms and applications, network connectivity and Cloud and data analytics.

DRIVERS

- ◆ Ubiquitous data connectivity and high-speed enterprise networks will help drive IoT penetration.
- ◆ Miniaturization and declining device cost are resulting in sensors and communication devices being embedded in everyday objects.
- ◆ Government initiatives that include Mega Trends such as Smart Cities, Make in India, Digital India will be the enabling forces for IoT across verticals.
- ◆ Regulatory requirements and government initiatives are laying the framework for large-scale IoT implementations.

- ◆ The initial investment for businesses to add devices on to the IoT network is quite high.
- ◆ The ecosystem has currently limited capabilities of real-time analytics to support complex decision making; which is critical for the success of IoT applications.
- ◆ Security, data privacy, and integrity concerns are inhibiting certain verticals from participating in IoT.
- ◆ Lack of industry standards or vertical-specific framework is holding back the adoption of IoT technology.

RESTRAINTS

“Data explosion is being accelerated by a new wave of digitization linking cloud services with the rise of the Internet of Things (IoT). For consumers, this includes bringing more of our everyday life into the digital world, from fitness tracking with wearables to connecting appliances in our homes (thermostats, etc.). Enterprises have understood that the digitization of their value chain and processes is a key competitive advantage that creates value, and IoT further extends that reach with vertical-specific analytics playing an increasingly important role.”

Mr. Randeep Raina, Head of Business and Sales Development—Asia Middle East and Africa at Nokia Networks

Source: Frost & Sullivan

Internet of Things (continued)

With increasing smartphone and tablet PC penetration, IoT is gaining importance and providing opportunities for new business models enabling convergence of various industry sectors

Partnerships Focusing on Developing IoT Capabilities, India, 2016



RCoM has entered into a partnership with the US-based Jasper, a global IoT platform leader, to offer enterprises and individuals in India the capability to launch and manage business activities and monitor individual behavioural patterns through the IoT platform.



Reliance Jio has partnered with Ecorithm to roll out IoT. As part of this deal, Ecorithm will route its world famous True Analytics platform to enable it to produce an uninterrupted flow of sensor data, such as industrial control system or building management system in a commercial building. This will equip Reliance Jio to participate in the Smart Cities initiative.



Vodafone has strengthened its machine-to-machine (M2M) portfolio with the acquisition of Cobra Automotive Technologies. Cobra is a leading provider of security and telematics solutions to the automotive and insurance industries. The acquisition of Cobra is in line with Vodafone's strategy to expand its M2M capability beyond connectivity. Cobra's telematics products and expertise will enable Vodafone to provide a more comprehensive range of end-to-end services to automotive customers.

“We believe that digital transformation will reach a critical stage of development within the next five years, with VOICE being the core foundations for this. Core elements such as manpower, material, process and data will be more connected within and between corporations, thus collaboration and interactions will also be more efficient. With the boundaries of corporations and even whole industries becoming more blurred, open collaboration and sharing will become main stream and propel a major shift in business models. All of this will occur in the process of digital transformation.”

Mei Bowen, President, ZTE India Technical & Commercial

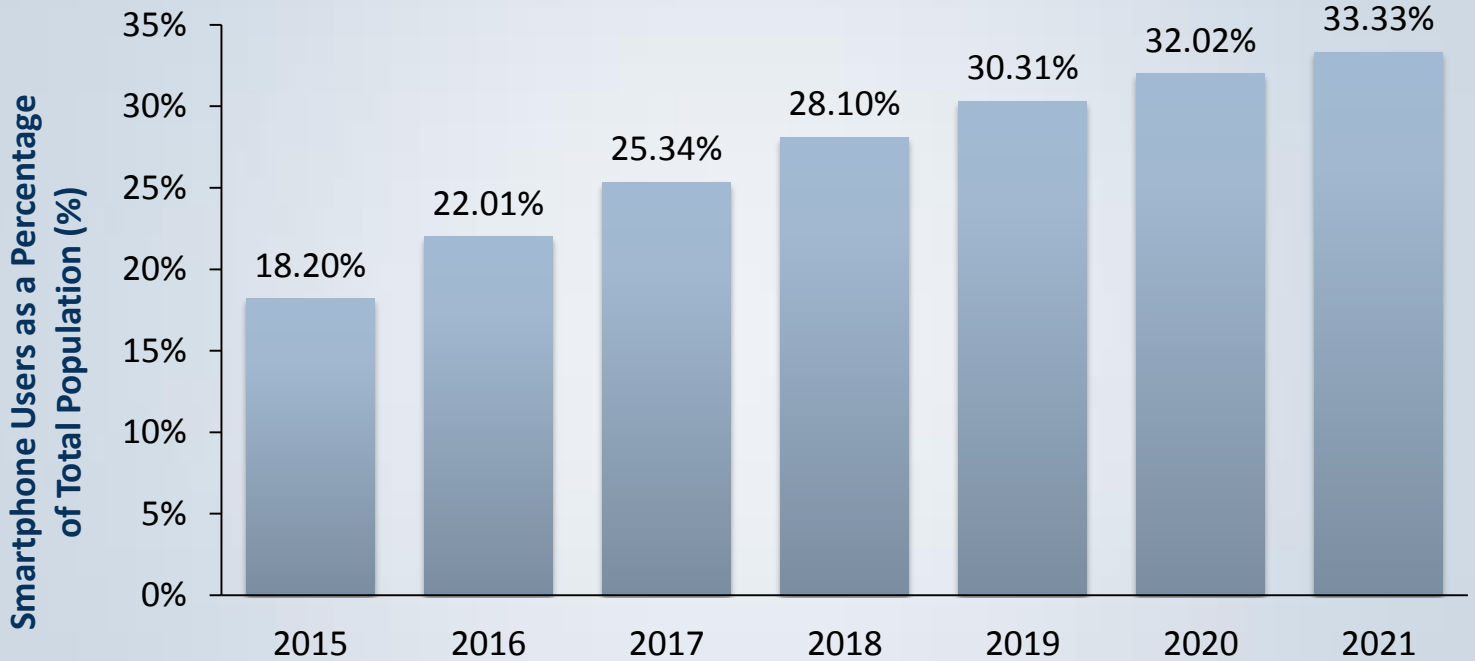
Source: Frost & Sullivan

Smartphones

As high speed broadband becomes pervasive with cheap or 'free' data subscriptions, smartphones will increase multifold in the country.

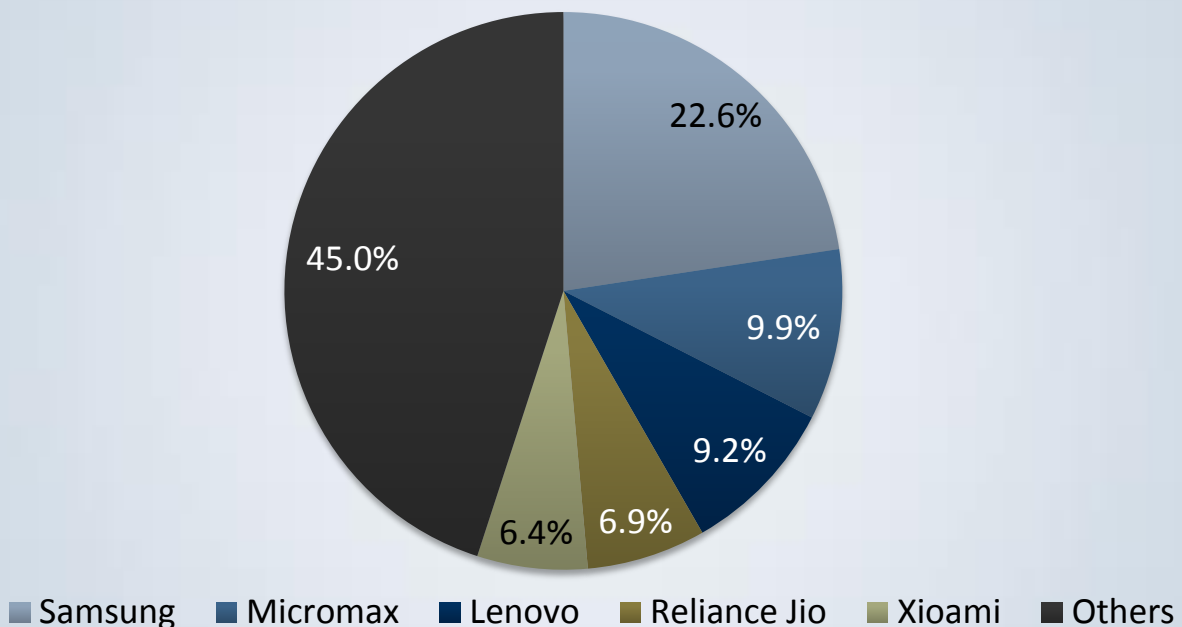
Frost & Sullivan estimates 4G smartphones will account for 75% of 170 million shipments by the next year, which currently has less than 1% subscriber penetration in the country.

Exhibit 14: Smartphone Penetration, India, 2015–2021



Chinese smartphone brands such as Oppo, Vivo, and Gionee, offer higher margin and payment for display space and branding and have made rapid inroads into Indian stores.

Exhibit 15: Smartphone Market Share, India, Q3 2016



Source: Statista

Mobile Apps Ecosystem

Mobile App ecosystem is driven by the rise in digital consumerism. A user friendly interface suitable for mobile devices continues to drive mobile apps, however, upgrades and multi-device support are challenges.

- 👉 India is the world's fourth largest mobile app economy followed by China, the United States, and Brazil.
- 👉 With 70% of Internet traffic on mobile, India has become an exciting place for developers and entrepreneurs.
- 👉 Due to sporadic connectivity, most apps are still downloaded via a 2G network and the consumers prefer offline playback versus online streaming. Similarly, Apps that consume less storage space are the most sought after.
- 👉 India's app economy is not driven by the number of downloads or the revenue but by the amount of time spent in-app by the users.
- 👉 Apart from regular apps, business apps specific to companies (for email and chat apps) are becoming an integral part of the corporate culture.
- 👉 Multi-device support, cyber security, analytics, and artificial intelligence are some of the areas.

DRIVERS

- ◆ The growth in smart devices and improved network connectivity are encouraging consumers to use mobile phones for almost all activities from ecommerce to booking transportation.
- ◆ Application innovation is a core area of focus for the Indian government as well as industry associations such as NASSCOM, thereby driving the set up of several incubation centers.
- ◆ India serves as the R&D and product engineering ground for many international application development companies.

- ◆ Although there are a lot of technological improvements in the country, the process of releasing an app (on the app store) is not an easy one. For example, to make an app available on all iPhone and iPads and in multiple languages, one needs to take 200–300 screenshots.
- ◆ Having too many apps are being perceived by many consumers as inconvenient, thereby leading to poor usage of apps and limited ROI.

RESTRAINTS

Source: 9Apps; Frost & Sullivan

Cloud Ecosystem

Building cloud infrastructure is necessary to support the growing surge of data and providing scalable storage option.

- According to Frost & Sullivan, the overall cloud services market was worth ₹16,980.12 crores in FY 2016 (April 2015 to March 2016).
- The major players in the market are Netmagic, TCL, AWS, Azure and Software Layer. There are also a number of emerging players like Sify, Airtel, and CntrlS.
- AWS, as part of its commitment to invest \$5 billion in India, has launched its cloud presence from the GPX data center in Mumbai. The entry of global service providers into the Indian market may result in a customer drain for some Indian service providers.
- The major industries that are primary contributors for the cloud service companies are BFSI, IT/ITES and Government/PSU. The industry that is expected to gain traction over the next two to three years is Manufacturing (for process automation and later, new product introduction). The fast emerging industries are Media, Hospitality, Education, and e-Commerce.

DRIVERS

- ◆ Indian companies are focusing on core revenue-generating segments and outsourcing cloud services.
- ◆ Cloud provides all enterprises with a plethora of platforms, infrastructure, and software at a fraction of the cost it would take to buy them upfront on premise.
- ◆ Cloud enables companies to bill for IT resources used on an hourly or a monthly basis, which makes it ideal for unpredictable bursting or balancing seasonal fluctuations in infrastructure requirements.
- ◆ Cloud enables businesses to have a shorter time to market than traditional systems.

- ◆ Cloud exposes stored confidential data to data leakage and fraud.
- ◆ Companies fear the possible loss of management control over IT resources by using cloud services of other vendors.
- ◆ For companies that already have a well-established IT infrastructure, migration of knowledge would be tedious and existing skill sets may become obsolete when moved to the cloud.

RESTRAINTS

Source: Frost & Sullivan

Digital Payments

Ecosystem strengthens with demonetization and cashless -India efforts.

- According to NASSCOM, financial technology industry in India is estimated to reach \$2.4 billion by 2020, up from \$1.2 billion in 2016.
- With the aim of establishing a cash-less economy, the Government is leaving no stone unturned to establish an ecosystem for digital payments.
- The NITI Aayog is striving towards making all government-citizen transactions cash-less through a digital platform.
- After the demonetization announcement of the Prime Minister, Paytm, has seen its daily transactions triple to 7.5 million; last month, it clocked 173 million users. Mobikwik, another such platform, has seen 400% growth in transactions in December 2016.

DRIVERS

- ◆ Demonetization has increased the number of transactions on digital payment platforms.
- ◆ Ease of making payments will encourage adoption of digital payment platforms.
The Indian Government, by introducing BHIM App, is further increasing the prospects of using the digital payments.
- ◆ Telecom operators, such as Airtel and Reliance Jio, which have licenses for payment banks are introducing digital payment apps.
- ◆ The Indian Government is making all efforts to educate the population about the advantages of digital payments.

- ◆ Concerns about cyber security is a major challenge.
- ◆ Non-uniform connectivity across the country makes it a non-viable option for day-to-day transactions.
- ◆ Illiteracy and poor awareness of payment techniques is one of the major restraints.

RESTRAINTS

Source: Quartz Media; Frost & Sullivan

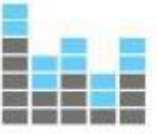
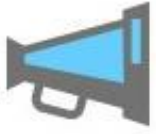
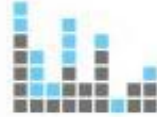
Digital Payments (continued)

According to the Chairman of NITI Aayog, cards, ATMs, and POS machines would become redundant in the country by 2020, because every Indian will be doing his transaction just by using his/her thumb in thirty seconds.

The efforts to transform the payment culture in India has been initiated by the government, banks, telecom companies, and eWallet companies.

- ❖ Unified Payment Interface (UPI) where mobile phones are used to transfer funds, e.g., Bharat Interface for Money (BHIM), State Bank of India (SBI) UPI app, Housing Development and Financial Corporation (HDFC) UPI app, iMobile and PhonePe.
- ❖ Aadhaar-enabled payment systems (AEPS) is an Aadhaar-based digital payment mode. The money you pay will be deducted from your account and credited to the payee's account directly.
- ❖ Unstructured Supplementary Service Data (USSD) banking is a mobile-banking-based digital payment mode available even on basic phones. This service can be used for many financial and non-financial operations, such as checking balance, sending money, changing MPIN, and getting MMID.
- ❖ Cards: Credit cards, debit cards and prepaid cards: Cards are one of the best modes to pay at portals or eCommerce sites. It charges 0.75% to 2.0% on transactions if the user is paying to merchants. Cards can be used only when there is a PoS in the merchant site.
- ❖ eWallets: An eWallet or mobile wallet is the digital version of a physical wallet with more functionality. This wallet can be used for various purposes, from paying mobile bills to sending money to friends. Some of the prominent eWallets are State bank buddy, ICICI Pockets, Freecharge, and Paytm. These wallets are not suitable for sending money to any bank accounts.
- ❖ Payment Banks: Telcos such as Airtel and Reliance Jio have begun operating as payment banks wherein an account can be opened through the retail outlets of the telcos, and the accounts can be accessed with the help of their payment apps (Airtel Money and Jio Money).
- ❖ The government digital payment App Bharat Interface for Money (BHIM) is a digital payment app was launched by Prime Minister Narendra Modi on 30th December 2016. The app already has seen 5 million downloads and recorded more than 700,000 transactions. This payment platform enables citizens to access bank accounts to receive and transfer money.

Source: UPI Payments; Frost & Sullivan



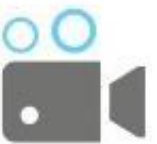
Video Broadcast Sector – Market Landscape and Major Trends



144P

240P

380P



Market Landscape

Getting India 100% digitized has been challenging because of the fragmented and financially constrained sector.

As on 31 December 2015, there were 130 Multisystem Operators (MSOs) permanent registration (for 10 years) for providing Cable TV services through Digital Addressable Systems (DAS) by the Ministry of Information and Broadcasting (MIB).

Exhibit 16: Number of Cable TV Subscribers, India, FY 2010–FY2015

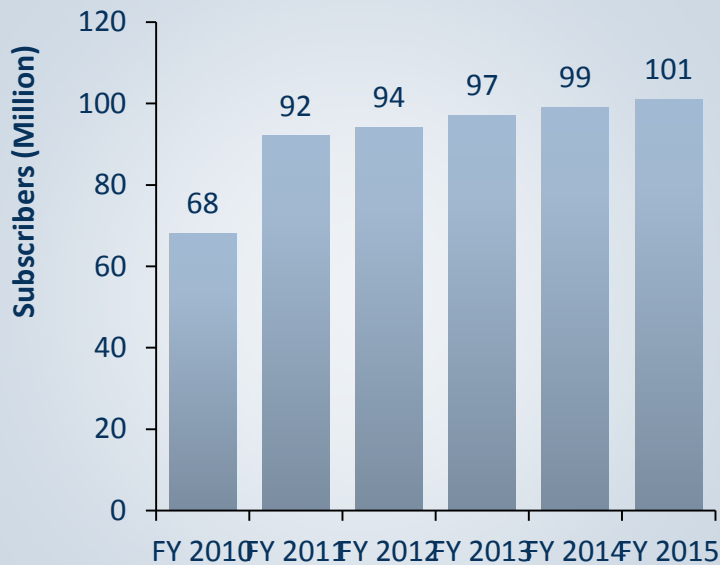
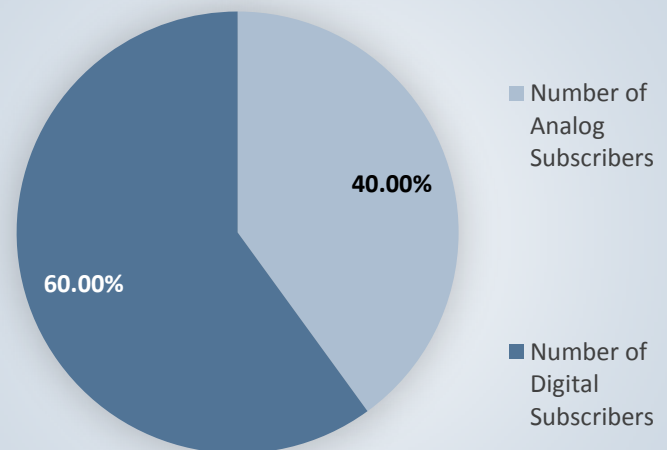


Exhibit 17: Split between Analog and Digital Cable TV Subscribers, FY 2016

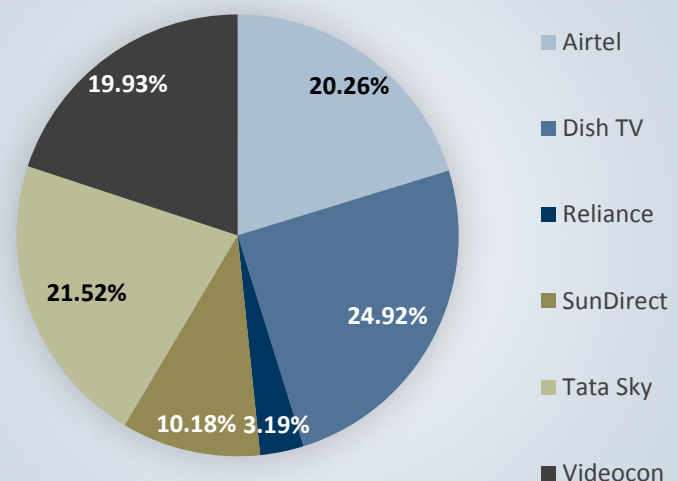


It is DTH that has boosted the digitization of television services in India. While consumers perceive it to be expensive, ARPUs in India are among the lowest in the world already.

Exhibit 18: Number of DTH Subscribers, India, FY 2010–FY2015



Exhibit 19: Market Share of DTH Operators, India, 2016



Note: FY 2015 refers to April 2015 to March 2016.

Source: Telecom Regulatory Authority of India (TRAI); Frost & Sullivan

Market Landscape (continued)

Revenue growth has been driven by advertisements of e-Commerce companies and TV digitization.

Exhibit 20: Subscription and Advertising Revenue of Broadcast Industry, India, FY 2011- FY2015



Exhibit 21: Evolution of Video Viewing, India, 2016

Factors	Core TV	Extended TV
Device 	Single TV	Connected Devices (Android, iOS, Laptops, Tablets, Google Play, Apple TV)
Programming 	Linear	Non-linear (Video on Demand, Catch-up TV, Time-shifted viewing, Live TV)
Technology 	Satellite broadcast technology	Broadband and Wi-Fi technology, Mobile Internet streaming
Screen 	Single screen	Multiscreen with omni-screen experience, anytime/anywhere TV
Audience 	Less interactive	More interactive and proactive

Note: FY 2015 refers to April 2015 to March 2016

Source: Telecom Regulatory Authority of India (TRAI); Frost & Sullivan

Impact of Government Announcements

Demonetization reduced the collections for LCOs, though the FDI norms have been relaxed, little activity is towards foreign investments in broadcast industry

Exhibit 22: Major Regulations that Impacted the Broadcast Industry, India, 2016



Demonetization

The collections for local cable operators (LCOs) would have dropped until December 2016 due to the ban on usage of ₹500 notes. The loss in the media and advertising segment has been recorded as ₹300 billion at the end of the year when most corporate ad spends were slashed owing to low on-ground collections.



Relaxation of Foreign Direct Investments (FDI) Norms

The government liberalised FDI norms for several sectors, including the media, in June 2016. FDI limits in broadcast carriage services like DTH, cable distribution, teleports, headend in the sky (HITS), mobile TV, etc., were allowed up to 100% with some caveats. Norms for FM radio broadcasts too were liberalised. However, per September 2016 data on FDI, media and entertainment was not among the top ten sectors for FDI.



TRAI Regulations on Interconnection Agreement Between Broadcasters and Multiple System Operators (MSOs)

TRAI has made it mandatory for operators to enter into a written interconnection agreement with the MSOs for retransmission of pay channels, including those pay channels for which no subscription fee were paid to the broadcaster. TRAI has also specified a time window for giving notice for renewal.



Reduced Time for Obtaining Uplink/Downlink Licenses

The Ministry of Information and Broadcasting (MIB) reduced the time period taken to obtain a licence for uplink or downlink of TV channels and teleports .

Source: Frost & Sullivan

Impact of Regulations

Telecom Regulatory Authority of India (TRAI) has periodically established regulations to solve the disputes among major stakeholders.

Exhibit 23: Major Regulations that Impacted the Broadcast Industry, India, 2016 (continued)

Court Against the Changes in Tariff Orders or Regulations for the Broadcast Sector

Court Against the Change

The recent consultation paper released by TRAI had issued draft guidelines on tariff interconnect and quality of service that was in direct violation of the Copyright Act and Rules that is provided for the protection, monetisation, enforcement, and adjudication procedures for all copyrightable work and broadcast reproduction rights. The Madras High court order

stopped TRAI from issuing draft tariff rules after a petition was filed by Star India. Based on the new draft, channels would be divided into genres, with each having a maximum price cap. The move will also change the manner in which interconnect agreements between broadcasters (TV channels) and service providers (cable, direct to home, etc.) are signed.

“The ‘Broadcast’ industry is going through a turbulent phase, mainly due to the slow progress of digitization (packaging and bundling) and increased content cost which does not lend itself to consumer choice. However, I hope the New Proposed Tariff order being introduced by TRAI, will change this industry from a Push industry to a Pull industry (content); thus giving consumers the liberty to determine their choice of channels/content.”

Mr. Tony Anthony D’Silva, ex-Group CEO (Media), Hinduja Group and MD, IndusInd Media & Communications

Source: Frost & Sullivan

TRAI's Role in Regulation

The media industry continues to look upon TRAI for major dispute resolution and country-wide policies for the restructuring of the industry. However, the fragmentation of the large sector, growing business models and technology disruption make it highly difficult for the regulator.

“Existing service providers need to explore adjacent markets like Media and Entertainment, and IoT. New technologies like IoT and converged telecommunications and broadcast networks would be the basis for the next phase of growth. Convergence of telecommunication and broadcasting networks would enable optimal utilization of spectrum networks and encourage merger and acquisitions among telecom and broadcasting organizations. This will result in increased competition and cost pressures.

Separation of application/services from the networks offers opportunities for innovation to meet consumer demand. Services delivered using cloud-based platforms may render telecom service providers as pure network operators. To remain competitive in the sector, existing business models need to be reworked to recover the cost of investment in the networks and services independently.

To exploit new opportunities being made available by IoT and cloud technologies, the Connect and Develop (C&D) kind of approach could be the most prudent. This can instill a culture of innovation in companies. The service provider's strategy must be to explore new digital initiatives and restructure existing business models to take advantage of the next phase of growth, face competition, and make use of disruption from convergence and new technologies.”

Mr. Sunil Kumar Singhal, Advisor, TRAI

Source: Frost & Sullivan

Over-the-Top (OTT) Video

The OTT market universe has exploded with multiple industry stakeholders, such as the broadcasters, pay TV operators, content aggregators, production houses and telcos, all wanting to become content distributors.

Exhibit 24: Total OTT Market: Key Stakeholder Examples, India, 2016

Content Owners



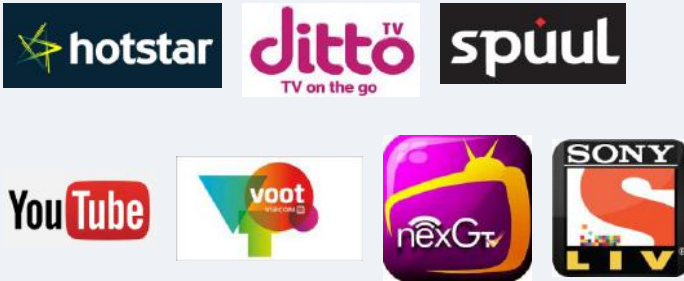
Content Aggregators



Delivery Platforms



Content Distributors / OTT Players



Advertising and Media Agencies



Payment Gateways



“Content producers, broadcasters and consumers are quickly adapting to the rapidly rising popularity of OTT/Digital platforms. Television as a medium will continue to grow as penetration and digitization increase, but it is the proliferation of high-speed data networks, and cheaper and smarter devices that will result in the rapid growth of Video On Demand (VOD) services and will potentially be a game changer in the next 3 to 5 years. The rise of VOD services will lead to interesting changes in consumer viewership behaviour, such as the rise of second screen viewing, the concept of ‘personal viewing’ instead of ‘family viewing,’ and instant gratification through binge watching, instead of regular drip-fed consumption of content. These changes will result in the need for more high-quality premium entertainment content, increasingly targeted to specific audiences rather than the one-size-fits-all content approach of television.”

Sameer Nair, Group CEO, Balaji Telefilms

Logo Image Source: Company Websites

Source: Frost & Sullivan

Over-the-Top Video (continued)

MNOs are offering Mobile TV services that enable access to selected TV channels through their networks and connected devices. Pay TV operators, especially direct to home (DTH) providers, have also introduced mobile TV services.

Exhibit 25: Total OTT Market: Mobile Network Operators (MNOs) OTT Platforms, India, 2016

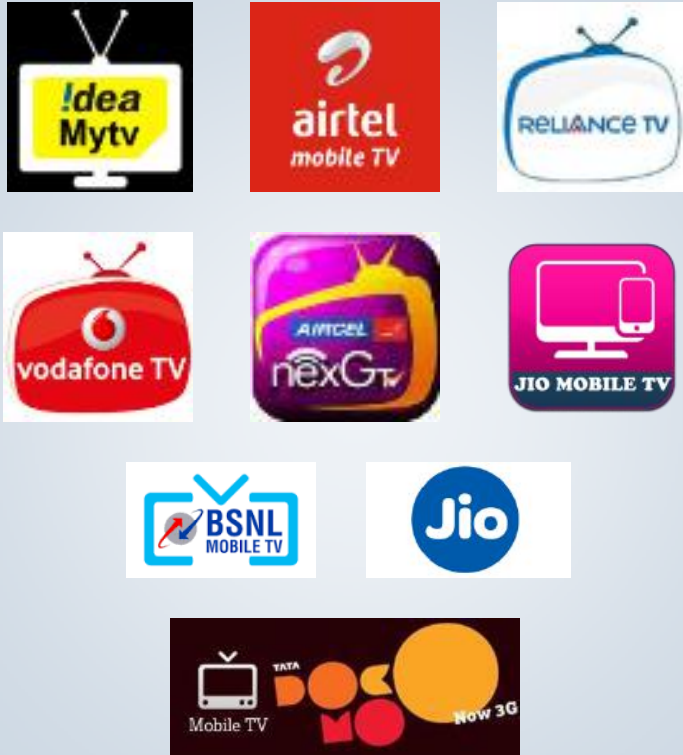
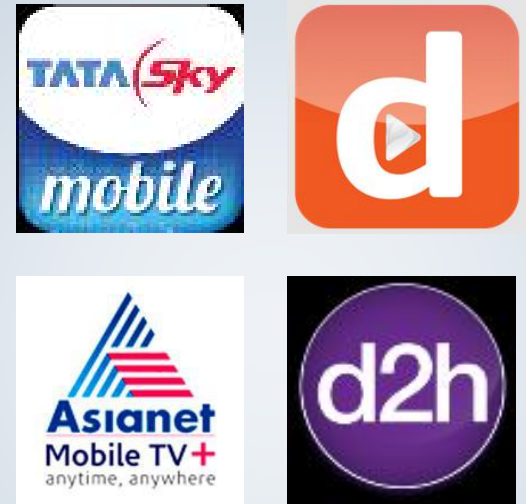


Exhibit 26: Total OTT Market: Pay TV/Cable TV Providers OTT Platforms, India, 2016



“The surging popularity of broadcast-owned OTT (Over-the-top) platforms is fast challenging the exclusivity that linear television enjoyed till quite recently. In international markets, the trend of ‘cord-cutting’ has already become old news, and an entire generation of ‘cord-nevers’ is emerging. Increasing volume of content, ease in discovery, multiple platforms and devices, need for speed, monetization components and making everything digital are all daily challenges for broadcasters. There is a need to reinvent the way work is done, with lowest Total Cost of Ownership (TCO). Just like other industries, Media & Entertainment (M&E) enterprises need to adopt ERP solution that centralizes operations by virtualizing the supply chain; an ERP that can act as a one-stop-shop to manage, review, process, and publish content across all the platforms and devices of the broadcast universe.”

Ramki Sankaranarayanan, Founder & CEO, Prime Focus Technologies

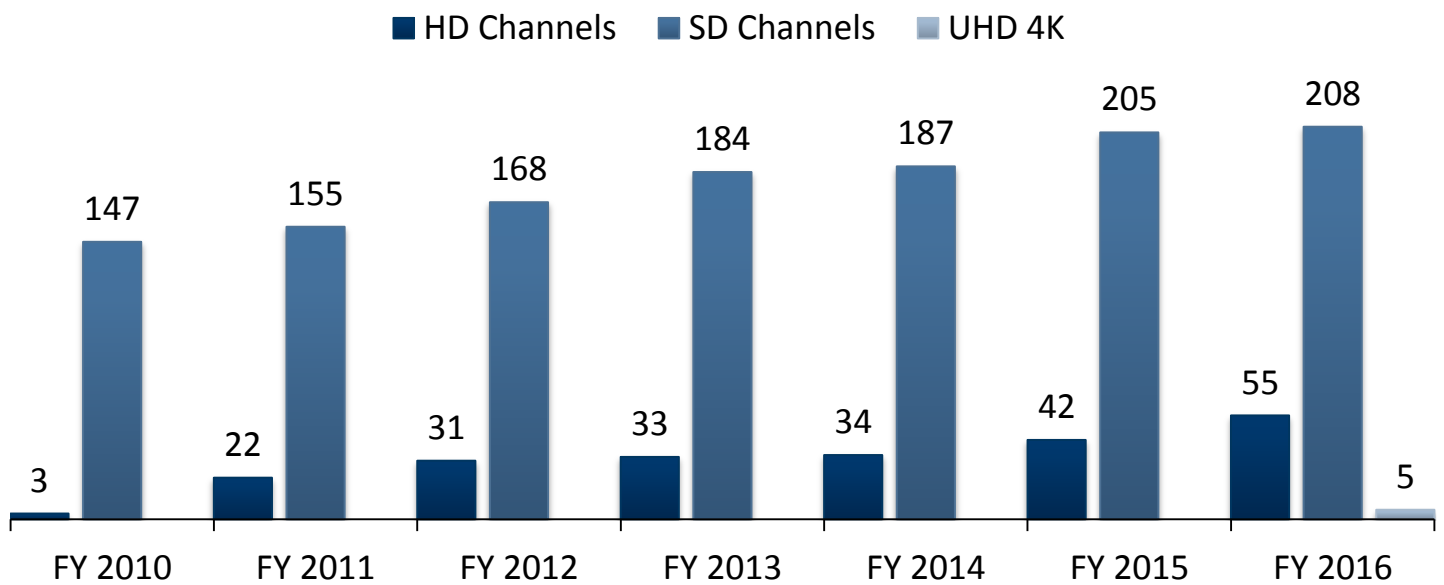
Source: Frost & Sullivan

HD Adoption

Though the number of HD channels in India is still low, the monetizing opportunity that is provided, in terms of advertisement, will encourage broadcasters to convert their channels to HD.

- Although the number of HD channels are currently less, the viewership it has received for limited channels is massive; broadcasters are looking to grab this opportunity as they are seeing equal support in infrastructure(HD TVs and HD Set Top box) too.
- Moreover, HD offers a premium in both advertising and subscription being a major driver for business for the broadcasters.
- Broadcasters need to evaluate and get the right content available in HD for customers in regional markets where the penetration of HD has remained low due to non-availability of local language channels in HD format.
- UHD(Ultra HD) 4K content usually uses 3840x2160 pixels; in India, 5 channels support 4K resolution i.e., DTH Life 4K, Star Gold 4K, Star Sports 4K, Sony SIX 4K, and Nat Geo 4K. However, the infrastructure cost of supporting 4K is high(UHD TV and UHD Set Top Box).

Exhibit 27: Number of SD, HD and UHD Channels, India, FY2010–FY2016



“Going forward, personalization will be the central theme of any TV viewing experience. This will drive innovation in content and ad targeting, especially in the OTT multiscreen space. As a result, future-ready cloud technologies will become core to broadcasting (to manage this shift with flexibility, scalability and reliability).”

K.A. Srinivasan, Co-founder, Amagi

Note: FY 2015 refers to March 2014 to March 2015

Source: Telecom Regulatory Authority of India (TRAI); Frost & Sullivan

Content Trends

Exhibit 28: Content Trends in Broadcast, India, 2016



Short Form Content

Viewership is shifting to the second screen i.e., smartphones, laptops and tablets. This has created interest in viewing 'short-form content' rather than movies and mega serials. This has given rise to a number of YouTube channels like Put Chutney coming up with series that last for one or a few episodes, to enthrall audiences with this type of content.



Sports away from Cricket

The sports leagues such as the Indian Super League (ISL) and Tamil Nadu Premier League (TNPL) has drawn audience focus away from international cricket. For example, in Kerala, ISL was the most watched sporting event in 2016. One of the highlights was the sharp increase in rural India viewership, registering a cumulative figure of 101 million. Similarly for the Tamil Nadu Cricket league, the matches were telecast in prime time on Star Sports and Star Vijay and gained high viewership ratings from rural Tamil Nadu.



General Entertainment still the Leader

In 2016, major national channels saw the closing of a number of series within a year due to the lack of TRP ratings. Major production houses are either banking on series that have continued garnering high TRPs for more than a year or making sequels of them. There is also a shift in foreign locations when the TRPs are not favourable to existing mega serials. Though such scenarios exist in the TV segment, according to BARC ratings, the major driver is still the general entertainment content in both the national and regional segments.

"We are seeing an explosive growth in digital video consumption in India, with already more than 130 million users watching content online each month. We expect this number to double over the next 12 to 18 months and by 2020/2021, we believe we would have more homes with a streaming device than TV sets. Roll out of 4G services, lower data prices, cheaper mobile devices and availability of high quality content online on an ad-supported, subscription free model by various OTT platforms are all contributing to this. The next big driver to this growth is going to be the increase in fixed line broadband penetration, especially as Internet will soon be more like a utility service (just like electricity), which will aid in consumption of streaming video on larger screens at home.

All in all, we see a huge growth for OTT video streaming services in India over the next few years. We, at Viacom18, have launched VOOT backed by great television content from our network, VOOT originals and VOOT Kids."

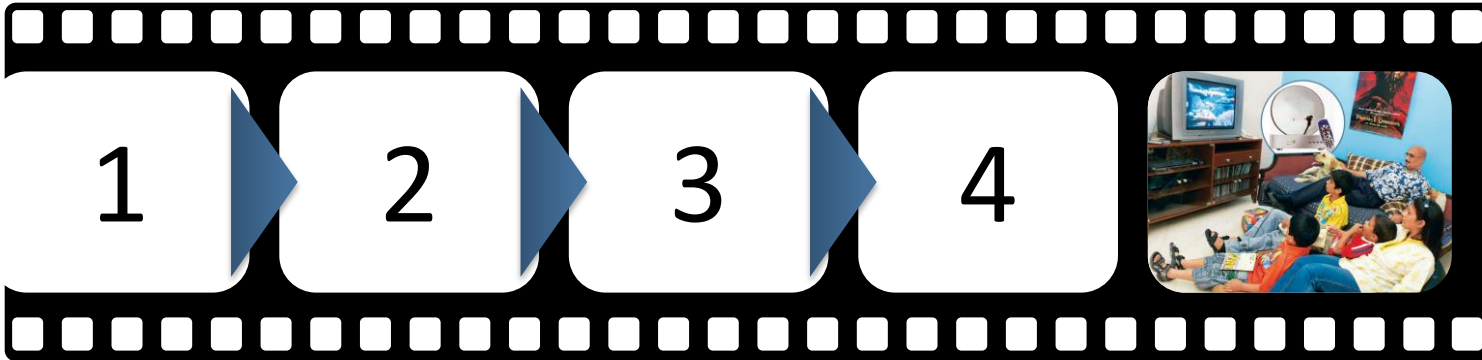
Gaurav Gandhi, Chief Operating Officer, Viacom18 Digital Ventures

Source: Business Standard; Frost & Sullivan

TV Digitization

Cable TV digitization opened up new avenues for all the stakeholders in the market; this has led to increase in demand for fibre infrastructure.

Exhibit 29: Phases for TV Digitization, India, 2016



Phase 1	2012	2013	2014	2015-2020
<ul style="list-style-type: none"> Covered Metros December 2012 deadline met 	<ul style="list-style-type: none"> Covered 38 cities December 2013 deadline met 	<ul style="list-style-type: none"> December 2015 deadline met Urban areas, including municipal corporations and municipalities 	<ul style="list-style-type: none"> Marching towards March 2017 deadline Rest of the country 	<ul style="list-style-type: none"> With the advent of liberalized licensing regimes and with the march of technology, cable operators (MSOs & LCOs) post digitization of their legacy networks can offer broadband services in addition to broadcasting.

“OTT video is one of the fastest growing services on digital platforms, with everyone from traditional media companies to new-age media companies to telcos betting on online video consumption going mainstream. As content differentiation becomes key in a cluttered landscape, many OTT video platforms are betting on producing and acquiring original content to gain users and build a loyal subscriber base. However, monetization remains largely advertisement driven and paid models continue to see consumer resistance, given the high cost of bandwidth and low cost of cable television.”

Shyam PV, Vice President at Hathway Cable & Datacom Ltd

Source: DTH Forum India; Frost & Sullivan

TV Digitization (continued)

Will grow the industry, increase the number of channels by genre, build up competition in television broadcasting and improve revenue-sharing models.

- Despite the tremendous growth in the number of TV channels in the last few years, this sector has had to face difficulties primarily due to capacity constraints and non-addressable nature of the network.
- Fuelled by convergence of technology, the government's push towards digitization will aid addressability in the cable TV sector. This led to the recommendation for implementing Digital Addressable Cable TV Systems (DAS) by the government on 5th August 2010.
- The implementation of digitization was decided to take place in a phased manner, covering metropolitan cities in the first place, followed by Tier II and Tier III cities, and the rest of India.
- The implementation date has been revised several times due to the unavailability of required infrastructure and adequate number of Set Top Boxes.
- In a recent notification by the Ministry of Information and Broadcasting, the final date by which the entire country shall be covered by Digital Addressable System, has been extended to 31 March 2017.
- From the reports of Ministry in Phase-I, 100% digitization was completed in Delhi, Mumbai, Kolkata and 86% in Chennai.
- Out of 38 cities in Phase-II, 100% digitization was completed in 35 cities and up to 81% in 3 cities: Coimbatore, Srinagar and Vishakhapatnam.
- The government of India has claimed almost 100% achievement in Phase III areas that include about 630 districts and 7,709 urban areas.

“The empowered consumer today has a stronger appetite for differentiated content. There is a strong paradigm shift being experienced in the overall content consumption pattern, where the viewer has the power to consume the content on a device of his choice. There is a strong case of snacking content, especially when the viewer is on-the-go; hence, it is a must for content creators to go the extra mile in offering relevant and engaging content, either completely new or repurposing the existing one.”

“Content ideally should be device agnostic; fuelled by the fact that connectivity/bandwidth is getting stronger by the day and more affordable as well. But that said, while we all are growing in the digital era, we must not forget that in India, at least for some time, ‘Reach’ still belongs to television!”

Mr. Sunil Buch, Chief Business Officer, Zee Entertainment Enterprises Limited (ZEEL)

Source: Ministry of Information & Broadcasting; Frost & Sullivan


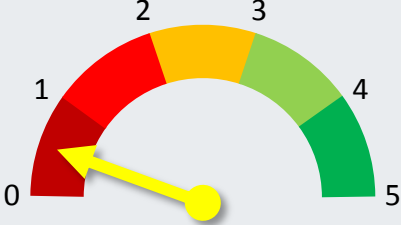



Conclusions and Outlook



Where is India ?

Connectivity is the backbone for all new age technologies and applications; developing 4G future-proof infrastructure will be the key

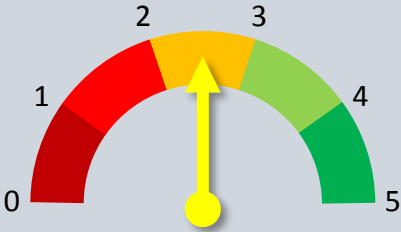
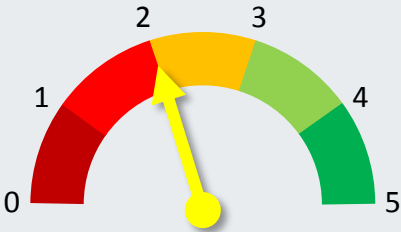
Exhibit 30: Major Trends and Current Status, India, 2016

Trends	Current Status
<p>4G: With network roll-out from major operators, adoption is set to increase, but network quality is still a major challenge.</p>	
<p>5G: Telecom operators are in talks with network companies to establish business cases, and the market will pick up, based on establishment of vertical-based use cases.</p>	
<p>IoT: It will become highly relevant as enterprises will try to leverage the high penetration of broadband connected devices. However, Government policies to encourage new technology adoption and cyber security regulation can help.</p>	
<p>Cloud: Cloud uptake is increasing across various verticals since it creates the background for digital transformation, but security concerns prevail.</p>	
<p>Digital Payments: With the Government encouraging digital payments, adoption is set to increase further, but sporadic connectivity and security concerns will slower the adoption.</p>	

Where is India? (continued)

The telecom and broadcast industries have to plan to monetize their applications in order to address the challenge of high investment for infrastructure and content, respectively

Exhibit 31: Major Trends and Current Status, India, 2016 (continued)

Trends	Current Status
<p>Over-the-top Video: A number of local and international market players have emerged in the past three years, and as AVOD is the most adopted model, the adoption rate is increasing but the sustenance of these companies without opting for SVOD is a question.</p>	
<p>Smart Devices: With the entry of Chinese companies, low-cost devices have proliferated in the market ,and consumers are now opting for more smart devices than before.</p>	

Source: Frost & Sullivan

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