

TELECOMMUNICATION



NOVEMBER 2016

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TELECOMMUNICATION



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EXECUTIVE SUMMARY

Second-largest subscriber base

- With a subscriber base of nearly 1058.86 million, as of March 2016, India accounted for the second-largest telecom network in the world

Third-highest number of internet users

- With 342.65 million internet subscriptions, as of March 2016, India stood third-highest in terms of total internet users in 2016. India is expected to become the second largest country in terms of internet subscribers, with around 402 million internet users by December 2015

Most of the Internet accessed through mobile phones

- Mobile based Internet is a key component of Indian Internet usage, with seven out of eight users accessing internet from their mobile phones
- Since 2012, the share of time spent on watching videos on mobile devices has grown by 200 hours a year

Rising penetration rate

- As of March 2016, urban tele-density stood at 154.01 per cent and rural tele-density at 51.37 per cent

Affordability and lower rates

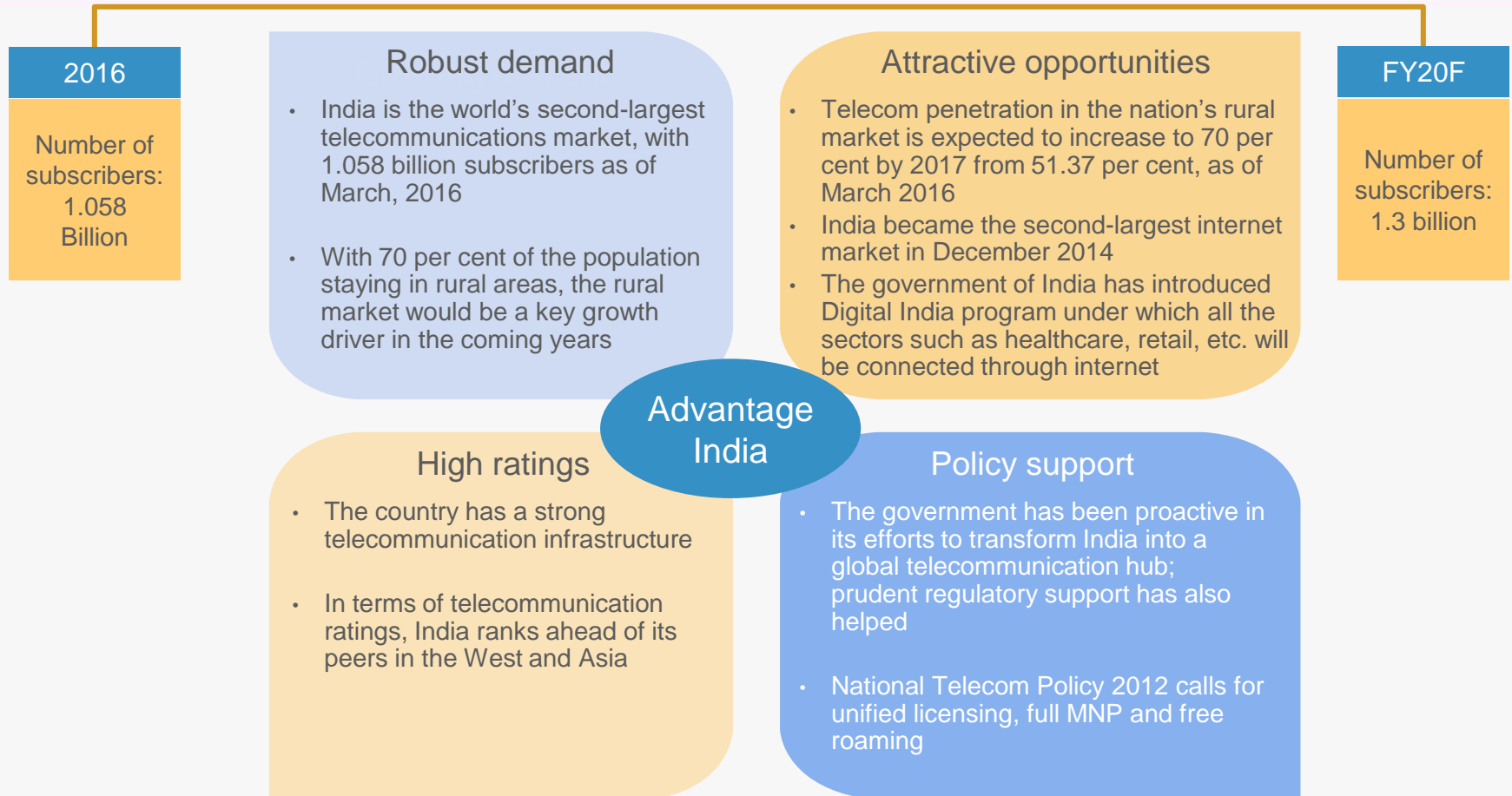
- Availability of affordable smartphones and lower rates are expected to drive growth in the Indian telecom industry

Source: Telecom Regulatory Authority of India, TechSci Research

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ADVANTAGE INDIA



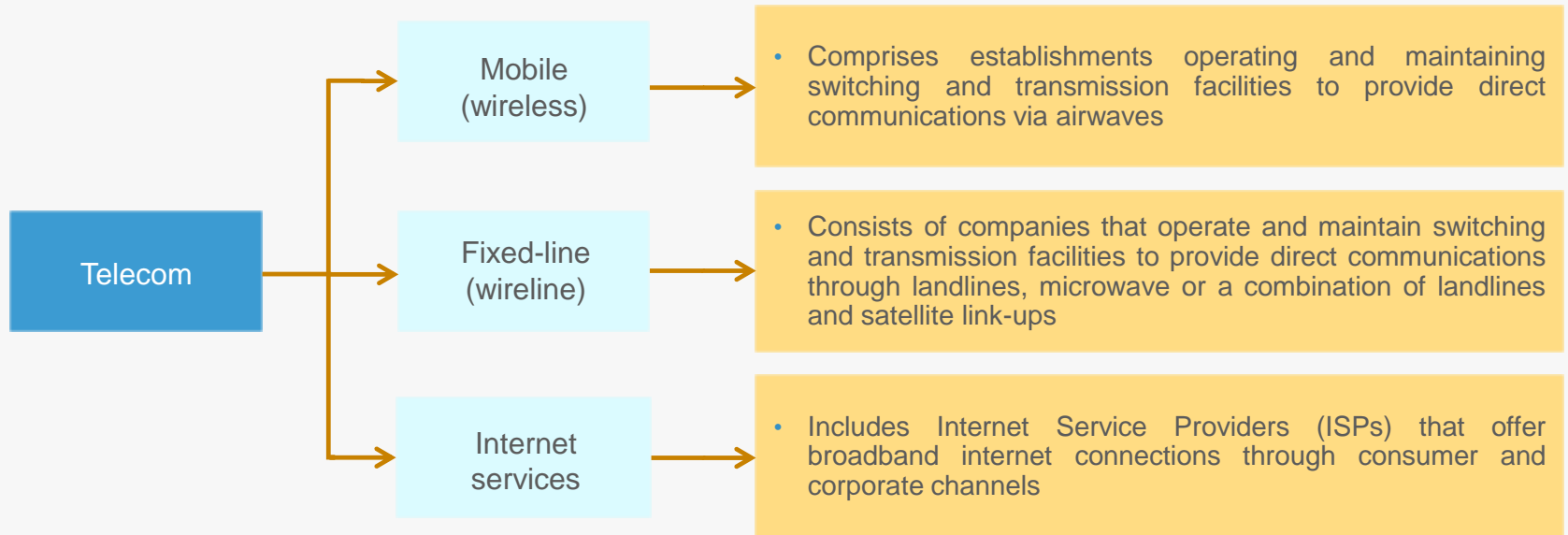
Source: BMI (Business Monitor International) Report, TechSci Research, Internet Mobile Association of India (IAMAI)
Notes: MNP - Mobile Number Portability

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MARKET OVERVIEW AND TRENDS

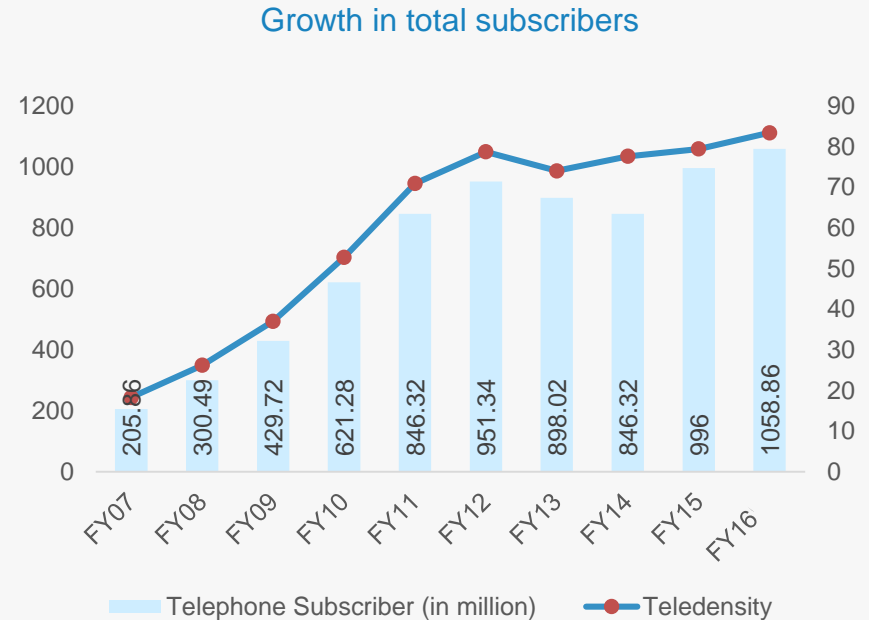
THE TELECOM MARKET SPLIT INTO THREE SEGMENTS



Source: TechSci Research

TELECOM SUBSCRIBER BASE EXPANDS SUBSTANTIALLY

- * India is currently the second-largest telecommunication market and has the third highest number of internet users in the world
- * India's telephone subscriber base expanded at a CAGR of 19.96 per cent, reaching 1058.86 million during FY07-16
- * Tele-density (defined as the number of telephone connections for every hundred individuals) in India, increased from 17.9 in FY07 to 83.36 in FY16
- * In March 2016, total telephone subscription stood at 1058.86 million, while tele-density was at 83.36 percent

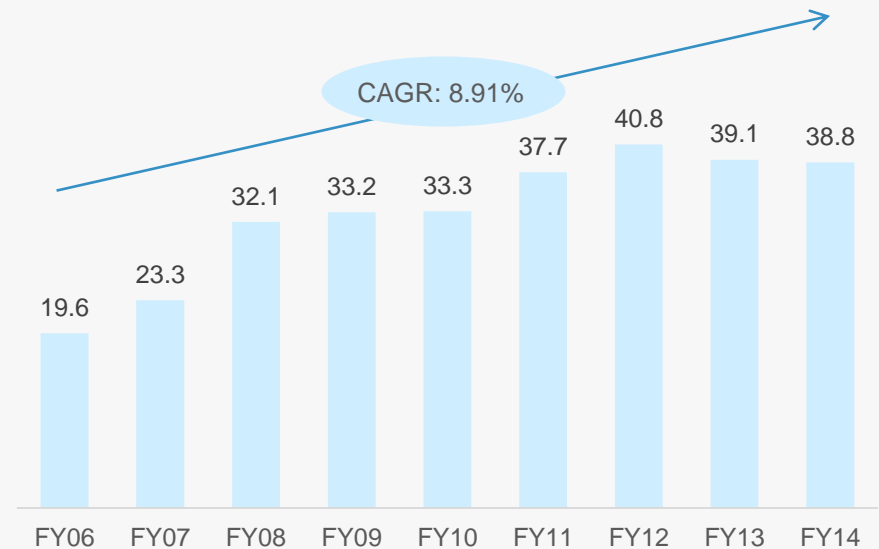


Source: Telecom Regulatory Authority of India, TechSci Research
Notes: CAGR - Compound Annual Growth Rate

SURGING TELECOM REVENUES

- * Indian telecom sector's revenue grew 10.7 per cent to USD71.2 billion in FY14 as compared to USD64.3 billion in FY13
- * Wireless and wireline revenue increased at a CAGR of 8.91 per cent to USD38.8 billion over FY06–14
- * Revenues from the telecom equipment is expected to be USD19 billion in FY15, which is further expected to touch USD30 billion in FY20.

Wireless and wireline revenues (USD billion)

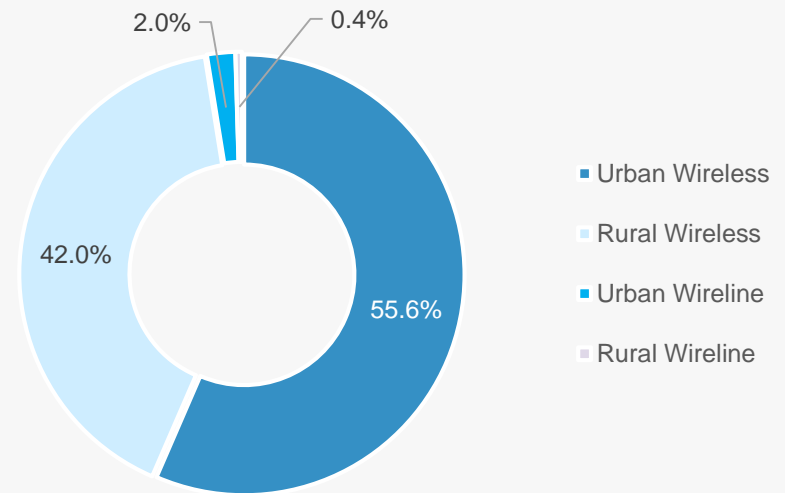


Source: Telecom Regulatory Authority of India, TechSci Research
Note: CAGR - Compound Annual Growth Rate; FY – Indian Financial Year (April – March);
Figures mentioned are as per latest data available

WIRELESS SEGMENT DOMINATES THE MARKET

- * In March 2016, India's telephone subscriber base reached 1058.86 million
- * In March 2016, the wireless segment (97.62 per cent of total telephone subscriptions) dominated the market, with the wireline segment accounting for an overall share of 2.4 per cent
- * Urban regions accounted for 57.29 per cent share in the overall telecom subscriptions in the country, while rural areas accounted for the remaining share

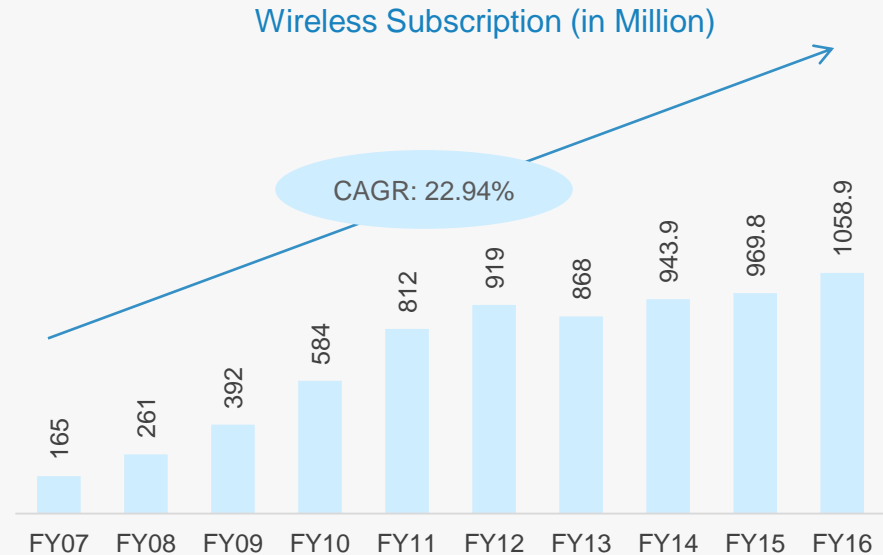
Composition of telephone subscribers (FY16)



Source: Telecom Regulatory Authority of India, TechSci Research

WIRELESS SUBSCRIPTIONS WITNESS ROBUST GROWTH OVER THE YEARS

- * During FY07-16, wireless subscriptions in the country increased at a CAGR of 22.94 per cent, with the number of subscribers reaching to 1,058.85 million in FY16
- * In FY16, urban wireless teledensity stood at 148.73 while rural wireless teledensity stood at 50.88
- * India is the world's second largest smartphone market and is expected to have almost one billion unique mobile subscribers by 2020

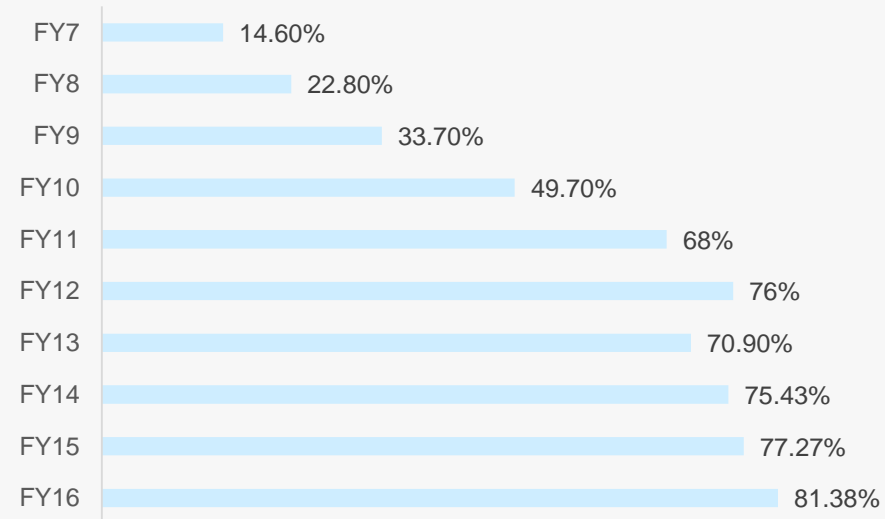


Source: Telecom Regulatory Authority of India, TechSci Research
Notes: CAGR - Compound Annual Growth Rate

WIRELESS TELEDENSITY GROWS OVER THE YEARS

- * The mobile segment's teledensity surged 6 times from 14.6 per cent in FY07 to 81.38 per cent, in FY16
- * GSM services continue to dominate the wireless market with a 95.73 per cent share (as of March 2016); while CDMA services accounted for the remaining 4.27 per cent share

Growth in wireless teledensity

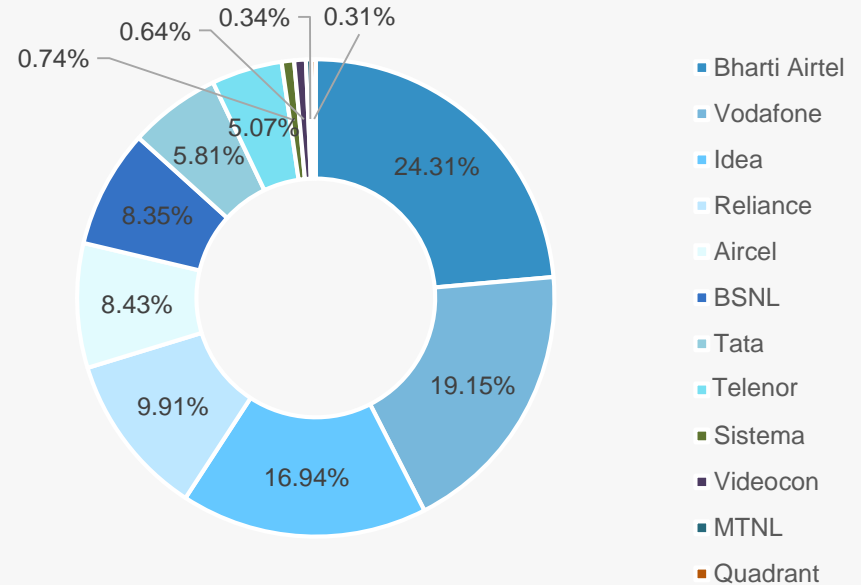


Source: Telecom Regulatory Authority of India, TechSci Research
Notes: Teledensity - The number of telephone lines for every 100 people in a country,
GSM - Global System for Mobile Communications,
CDMA - Code Division Multiple Access

WHILE BHARTI AIRTEL DOMINATES WIRELESS SEGMENT...

- * As of March 2016, Bharti Airtel was the market leader, with a 24.31 per cent share in the total subscription, followed by Vodafone (19.15 per cent share)
- * The top five players in the sector include - Bharti Airtel, Vodafone, Idea, Reliance, and BSNL – accounting for 78.74 per cent of the total subscribers in the country

Wireless market share in terms of total subscribers (FY16)

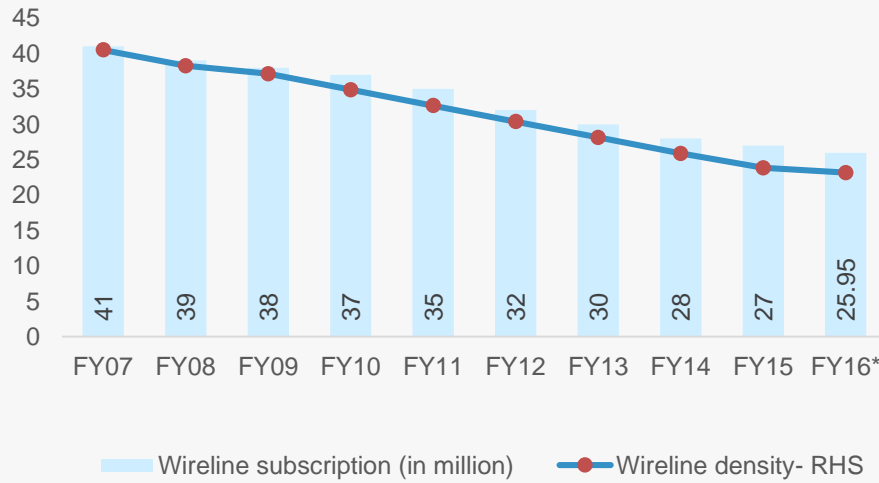


Source: Telecom Regulatory Authority of India, TechSci Research
Notes: BSNL - Bharat Sanchar Nigam Limited

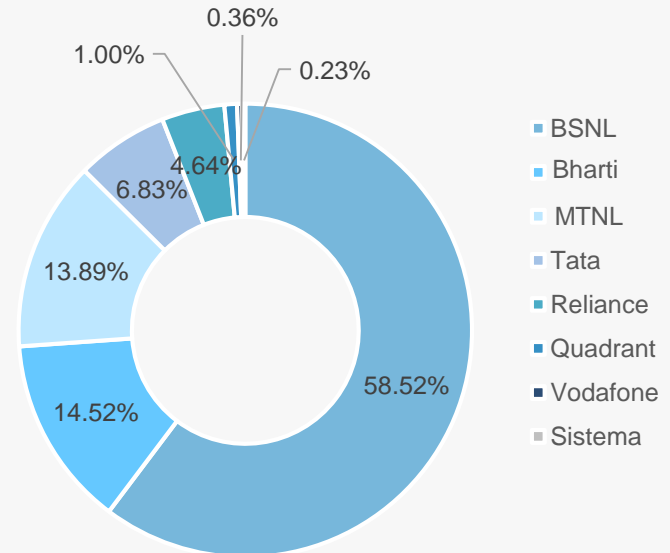
BSNL DOMINATES FIXED-LINE SEGMENT

- * Total fixed-line subscription stood at 25.95 million, while teledensity reached 2.06 per cent due to wide usability of the wireless segment in FY16
- * BSNL is the market leader with a 60.28 per cent share, followed by MTNL (13.60 per cent)
- * BSNL, MTNL, and Bharti together account for 87.46 per cent of the total fixed-line market

Fixed-line segment subscription and teledensity (FY16)



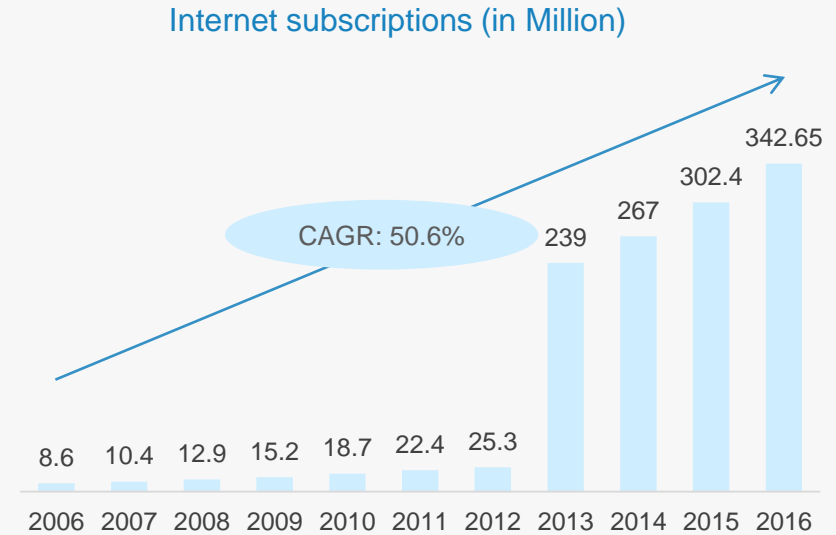
Fixed-line market share (FY16)



Source: Telecom Regulatory Authority of India, TechSci Research
Notes: BSNL - Bharat Sanchar Nigam Limited
FY16* - as on March 2016

NUMBER OF INTERNET SUBSCRIBERS INCREASING AT A FAST PACE

- * The number of Internet subscribers in the country increased at a CAGR of 44.56 per cent, with the number reaching 342.65 million in March, 2016 from 8.6 million in 2006
- * By December 2015, the number of internet users is anticipated to reach 402 million. This is expected to reach 462 million by the end of June 2016 with the increasing number of subscribers coming online especially through mobile devices

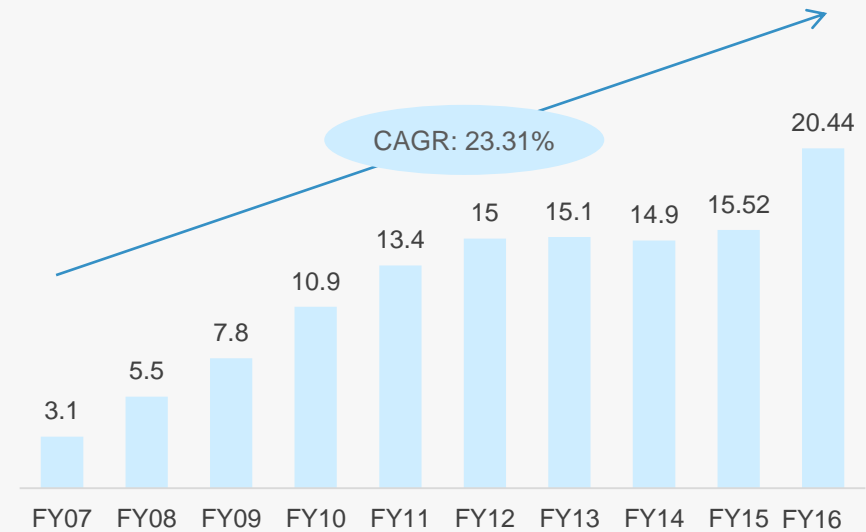


Source: Telecom Regulatory Authority of India, Business Monitor International, TechSci Research
Including Internet Access by Wireless Phone Subscribers,
CAGR - Compound Annual Growth Rate;
BSNL - Bharat Sanchar Nigam Ltd,
Internet live stats

STRONG GROWTH IN BROADBAND DRIVES INTERNET ACCESS REVENUES

- * Broadband subscription in the country witnessed an increase at a CAGR of 23.31 per cent during FY07–16 (till March 2016)

Wired broadband subscriptions (in million)

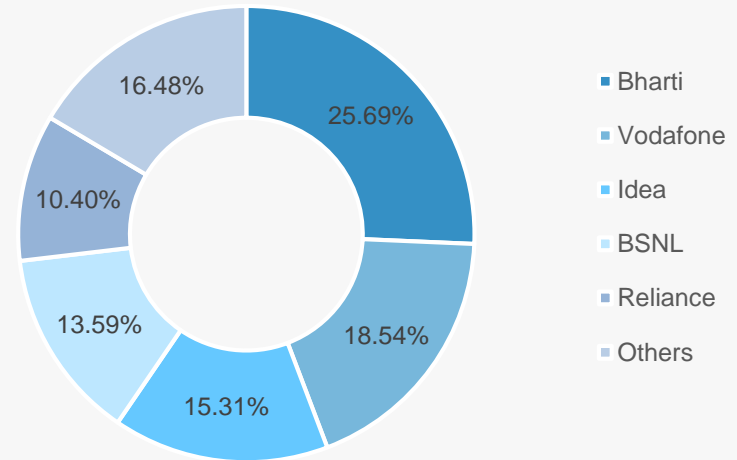


Source: Telecom Regulatory Authority of India, TechSci Research
Notes: CAGR - Compound Annual Growth Rate

BHARTI ACCOUNTS FOR MAJOR SHARE IN BROADBAND SUBSCRIPTIONS






- * As of March 2016, Bharti accounted for the largest share of 25.7 per cent in the total broadband market of India
- * Vodafone accounted for the second-largest share of 18.54 per cent in the country's broadband market, during the same period

Market break-up by broadband subscriptions (wired and wireless) (FY16)



Source: Telecom Regulatory Authority of India, TechSci Research
Notes: BSNL - Bharat Sanchar Nigam Ltd,

KEY COMPANIES IN THE MARKET

	Company	Ownership	Presence
	Mahanagar Telephone Nigam Ltd (MTNL)	Government (56.3%), Life Insurance Corporation (18.8%)	Fixed-line and mobile telephony (in Delhi and Mumbai), data and Internet
	Bharat Sanchar Nigam Ltd (BSNL)	Government (100%)	Fixed-line and mobile telephony (GSM – outside Delhi and Mumbai), data and Internet in 22 circles
	Reliance Communications	ADAG Group (approximately 59.70%)	Mobile (CDMA) and broadband
	Bharti Airtel	Bharti Group (43.72%), Pastel Ltd (14.79%), Indian Continent Investment (6.65%)	Broadband and mobile (GSM) in 22 circles
	Vodafone India	Vodafone (84.5%), Piramal Enterprises (11.0%)	Broadband and mobile (GSM) in 22 circles

Source: Companies' websites, Bloomberg, TechSci Research

NOTABLE TRENDS IN THE INDIAN TELECOM SECTOR ... (1/2)

Green Telecom

- The green telecom concept is aimed at reducing carbon footprint of the telecom industry through lower energy consumption
- Tata has invested around USD16.38 million to convert its 10,000 base stations from indoor to outdoor to reduce energy consumption and carbon footprint across its 20 telecom circles in India so far

Expansion to Rural Markets

- There are over 62,443 uncovered villages in India; these would be provided with village telephone facility with subsidy support from the government's Universal Service Obligation Fund (thereby increasing rural teledensity)
- In March 2016, the rural subscriber base accounted for 42.42 per cent of the total subscriber base, thereby fuelling growth across the sector

Emergence of BWA Technologies

- The most significant recent developments in wireless communication include BWA technologies such as WiMAX and LTE
- In 2015, Airtel launched its 4G services in 296 cities across the India
- In 2015, BSNL started its first 4G Wireless Broadband Internet Service- WiMax
- Reliance Jio, has launched 4G services across pan- India as on December 2015

Source: TechSci Research

Notes: BWA - Broadband Wireless Access, TRAI - Telecom Regulatory Authority of India

NOTABLE TRENDS IN THE INDIAN TELECOM SECTOR ... (2/2)

Telecom Finance Commission

- Department of Telecommunication is planning to issue a global tender for inviting applications for setting up a Telecom Finance Corporation (TFC). The government has fixed a deadline according to which TFC is expected to be operational by March 31, 2017

Rising investments

- Vodafone one of the leading players in the telecom sector in India, has disclosed its plans to invest USD1310 million to upgrade and expand Vodafone India network coverage and USD655 million to upgrade its technology centre

Outsourcing non-core activities

- As part of the recent outsourcing trend, operators have outsourced functions such as network maintenance, IT operations, and customer service

Mobile banking

- Availability of affordable smartphones, along with a rise in the security level of mobile transactions, is expected to boost growth of transactions conducted via phones, with the overall transaction value being tripled in 2014
- In May 2016, about 37 lakh mobile banking transaction attempts were able to reach NPCI's platform

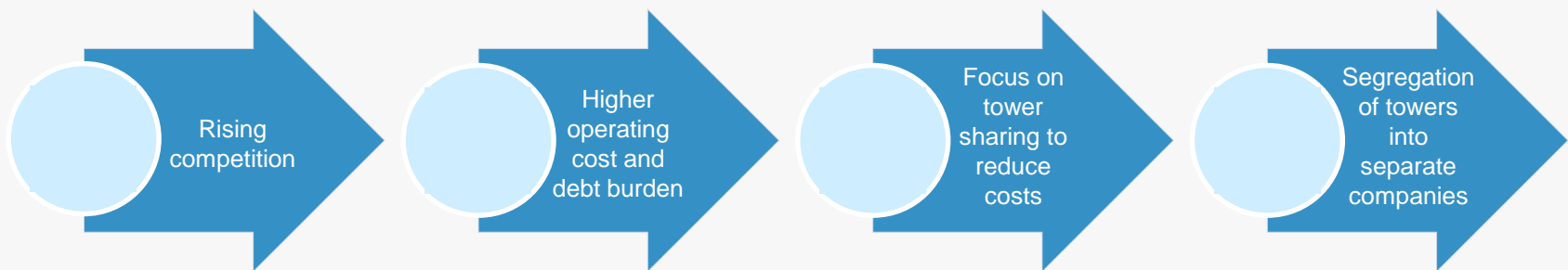
Source: 'Searching for New Frontiers of growth: Indian Banks'- PwC, TechSci Research, Reserve Bank of India

Note: NPCI - National Payment Corporation of India

EMERGENCE OF TOWER INDUSTRY

- * A surge in the subscriber base has necessitated network expansion covering a wider area, thereby creating a need for significant investment in telecom infrastructure
- * To curb costs and focus on core operations, telecom companies have been segregating their tower assets into separate companies. For example: Reliance Communications has decided to finalise a deal to sell its stake in Reliance Infratel. The value of the deal is around USD3.68 billion
- * Creating separate tower companies has helped telecom companies lower operating cost and improve capital structure; this has also provided an additional revenue stream
- * Inspired by the success seen by Indian players in towers business, most of the operators around the world are replicating the model

Emergence of tower industry



Source: TechSci Research

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PORTER FIVE FORCES ANALYSIS

PORTER'S FIVE FORCES ANALYSIS

Competitive Rivalry

- Customers' low switching cost and price sensitivity are increasing competition among players
- High exit barriers are also intensifying competition
- There are around 6 to 7 players in each region, leading to intense competition

Threat of New Entrants

- Strict government regulations
- Extremely high infrastructure setup cost
- Difficulty in achieving economies of scale

Substitute Products

- Hardly any threat of substitute products as there is no substitute available in the market

Bargaining Power of Suppliers

- High bargaining power of suppliers as there are just a few suppliers in the sector
- High cost of switching suppliers

Bargaining Power of Customers

- Low switching cost and mobile number portability give customers high bargaining power
- Customers are price sensitive



Source: TechSci Research
Note: VoIP – Voice Over Internet Protocol

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STRATEGIES ADOPTED

STRATEGIES ADOPTED

Marketing strategy

- Players are using innovative marketing strategies to succeed in this sector. For example,
 - In August 2015, Idea Cellular launched new campaign “Get idea and dance”
 - Airtel launched new ad campaign “Airtel myPlan Family”

Differentiation

- Players differentiate themselves by providing different services to customers. For example,
 - In 2015, Airtel India launched a mobile app “Wynk Movies”, it is a library that includes videos and movies
 - In November 2015, Vodafone launched “Choose Your Number” facility where pre paid and post paid customers get numbers of their own choice

Pricing strategy

- Players price their products very carefully due to the price sensitive nature of customers and high competition in the sector. Players generally go for price war. For example,
 - To compete with Airtel 4G services, Vodafone launched ‘Double Data’ scheme for its prepaid customers where users will get double data pack at the same price.
 - Companies such as Reliance Jio, Airtel have already launched 4G technology at very competitive prices
 - In September 2016, Reliance Jio 4G network plans have been launched by the company’s chairman Mr. Mukesh Ambani. Free domestic voice calls have been offered by Jio. No charge or deduction of data would be done for making voice calls to any network across the country. Also, the company has offered cheaper data plans and tariff plans ranging from USD2.28 to USD76.37 per month. As of October 2016, the company’s subscriber base had crossed 16 million customers

Source: Company websites, TechSci Research

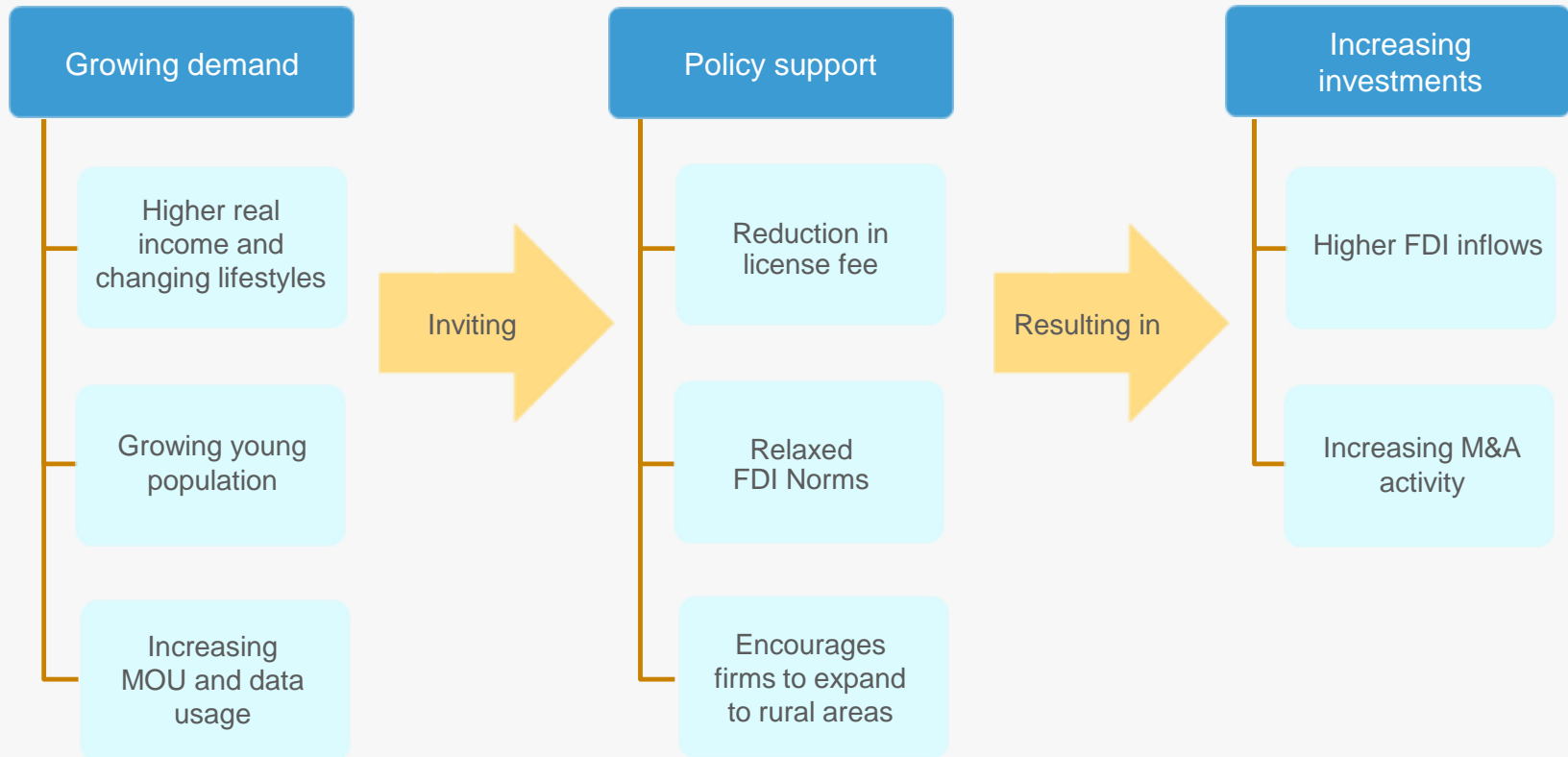
Notes: CDMA – Code Division Multiple Access, GSM - Global System for Mobile Communication

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GROWTH DRIVERS

SECTOR BENEFITS FROM RISING INCOME, GROWING YOUNG POPULATION

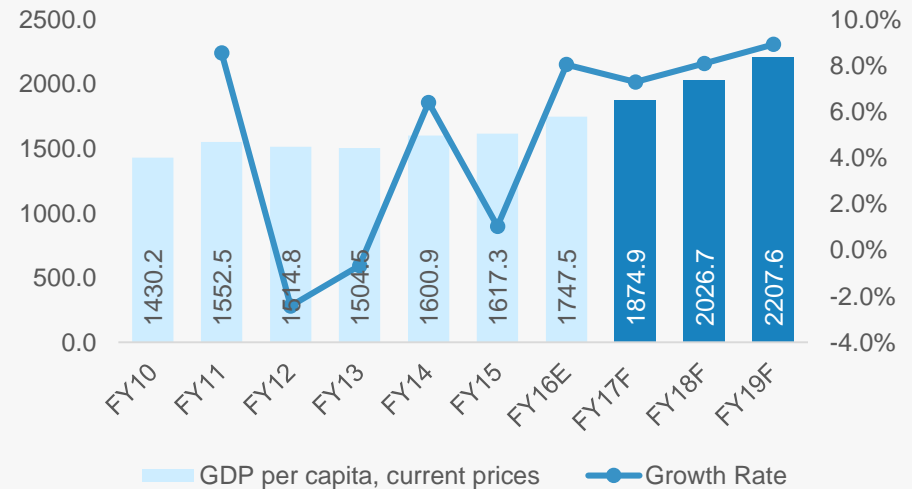


Notes: FDI - Foreign Direct Investment, MOU - Minutes of Use per month and per subscriber, M&A - Mergers and Acquisitions

RISING INCOME FUELS DEMAND FOR TELECOM SERVICES

- * Incomes have risen at a brisk pace in India and will continue rising given the country's strong economic growth prospects.
- * Nominal per capita income have recorded a CAGR of 8.87 per cent over 2000–15
- * Increasing income has been a key determinant of demand growth in the telecommunication sector in India
- * The IMF estimates nominal per capita income in India to expand at a CAGR of 4.94 per cent during FY10–FY19
- * Per capita income in the country is expected to grow at a CAGR of 8.1 per cent during FY15-FY19
- * Per capita income in the country is estimated at USD1,747.5 in FY16

Rising per capita income in India (USD)



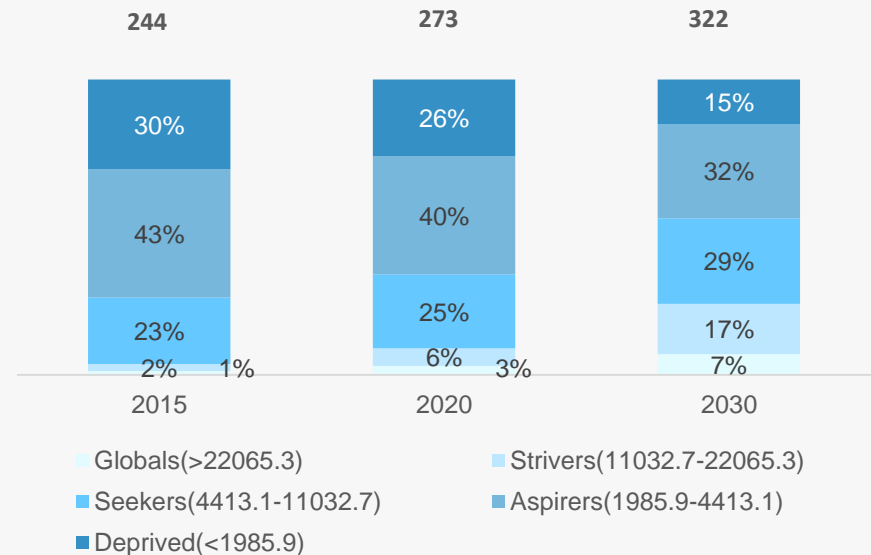
Source: IMF, TechSci Research
Notes: CAGR - Compound Annual Growth Rate,
F – Forecast, E - Estimate

INCREASING INCOME AND GROWING RURAL MARKET – DEMAND DRIVERS

- * The emergence of an affluent middle class is triggering demand for the mobile and internet segments
- * A young, growing population is aiding this trend (especially demand for smart phones)

Indian residents shifting from low to high income groups (%)

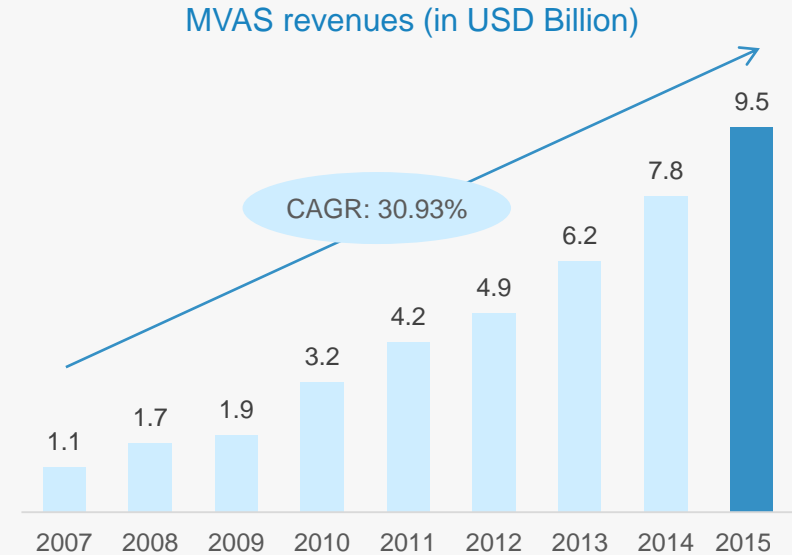
Million Household, 100%



Source: McKinsey Quarterly Report, TechSci Research
Note: Mobile Users Come of Age' February 2011

INCREASING INTERNET REVENUES AND SUBSCRIPTIONS

- * The Mobile Value Added Services (MVAS) industry has expanded at a CAGR of 30.93 per cent to USD9.5 billion by 2015 from USD1.1 billion in 2007
- * The share of non-voice revenues, which currently stands at around 10 per cent of telecom operators' revenues, is estimated to rise to more than 30 per cent in the next five to seven years
- * A decline in the prices of smartphones and data subscription rates is likely to drive demand for MVAS



Source: Wipro Technologies,
The Internet and Mobile Association of India, TechSci Research
Notes: CAGR - Compound Annual Growth Rate,
MVAS - Mobile Value-Added Services,
E - Estimate, F - Forecast

STRONG POLICY SUPPORT CRUCIAL TO THE SECTOR'S DEVELOPMENT ... (1/3)

To compensate the consumers in case of call drop

- In October 2015, Telecom Regulatory Authority of India announced an amendment for Telecom Consumer Protection Regulations 2012 according to which mobile service operators have to provide compensation to the users in case of call drop.
- The formulated regulation would be effective from January, 2016.

Standards of quality wireline and wireless services

- In 2015, Telecom Regulatory Authority of India made regulations to amend the Standards of quality of wireline (telephone service) and cellular mobile telephone services. These regulations has been laid down to ensure better and effective compliance with the quality of service regulations and to protect the interest of the customers

Relaxed FDI norms

- FDI cap in the telecom sector has been increased to 100 per cent from 74 per cent; out of 100 per cent, 49 per cent will be done through automatic route and the rest will be done through the FIPB approval route
- FDI of up to 100 per cent is permitted for infrastructure providers offering dark fibre, electronic mail and voice mail

Notes: FDI - Foreign Direct Investment,
FIPB - Foreign Investment Promotion Board
Source: TRAI, TechSci Research

STRONG POLICY SUPPORT CRUCIAL TO THE SECTOR'S DEVELOPMENT ... (2/3)

Telecommunication Tariff Order

- In 2015, TRAI passed the telecommunication tariff (16th amendment) order, according to which, every service provider should offer a special roaming tariff plan to its prepaid and post-paid customers and on payment of fixed charge for special roaming tariff plan national roaming should be free

Set up internet connections

- The Department of Information Technology intends to set up over 1 million internet-enabled common service centres across India as per the National e-Governance Plan
- On 8th August 2016, the Telecom Regulatory Authority of India (Trai) made the 10th amendment to the TCPR (Telecom Consumers Protection Regulations) permitting telecom companies to offer data packs having maximum validity of 365 days

Reduction in license fees

- In January 2015, the Government of India recommended reduction in license fees of telecom operators by 6 per cent, telecom operators currently pay 8 per cent of adjusted gross revenue as licence fee
- The issuance of several international and national long-distance licenses has created opportunities and attracted new companies into the market

Notes: USOF - Universal Service Obligation Fund; OFC - Optical Fibre Cable,
WiMAX - Worldwide Interoperability for Microwave Access Telecommunications
Source: TRAI, TechSci Research

STRONG POLICY SUPPORT CRUCIAL TO THE SECTOR'S DEVELOPMENT ... (3/3)

Financial support

- The USOF is expected to extend financial support to operators providing services in rural areas and encourage active infrastructure sharing among operators
- TRAI has recommended that USO levy component to be reduced from 5 per cent to 3 per cent of annual revenues for all the licenses from April 2015

Enhanced spectrum limit

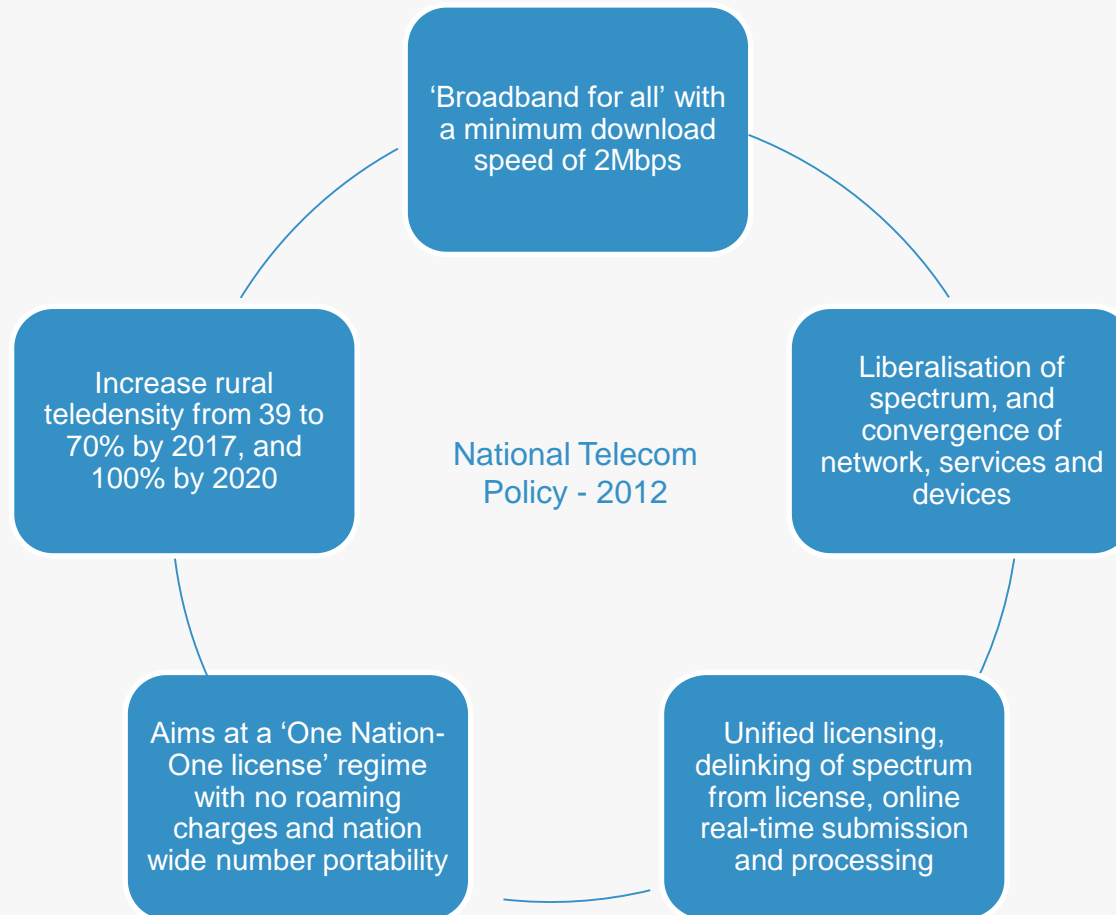
- The prescribed limit on spectrum would be increased from 6.2MHz to 2x8 MHz (paired spectrum) for GSM technology in all areas other than Delhi and Mumbai, where it will be 2x10MHz (paired spectrum)
- Telecom players can, however, obtain additional frequency; there will be an auction of spectrum subject to the limits prescribed for the merger of licenses
- As of October 2016, telecom operators like Vodafone and Tata Teleservices purchased spectrum worth USD 1.51 billion and USD 0.34 billion, respectively, from the government

Telecommunication amendment order for broadcasting and cable services

- In 2015, telecom authority issued this order mandating every DTH operator to specify the tariff for supply and installation of the customer premises equipment. DTH operator should specify the refundable security deposit, installation charges, monthly rental charge and activation

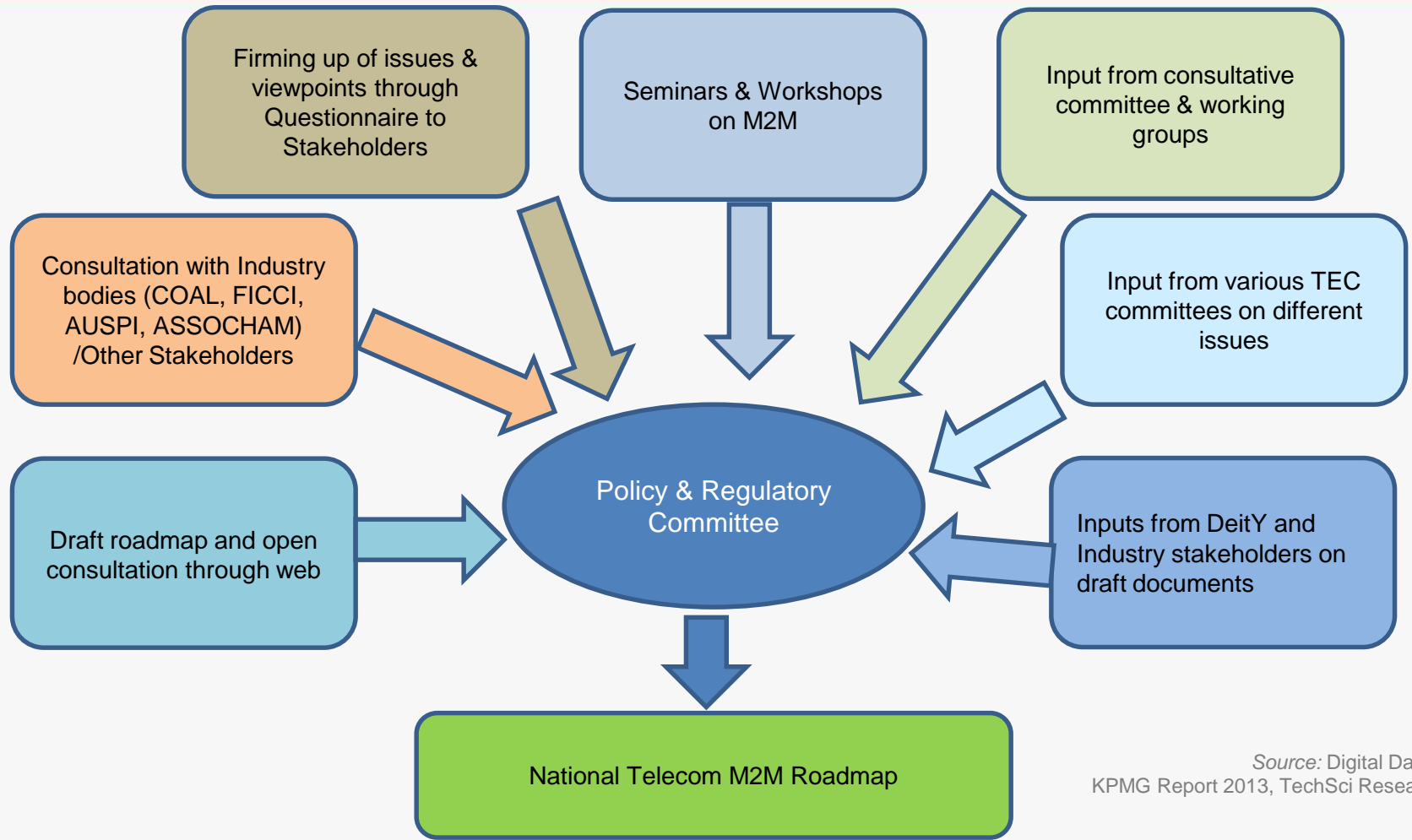
Source: TRAI, TechSci Research
Notes: USOF - Universal Service Obligation Fund; OFC - Optical Fibre Cable

NATIONAL TELECOM POLICY - 2012



Source: Digital Dawn,
KPMG Report 2013, TechSci
Research

Process of M2M Roadmap Formulation

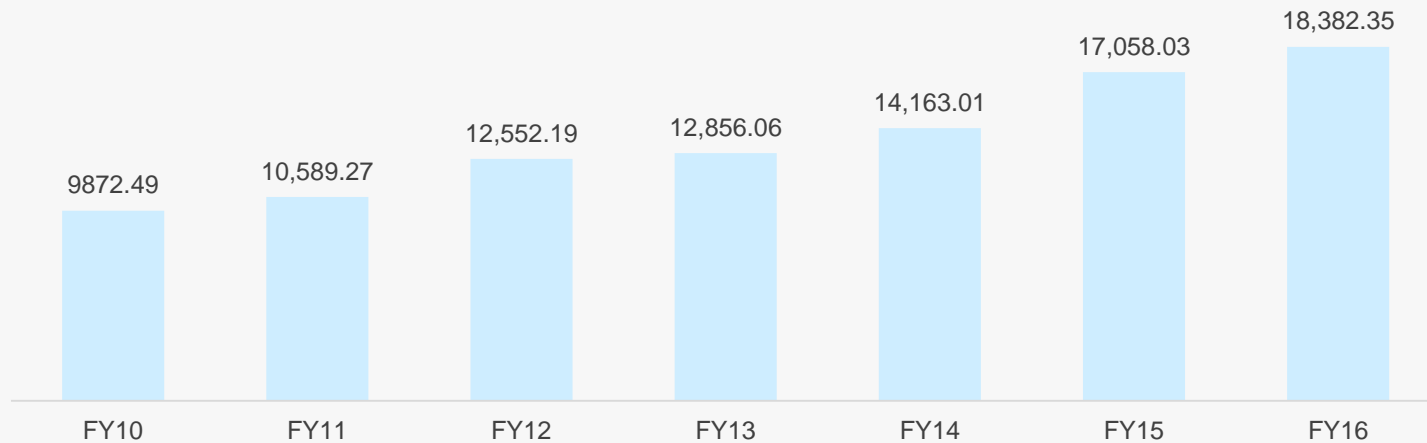


Source: Digital Dawn, KPMG Report 2013, TechSci Research

FOREIGN INVESTMENTS FLOWING IN ... (1/2)

- * Cumulative FDI inflows into the telecom sector over April 2000–March 2016, totalled to USD18.38 billion
- * During this period, FDI into the sector accounted for a share of 6.4 per cent of total FDI inflows into the country, till March 2016

Cumulative FDI inflows into telecommunication (USD million)



Source: Department of Industrial Policy & Promotion, TechSci Research
Note: FY16 - Data mentioned is from April 2000 – March 2016

FOREIGN INVESTMENTS FLOWING IN ... (2/2)

Foreign investment in India

Target	Acquirer	Acquisition price (USD million)	Division acquired
Videocon Telecommunications Ltd-1800 MHz spectrum in six circles	Bharti Airtel (2016)	660	100% stake
Bharti Airtel's operations in Burkina Faso and Sierra Leone	Orange SA (2016)	900	100% stake
MTS	Reliance Communication (2015)	736.98	8 – 10% stake
Augere Wireless	Bharti Airtel (2015)	21.3 million	100% stake
Bharti Airtel	SingTel(2013)	302	Increases stakes to 32.34%
Bharti Airtel	Qatar Foundation Endowment(2014)	1,260	PE deal – 5% stake
Vodafone India Ltd	Vodafone International Holdings (2014)	1,641	Increases stakes to 100%

- * As on September 2016, Reliance Communications merged operations with telecom operator Airtel. The merged entity plans to dilute 25 per cent of its equity by selling stake to Russian company, Sistema.

Source: Thomson Banker, Deal Tracker, Grant Thornton, TechSci Research
Notes: M&A - Merger and Acquisition, PE - Private Equity

EXPANSION AND GROWTH STRATEGIES OF LEADING PLAYERS

New Call Telecom Investment decision

- In 2015, New Call Telecom has announced to invest USD300 million in India within next 12-18 months. The company has decided to invest in India to increase its presence. Along with investments, New Call Telecom has already acquired Nimbuzz (global mobile technology brand) and New Delhi based Ozone networks

Vodafone India 4G launch, Reliance Jio 4G launch

- In January 2016, Vodafone India launched its 4G network services in Kolkata and Kozhikode (Kerala) following its successful implementation in other parts of Kerala such as Kochi and Thiruvananthapuram
- In September 2016, Reliance Jio launched 4G services across India, at comparatively cheaper rates. The company has targeted to acquire 100 million customers by March 2017. In addition to the existing plan India 2300 MHz spectrum and 1800 MHz in 14 circles, during this year's auction Jio invested over USD1,527.7 million to acquire 1800 MHz spectrum in 6 circles and 800 MHz spectrum in 10 circles

Mobile wallet by Vodafone

- Vodafone India has entered into an agreement with Walmart India to make payments using M-Pesa mobile wallet services. Under this agreement, Vodafone M-Pesa will offer safe, secure and convenient transactions and on placing an order with Walmart India, Vodafone M-Pesa agent will reach out to customer and cash in into his M-Pesa account

New Entrant in the Smartphone Market

- China based companies such as Xiaomi, One Plus, OPPO, Huawei, etc. have launched their Smartphones in India.
- Domestic Players such as Micromax, Karbonn and Lava are the top three budget smartphone companies in India

Source: Thomson Banker, Deal Tracker, TechSci Research
Note: M&A - Merger and Acquisition

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OPPORTUNITIES

OPPORTUNITIES ACROSS SEGMENTS IN THE INDUSTRY ... (1/2)

Increasing mobile subscribers

- The number of wireless subscribers in India reached 1.033 billion, by March 2016
- Of the total 1033.63 million subscribers in 2016, around 56.96 per cent subscribers are likely to be from urban areas and the rest (43.04 per cent), from rural areas

Untapped rural markets

- By 2017, rural tele-density is expected to reach 70 per cent and 100 per cent by 2020, growing from 43.05 per cent as of March 2016
- By March 2016, rural wireless tele-density in the country increased to 50.88, while, the urban wireless tele-density reached to 148.73 during the same period

Rising internet penetration

- Internet penetration is expected to grow steadily and is likely to be bolstered by government policy
- Number of broadband subscribers reached 149.75 million at the end of March 2016

Source: KPMG, TRAI, TechSci Research

OPPORTUNITIES ACROSS SEGMENTS IN THE INDUSTRY ... (2/2)

Development of telecom infrastructure

- Telecom infrastructure was expected to increase at a CAGR of 20 per cent to 571,000 towers during 2008–15
- TRAI has made several recommendations for the development of telecom infrastructure, including tax benefits and recognising telecom infrastructure as essential infrastructure

Growth in MVAS and cloud computing

- The Indian Mobile Value-Added Services (MVAS) industry is expected to reach USD9.5 billion by 2015 from USD4.9 billion in 2012
- Public cloud services in India generated USD730 million by December 2015. Indian public cloud services market is expected to reach USD1.9 billion by 2019.

Telecom equipment market

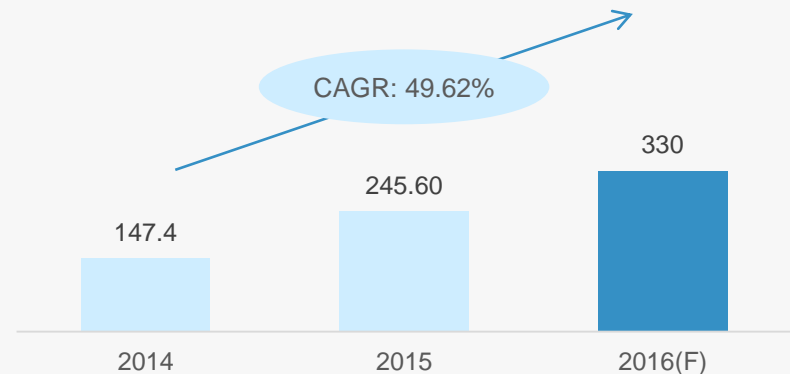
- Telecom equipment market was estimated to be USD20 billion in 2015-16
- It is anticipated to reach USD30 billion by 2020
- Under Digital India programme, 'every Indian has a smartphone by 2019' programme implemented

Source: Press information bureau, Government of India, TechSci Research
Notes: VAS - Value-Added Services, NTP - National Telecom Policy

MOBILE APPLICATION MARKET: FAST GROWING SEGMENT

- * The mobile application (app) market is expected to expand at a CAGR of 49.62 per cent to USD330 million during 2014–16
- * The mobile app market is estimated around USD245.6 million in 2015
- * The segment's growth is expected to be driven by increasing mobile connections and availability of low-range smartphones
- * Over 100 million apps are downloaded every month across different platforms such as iOS, Blackberry, Nokia, and Android

Mobile App Market Size (USD million)



Source: Gartner, Deloitte, Assorted News Articles, TechSci Research
Notes: CAGR - Compounded Annual Growth Rate, *CAGR is calculated in USD million terms, F - Forecast

TELECOMMUNICATION

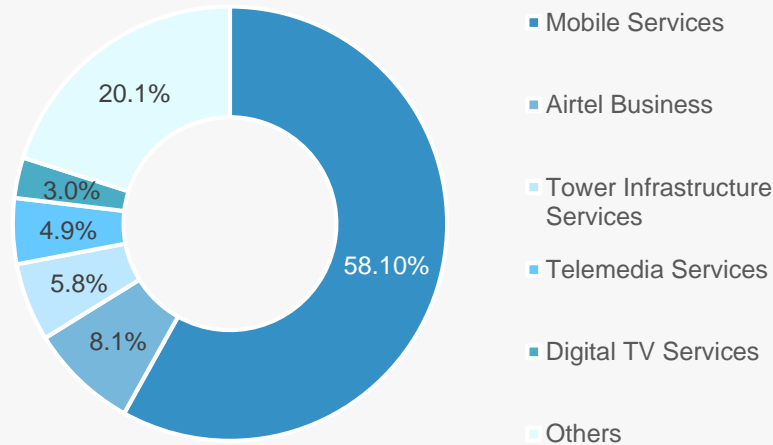


SUCCESS STORIES

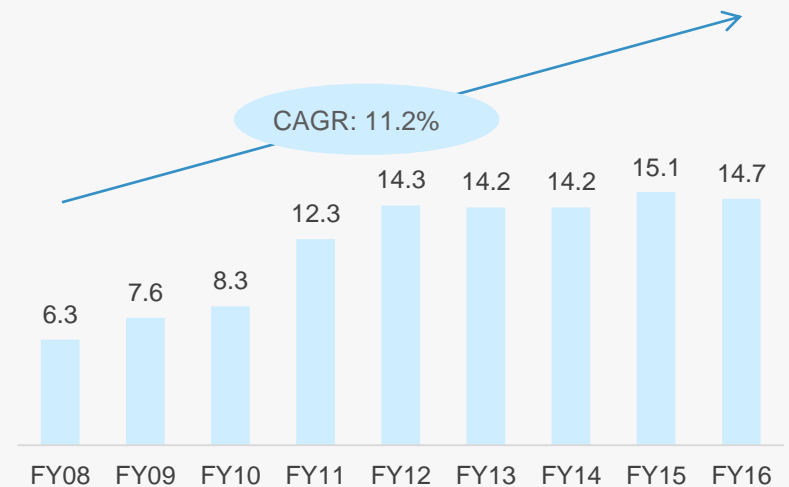
BHARTI AIRTEL: AN INSPIRING SUCCESS STORY ... (1/2)

- * Set up in 1995, Bharti Airtel is world's leading mobile operator with presence in 20 countries
- * It is the country's leading mobile operator, with a customer base of 357.4 million as of March 2016, and the world's third-largest telecom operator
- * Revenues increased at a CAGR of 11.2 per cent during FY08-FY16 from USD6.3 billion in FY08 to USD14.7 billion in FY16

Major segments⁽¹⁾ (FY16)



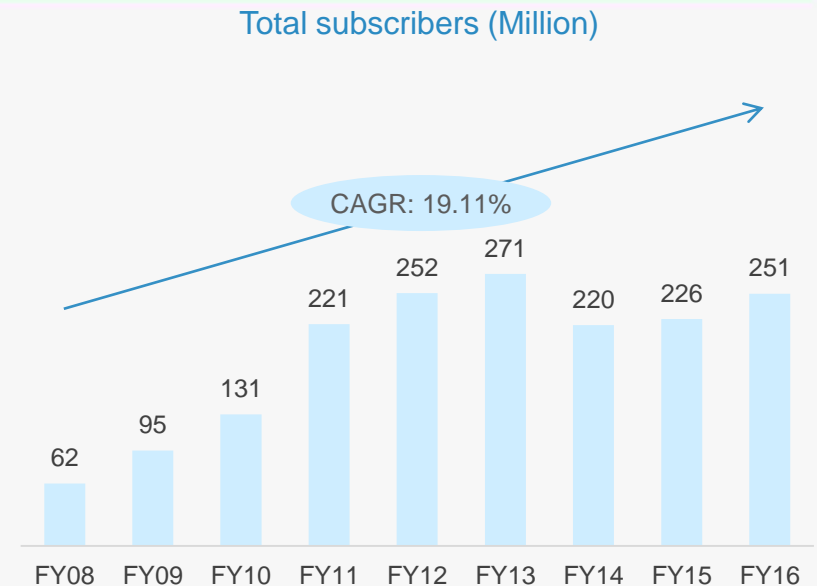
Revenues (in USD Billion)



Source: Company website, TechSci Research
Notes: CAGR - Compound Annual Growth Rate
Note: ⁽¹⁾ - Revenue is including eliminations

BHARTI AIRTEL: AN INSPIRING SUCCESS STORY ... (2/2)

- * Bharti Airtel had over 251.2 million subscribers, as of March 2016
- * The company's overall subscriber base in the country expanded at a CAGR of 19.11 per cent, reaching 251.2 million from 62 million over FY08–FY16
- * Bharti Airtel has a mobile subscriber base of 200 million in India
- * Bharti Airtel bought optical network gear from Ciena Communications Inc in 2014 to expand capacity of its i2i undersea cable network that connects India to Singapore
- * The company had expansion plans in Africa to tap the huge growth potential
- * It became the first Indian telecom company to offer 4G service on mobile phones
- * On 8th April, 2016, Bharti Airtel Ltd acquired 4G TD spectrum for eight circles namely Bihar, J&K, Tamil Nadu, West Bengal, Assam, North East, Andhra Pradesh and Orissa from Aircel Limited

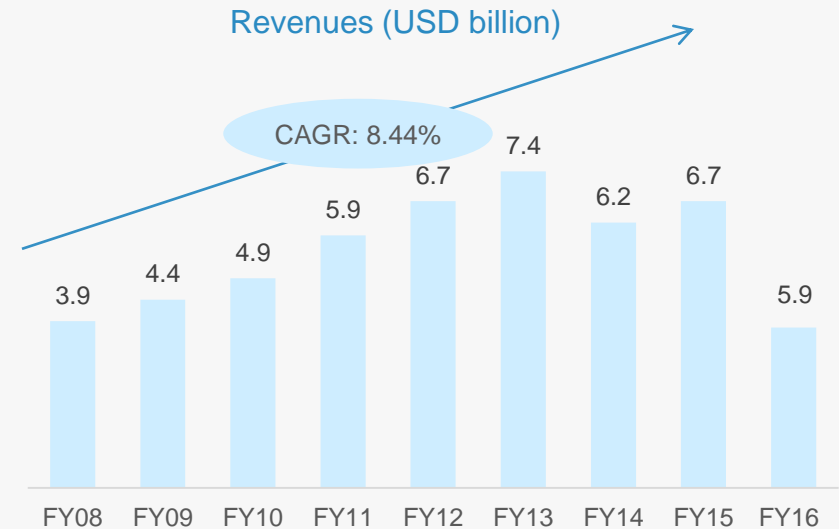


Source: Company website, TechSci Research
Notes: CAGR - Compounded Annual Growth Rate

- * As of November 2016, the company signed a USD 60 million deal with Finnish gear maker 'Nokia' to implement voice-over-LTE (VoLTE) calling technology

VODAFONE: INDIA'S THIRD-LARGEST MOBILE OPERATOR ... (1/2)

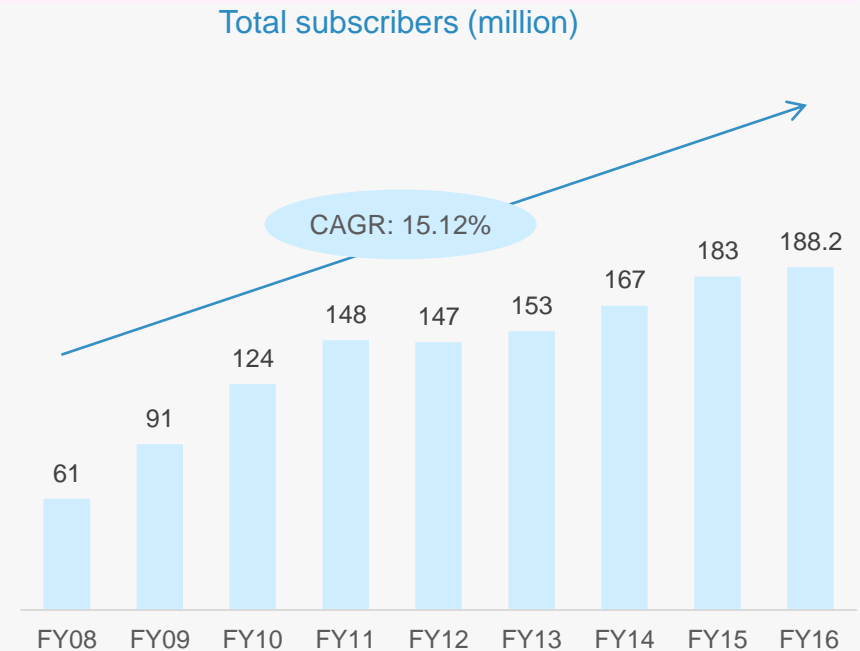
- * Established in 1994, Vodafone is one of India's leading mobile operators, with more than 188.2 million customers as of September 2015
- * Vodafone's revenues from India increased at a CAGR of 8.44 per cent to USD6.7 billion during FY08–15



Source: Company website, TechSci Research
Notes: CAGR - Compounded Annual Growth Rate

VODAFONE: INDIA'S THIRD-LARGEST MOBILE OPERATOR ... (2/2)

- * Vodafone's customer subscription increased at a CAGR of 15.12 per cent to 188.2 million during FY08–FY16⁽¹⁾
- * In September 2015, Vodafone's subscriber base stood at 188.2 million
- * Vodafone has announced to launch its 4G services in Mumbai, Delhi, Kolkata, Kerala and Karnataka by December 2015
- * Gujarat, Uttar Pradesh, Maharashtra, and West Bengal together account for over 45 per cent of the total customer base
- * Vodafone Group plans to invest heavily in the establishment of a fibre-optic network in India
- * Vodafone has launched 4G services in Delhi, Kolkata, Karnataka and Kerala in February 2016. In May 2016, the company also planned to cover four circles of Gujarat, Haryana, UP (East) and West Bengal

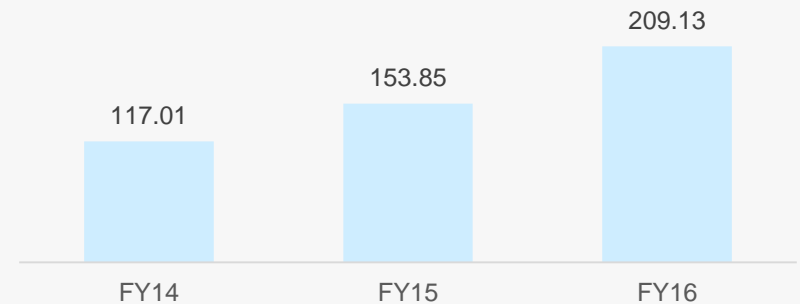


Source: Company website, TechSci Research
Notes: FY16⁽¹⁾ represents data till Sep 2015,
CAGR - Compounded Annual Growth Rate

MOBILE NUMBER PORTABILITY: A PARADIGM SHIFT IN INDIAN TELECOM

- * Mobile Number Portability (MNP) in India was introduced in November 2010
- * MNP allows subscribers to change their mobile service provider while retaining their old mobile number
- * The portability service was made available for both postpaid and prepaid customers as well as on both GSM and CDMA platforms
- * The implementation of MNP has brought a slew of benefits for customers in terms of better plans and offers
- * MNP requests in India increased to 209.13 million at the end of March, 2016

Number of MNP requests (in million)



Source: TRAI Report, TechSci Research

TELECOMMUNICATION



USEFUL INFORMATION

INDUSTRY ASSOCIATIONS

Association of Unified Telecom Service Providers of India (AUSPI)

B-601, Gauri Sadan 5, Hailey Road, New Delhi – 110 001, India

Tel: 91 11 23358585

Fax: 91 11 23327397

Website: <http://www.auspi.in/>

Association of Competitive Telecom Operators (ACTO)

601, Nirmal Tower, 26, Barakhamba Road, Connaught Place, New Delhi – 110 001, India

Tel.: 91 11 43565353 / 43575353

Fax: 91 11 43515353

E-mail: info@acto.in

Website: www.acto.in

Internet & Mobile Association of India (IAMAI)

F-36, Basement, East of Kailash, New Delhi – 110 065, India

Tel: 91 11 46570328

E-mail: kalyan@iamai.in

Website: www.iwww.iamai.in

BMI telecoms business environment ratings

- * Industry rewards: it considers average revenue per users, number of subscribers, subscriber growth, and number of operators
- * Country rewards: it considers urban/rural split, age range, GDP per capita, USD
- * Industry risks: it considers regulatory independence
- * Country risk: it rates the country on short-term external risk, policy continuity, legal framework corruption
- * Telecom ratings: overall rating of the above indicators

- * **BWA:** Broadband Wireless Access
- * **CAGR:** Compound Annual growth rate
- * **DoT:** Department of Telecommunication
- * **FDI:** Foreign Direct Investment
- * **FTTH:** Fibre To The Home
- * **FY:** Indian Financial Year (April to March)
- * **IMF:** International Monetary Fund
- * **INR:** Indian Rupee
- * **IPTV:** Internet Protocol Television
- * **M&A:** Mergers and Acquisitions
- * **MoU:** Minutes of Use per month and per subscriber
- * **MPEG:** Moving Picture Experts Group

- * **OFC:** Optical Fibre Cable
- * **TRAI:** Telecom Regulatory Authority of India
- * **USOF:** Universal Service Obligation Fund
- * **USD:** US Dollar
- * **VAS:** Value-Added Services
- * **WiMAX:** Worldwide Interoperability for Microwave access telecommunications
- * Wherever applicable, numbers have been rounded off to the nearest whole number

EXCHANGE RATES

Exchange rates (Fiscal Year)

Year	INR equivalent of one USD
2004-05	44.81
2005-06	44.14
2006-07	45.14
2007-08	40.27
2008-09	46.14
2009-10	47.42
2010-11	45.62
2011-12	46.88
2012-13	54.31
2013-14	60.28
2014-15	61.06
2015-16	65.46
2016-2017E	66.95

Exchange rates (Calendar Year)

Year	INR equivalent of one USD
2005	43.98
2006	45.18
2007	41.34
2008	43.62
2009	48.42
2010	45.72
2011	46.85
2012	53.46
2013	58.44
2014	61.03
2015	64.15
2016 (Expected)	67.22

Source: Reserve bank of India,
Average for the year

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