

Executive Summary

The Indian economy has undergone rapid transformation in the past two decades, and the telecom sector has contributed significantly to this growth. From under 4% in 2001, tele-density has reached 77.04% in September 2012[a], leading to substantial economic and social benefits for the country. While urban voice penetration has reached 161.03%, rural voice penetration at 40.36% and broadband at less than 2% need to be substantially enhanced in the next wave of telecom growth[b].

Globally, the telecom industry has seen substantial transformation over the last 5 years. While voice revenues saturate, data traffic has exploded driven by availability of infrastructure, devices and content. This data opportunity, however, has resulted in associated new challenges for operators and regulators. Data traffic economics still need the right balance to justify substantial investments required in spectrum and infrastructure. In addition, emergence of Over-the-top (OTT) players is transforming the telecom ecosystem. OTT players threaten to undermine operators' voice and messaging revenues, but also offer new opportunities in media and cloud as new ecosystems develop.

After a period of rapid growth, Indian operators also face challenges now, as growth of voice revenues has slowed down, while the data and 3G opportunity is materializing slower than anticipated. Hyper-competition, large investments in spectrum and network along with declining tariffs have led to significant pressure on operator profitability. Greater regulatory clarity on licensing and M&A norms will also encourage operators to take the requisite bold steps, to drive the next phase of growth for the sector.

A new policy framework was therefore required to facilitate development of telecom infrastructure, affordable services and devices, to drive mass adoption while ensuring economic sustainability for the telecom industry.

The Government has responded with the National Telecom Policy 2012 (NTP 2012) to provide a long term vision for the sector, and drive inclusive and sustainable development within the broader economic agenda. NTP 2012 lays thrust on providing broadband access to all citizens, empowering inclusive and equitable growth, optimizing spectrum allocation & licensing, development of indigenous R&D and manufacturing capability, protection of consumer interests and addressing financial concerns of industry players.

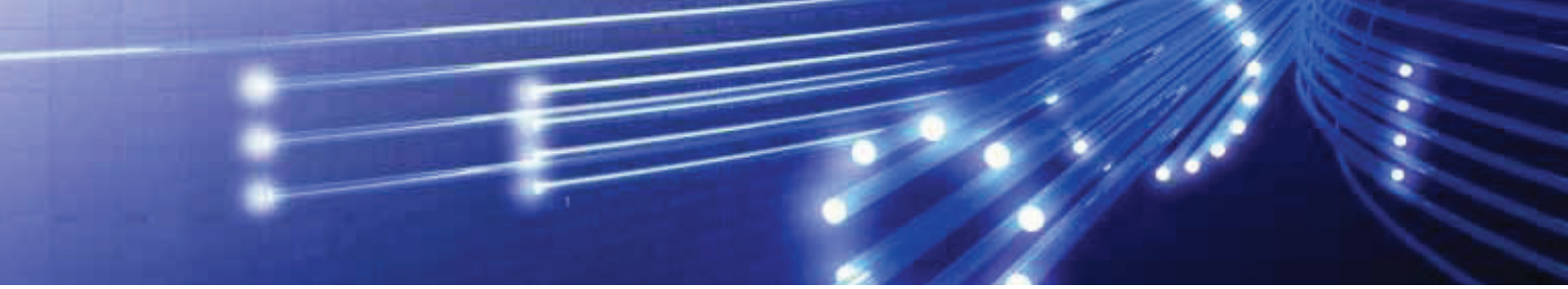
This report focuses on key aspects that are critical to the next telecom revolution, and the required role of multiple stakeholders, which include:

1. Winning the rural challenge
2. Driving broadband growth

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[a] TRAI

[b] Urban voice penetration and rural voice penetration data as of 30th September, 2012; Broadband penetration = fixed broadband penetration at 1.24% as of 30th September, 2012, and high speed data card penetration estimated at 0.62%; TRAI, A.T. Kearney analysis



3. Promoting local telecom manufacturing and R&D
4. Enabling environmentally sustainable growth

1. Winning the Rural Challenge

With about 70% of the country's population living in rural areas, bridging the rural-urban digital divide is critical for India's inclusive growth agenda. This will require the industry to address issues impacting the economic viability of rural operations i.e. lower ARPU, high cost of network roll out and operations, high sales and service costs per subscriber.

- Rural demand needs to be enhanced through lower cost devices, greater digital literacy and development of local, relevant content. Further, government efforts through National Rural Employment Guarantee Act and direct payments to citizens leveraging UIDAI cards will also help enhance disposable income of rural India.
- Network economics can be improved to a large extent by greater active and passive sharing amongst operators. Adoption of new technology and renewable power can further help reduce operating costs, and enhance network uptime in rural areas. Additionally, USOF can be further utilised to develop shared access and backhaul infrastructure for rural sites, and also support growth of renewable power solutions.
- Sales and customer service economics can be improved by partnering with private and public sector entities with pan-India reach (like railways, India Post, etc.), local bodies and Self Help Groups, to re-define the service delivery value chain and extend reach for telecom operators.

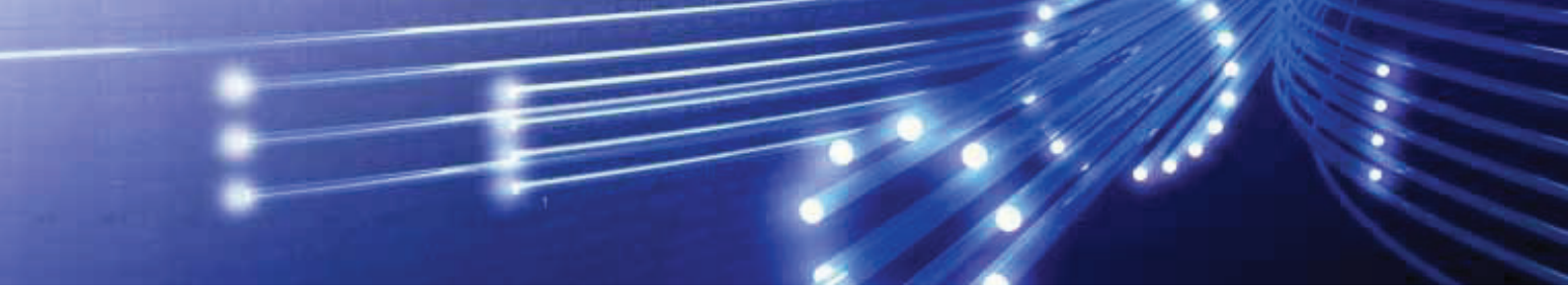
NTP 2012 strives to address many of these issues by facilitating network sharing, development of national optical fibre network and promoting local content and manufacturing.

2. Driving Broadband Growth

India currently has only about 22.5 million broadband connections, of which 15.08 million are provided through fixed line while the rest are through wireless datacards[c]. Recognising the importance of broadband to help India participate in the knowledge economy, government has set ambitious targets for enhancing broadband penetration as part of NTP 2012 – 175 million broadband connections by 2017 and 600 million by 2020.

Wireless broadband is expected to be the key driver of broadband growth in India as it helps overcome the fixed infrastructure deficit and also offers ease of access and convenience. Exponential growth in

[c] TRAI, A.T. Kearney analysis



penetration of smart devices like tablets and smartphones is further expected to accelerate data uptake. Mobile data traffic in India is expected to grow at 126%[d] CAGR from 2011 – 2016 and account for ~75%[e] of wireless operator's traffic and over 30%[f] of revenues by 2016.

NTP 2012 addresses several aspects that are critical to provide broadband on demand to the citizens.

Facilitating Investments in broadband backhaul and access infrastructure:

Government proposes to simplify the policy for Right of Way (RoW) to facilitate rollout of fixed infrastructure and installation of towers. This will help fiberisation of sites to handle high speed traffic, especially in cities. This will also support rollout of fixed line access networks, which may have lower number of connections, but will play a critical role in providing high speed connectivity of up to 100 Mbps, as envisioned in NTP 2012.

In view of the low financial viability of covering rural India, Government is also rolling out an ambitious National Optical Fibre Network (NOFN) that will connect 250,000 village panchayats and address their backhaul needs. The private sector is expected to complement this with appropriate access infrastructure leveraging innovative technologies.

Availability of sufficient spectrum at market determined price:

Nearly 84%[g] of broadband connections by 2017 are expected to be from mobile broadband. Recent estimates (TRAI 2010) suggest that if data penetration is to pick up as expected, there would be a spectrum deficit of 225 MHz by 2014. Planning for this data growth will require:

- Spectrum liberalization, with operators adopting spectrum sharing and more efficient data transfer technologies like LTE
- Sufficient spectrum allocation at market determined prices
- Refarming existing spectrum especially taking advantage of digital dividend frequencies which are freed by the switchover from analog to digital TV in urban areas
- Audit spectrum usage to ensure efficient use

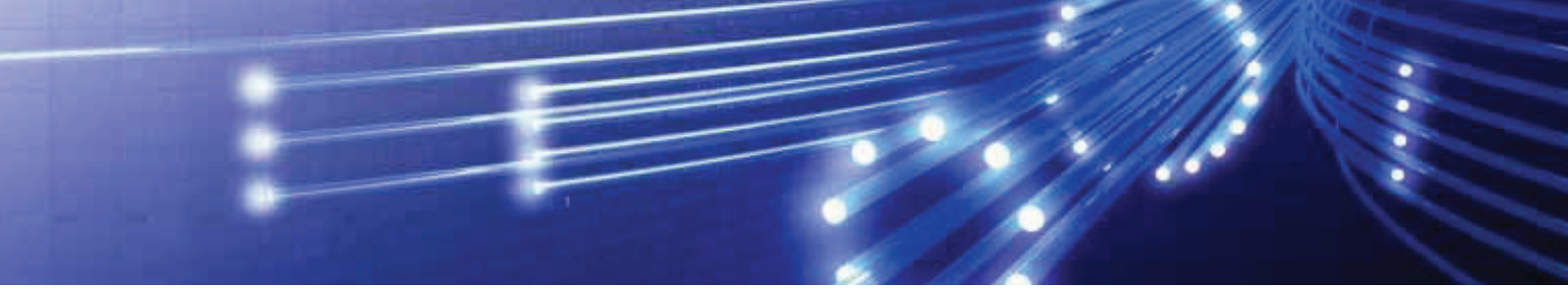
Increased affordability of broadband services and availability of local content:

Although data tariffs in India show a declining trend, the cost of ownership of broadband services as percentage of per capita GDP is still quite high. Some measures that will help reduce cost of broadband access to the end consumer are:

- Availability of sufficient spectrum at reasonable prices to help operators reduce data tariffs
- Development of low cost smart devices through local R&D and manufacturing

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[d] Cisco VNI Index
[e] A.T. Kearney analysis
[f] Pyramid Research, A.T. Kearney analysis
[g] A.T. Kearney analysis



- Developing India as a regional content and connectivity hub for data hosting, to reduce dependence on international bandwidth carriers
- Operators driving volumes to drive down tariffs as has been the case for voice
- Bundling of services as convergent offerings

Additionally, there is a need to develop local, relevant content to make broadband relevant for the masses. Some of the initiatives envisaged in this direction are:

- Developing a local language technology platform that enables standardization of language technologies
- Promoting innovation in local content by encouraging a more equitable ecosystem for content developers and operators
- Enhancing delivery of services through broadband, i.e., e-governance, e-education, e-health, etc.

3. Promoting Local Telecom Manufacturing and R&D

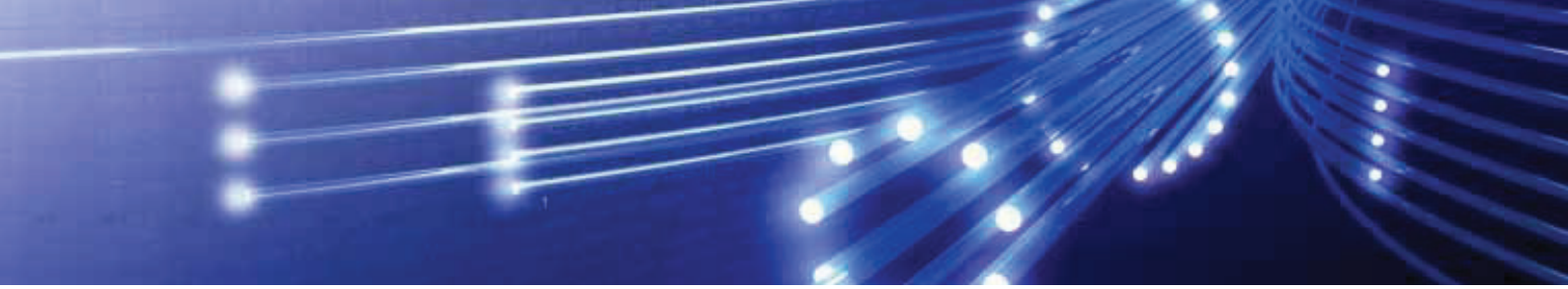
With significant investments planned in rural and broadband networks, India will continue to be a large market for telecom equipment with operator capex expected to be between 10-15% of revenues. Further, with its large subscriber base, it will be one of the largest end user device markets. There is an opportunity to enhance the share of local manufacturing for telecom equipment and devices. This will help drive employment and also support development of an electronic manufacturing ecosystem in the country. While global players can enhance their India footprint, local players can also broaden their range of product offerings through own R&D, technology tie-ups or JVs. In the initial stages, the country can focus on select product technologies i.e., embedded technology and devices, fibre optics, wireless broadband and convergent products.

Based on global success stories, six aspects have been identified that are critical for the country to develop a thriving manufacturing and R&D ecosystem, viz. –

- Technology standards development
- Human capital development
- Conducive regulation
- Enabling infrastructure
- Easy access to capital
- Market stimulation

4. Enabling Environmentally Sustainable Growth

With its vast network footprint, Indian telecom sector consumes significant amount of power and diesel, and accounts for about 1% of country's carbon footprint. The telecom sector also impacts the environment by usage of hazardous material in telecom devices and equipment. NTP 2012 has taken steps to induce



environmental and health dimensions into the ecosystem. This needs to be complemented further by industry, to ensure a sustainable future growth. Developing extended responsibility for all stakeholders in the telecom value chain will imply:

- As an enabler, government to strengthen policy support, formulate pragmatic environmental and health standards and offer fiscal incentives to encourage transition to green norms
- As implementers, telecom operators and equipment manufacturers to adopt alternate and sustainable technology to minimize power consumption, pursue process and product innovations to minimize consumption of hazardous elements during manufacturing and end of life disposal, and develop smarter telecom applications and processes to make paper redundant
- Drive proactive consumer education to complement industry and regulatory initiatives

Investment Opportunities in the Indian Telecom Sector

With its considerable size and growth, Indian telecom sector offers a range of investment opportunities across the value chain for global and Indian players. Some key areas include:

- Expansion of broadband network coverage along with expected M&A provides opportunities for telecom operators, network and IT equipment vendors, tower companies and associated services providers
- Local manufacturing of telecom equipment and devices will open up new avenues for global and Indian players
- Rural infrastructure rollout and provisioning of innovative last mile solutions will offer a range of business models to small and large players
- Compliance to green telecom norms will offer opportunities in green telecom equipment, renewable solutions and services
- R&D and mobile VAS are expected to attract new entrepreneurs and also large Indian and global corporations

Although the telecom industry today faces multiple challenges to drive revenue growth while sustaining profitability, the future prospects continue to be bright. Ensuring continued success of the industry will require availability of affordable voice and data access to consumers across the country, and collaborative efforts by government and industry players. The requisite regulatory and fiscal impetus, coupled with industry innovation and competitive dynamics will enable this.