



सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP



N·S·D·C
National
Skill Development
Corporation

Transforming the skill landscape

Human Resource and Skill Requirements in the Telecommunications Sector

(2013-17, 2017-22)



cutting through complexity

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In addition, we convey our gratitude to all those who have, in some way or other, contributed towards the successful completion of this study.

Executive Summary

Industry Overview

With approximately 900 million subscribers, the gross revenue of the sector stands at about INR 57,400 crore as of September 2013

Key Growth Drivers

Rising incomes and growing rural market

- Nominal per capita income is estimated (IMF) to have recorded a CAGR of 11.2 percent over 2000–12 (INR 89,514)
- The emergence of an affluent middle-class is triggering demand for the mobile and internet segments

Subscriber base

- The mobile service penetration in the country is currently at 51 percent and is expected to grow to 72 percent by 2016

M&A policy

- The inter-ministerial panel telecommunications commission approved the guidelines that will allow telecommunications companies to acquire operators in a manner that the market share of the resultant entity does not exceed 50 percent

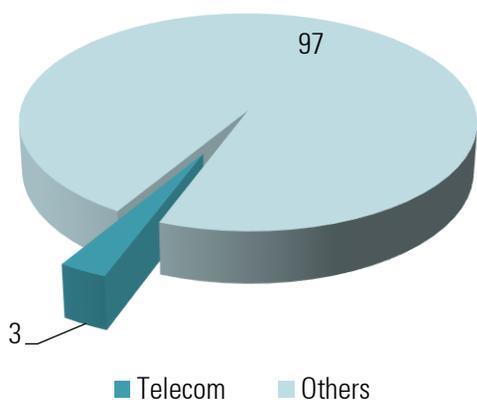
Mobile value-added services (MVAS)

- The Indian MVAS segment is estimated to grow to INR 64,800 crore by 2015, with semi-urban and rural areas expected to drive the next wave of growth in subscriptions

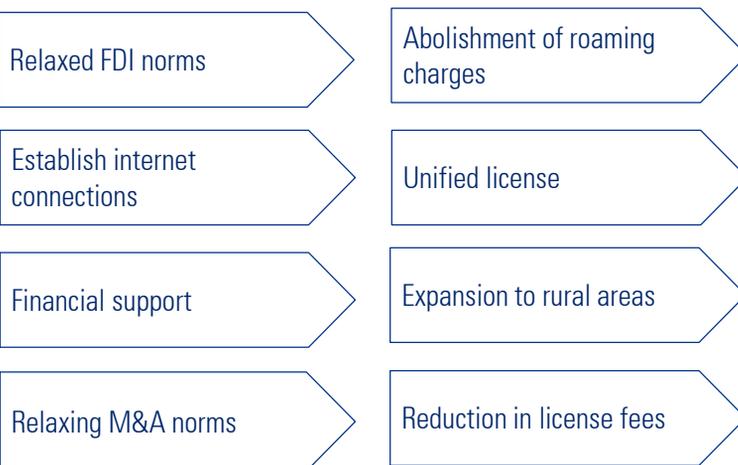
Handsets

- The handset market's revenues in India will grow to INR 46,800 crore in 2016, according to a TRAI report
- India is the second-largest mobile handset market in the world and is set to grow further with unit shipment of 208.4 million in 2016 at a CAGR of 11.8 percent from 2010 to 2016

Contribution of the telecommunications sector to India's GDP (FY13)



Key development in the telecommunications sector



Source: Press releases, company website; KPMG in India analysis

Demographic characteristics of workforce

Sector has significant indirect employment potential along with direct employment across sub-sectors

- Telecommunications providers are tapping the potential of services that are rendered on mobile and connected devices (like television and the internet). These companies require large CAPEX and skilled manpower for their expansion to host and provide these services.
- A host of jobs are related to the development and maintenance of devices, lines, systems and networks that facilitate communication. This offers a wide range of career prospects, and one can pursue a career in:
 - ✓ Application/product development
 - ✓ Application testing
 - ✓ ERP implementation/integration
 - ✓ ERP implementation/integration
 - ✓ Network planning
 - ✓ Data networking
 - ✓ Mobile application development and value-added services

General trends in employment

- Product companies largely seek engineering graduates (who have a background in computers, electronics or telecommunications) since the nature of the job is technical
- Application development and maintenance provides opportunities to application developers with strong programming skills in database and GUI development
- Engineers with a background in IT, computers and electronics have an edge over others due to their knowledge of computer architecture and systems design
- Skills like coding and software testing are essential in the development domain of the telecommunications sector
- Entry-level roles in telecommunications can vary from a management trainee to an executive of any vertical in the present-day telecommunications sector

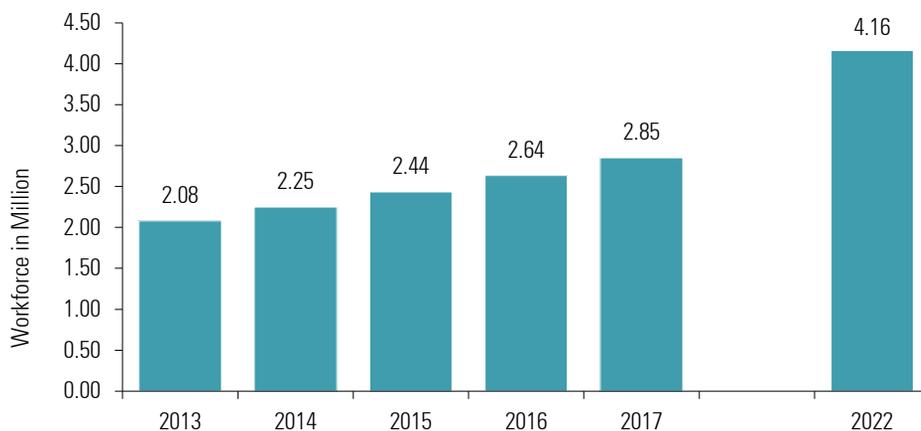
Challenges faced by recruiters

- Candidates lack exposure, technical depth, analytical and logical reasoning
- There are less institutes imparting core telecommunication education and developing skill-set required in the telecommunications sector
- High attrition rate in entry-level roles poses a significant challenge for service providers and other sub-segments
- Candidates fail to develop a combination of skills, resourcefulness and entrepreneurial abilities

Incremental Human Resource Requirement (2013-22)

Current workforce of 2.08 million (2013) is expected to increase to ~4.16 million by 2022

Sector workforce in 2013–22

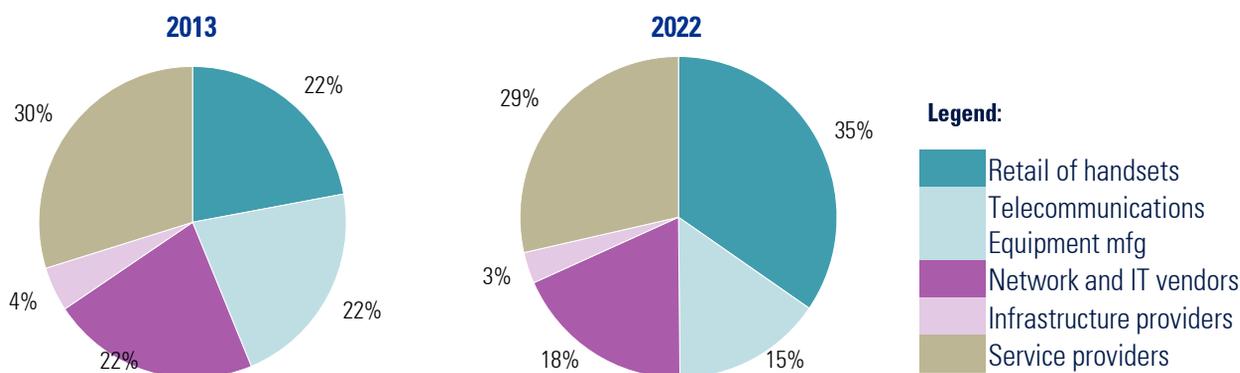


Source: Primary Interactions, NSSO 68th Round of EU Survey, KPMG Analysis

The sector currently employs over 2.08 million employees and is slated to employ more than 4.16 million employees by 2022. This implies additional creation of ~2.1 million jobs in the nine-year period.

The period 2013–17 will see a marginally higher growth in employment vis-a-vis 2017–22 due to expected changes in infrastructure integration and shared services along with increasing share of organised retail leading to higher productivity levels of workforce.

Sub-sector division of the workforce in 2013–22



Source: Primary Interactions, KPMG Analysis

The analysis of the break-up of workforce by sub-sectors indicates that retail segment would show strong employment growth in absolute numbers increasing the share of overall sectoral employment from 22 percent in 2013 to 35 percent by 2022.

Supply & Training Infrastructure

Corporates have either set up captive training centres or tied with academic institutes to develop talent for the sector

Ericsson — EMPOWER training programme

- Ericsson's EMPOWER is a telecommunications certification programme that combines practical knowledge with simulated training, to empower and make young telecommunications engineers industry ready. Ericsson launched its brand, 'Empower', in September 2009, and joined hands with 12 engineering institutions and currently has association with 75 universities/technical education institutes across India

IITM - Institute of Telecom Technology and Management (MTNL)

- Setup by MTNL, Delhi, IITM has trained more than 900 students in various engineering colleges since 2011

ARTTC, Ranchi (BSNL)

- Advanced Regional Telecom Training Centre (ARTTC) is situated in the capital city Ranchi of Jharkhand. ARTTC is pioneer telecommunications training centre in India serving for the training needs on different fields of Telecommunication under rainbow umbrella of BSNL

NTTF and Indus Towers partnership to run certification programme

- Indus Towers runs a certification programme for two months to equip students in Cell Site Maintenance

Telecommunications centre of excellence has been established with government/private player support at select academic institutions

Associate institute	Sponsor	Work assigned
IIT Kharagpur	Vodafone Essar & Texas Instruments	Next generation network (NGN) and network technology
IIT Delhi	Bharti Airtel	Telecommunications technology and management of infrastructure
IISC (Indian Institute of Science), Bangalore,	Aircel & Texas instrument	Information security and disaster management of infrastructure
IIT Kanpur	BSNL & Alphion	Technology integration, multimedia and computational mathematics
IIT Chennai	BSNL & Alphion	Telecommunications infrastructure and energy
IIT Mumbai	TTeleservices	Rural applications
IIM Ahmedabad	Idea Cellular	Policy, regulation, governance, customer care and marketing

Recommendations

Select recommendations & implications

Recommendation	Implications
Include telecommunications and related areas as super specialisations in engineering and MBA colleges	<ul style="list-style-type: none">▪ Engineering/management colleges and training institutes will include telecommunications as a separate specialized course▪ Additionally, there can be a super specialized course in telecommunications. For example, engineering institutes may offer a specialized course in operations management with a focus on passive infrastructure▪ Colleges need to focus on clarifying basic concepts in the field of telecommunications and electrical engineering.
Increased focus on soft skills	<ul style="list-style-type: none">▪ Training institutes and colleges would focus on imparting communication skills to improve efficiency and the overall success rate of jobs
Introduce funding schemes to train potential candidates	<ul style="list-style-type: none">▪ Banks may consider providing special soft loans to students keen on pursuing a course in telecommunications. This will give a boost to the supply side where the fees are usually on the medium to high-side due to the technical nature of the job
Government to develop PPP models in training for infrastructure sharing	<ul style="list-style-type: none">▪ Develop mechanisms for sharing existing training infrastructure at BSNL, MTNL and other government training infrastructure for delivery
Developing certified training programmes that help trainees 'earn while they learn'	<ul style="list-style-type: none">▪ It is important to devise a structure for training programmes that includes an active practical learning component for trainees at a live working location. This should be supported with remuneration equivalent to that of an unskilled/semi-skilled worker in the sector, besides providing financial assistance that helps the individual in investing in training
Providing incentives to employees working in remote tower sites and to: a central database for telecommunications employees	<ul style="list-style-type: none">▪ To avoid attrition and motivate employees to work in remote tower sites, companies and the government can consider providing incentives▪ A database on the vacancies in telecommunications firms would help employees locate jobs close to their hometown/preferred location, which, in turn, would reduce attrition
Government funding is required to create an ecosystem for engineering graduates	<ul style="list-style-type: none">▪ The government needs to invest in areas like R&D to create an ecosystem for engineering graduates▪ The government should take adequate steps to ensure dissemination of information/technical knowhow currently concentrated in the hands of vendors

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Abbreviations

ADC	Access Deficit Charges
ARPU	Average revenue per user
BSNL	Bhartiya Sanchar Nigam Limited
BWA	Broadband wireless access
CAGR	Compound annual growth rate
CAPEX	Capital expenditure
DoT	Department of telecommunications
DTH	Direct to home
DTS	Department of telecom services
ERP	Enterprise resource planning
FDI	Foreign direct investment
FIPB	Foreign Investment Promotion Board
GDP	Gross Domestic Product
GSM	Global system for mobile telephony
ILD	International long distance
IT	Information technology
MBA	Master of business administration
MNP	Mobile number portability
NLD	National long distance
NTP	National telecom policy
OPEX	Operational expenditure
ROI	Return on investment
TRAI	Telecom regulatory authority of India
UASL	Unified Access Service License
VAS	Value added services
VoIP	Voice over internet protocol

Context and approach

Brief background	<p>NSDC had conducted sector-wise skill gap studies for 19 high priority sectors in 2008–09 .</p> <ul style="list-style-type: none">▪ KPMG has been engaged as a consultant to help evaluate the skill gap across 25 sectors and develop actionable recommendations for its stakeholders.▪ Mandate includes sector and sub-sector level analysis, demand-supply projection, estimation of incremental man-power requirement between 2013-2017 and 2017-2022, identification of key-employment clusters, and SWOT analysis of each sector▪ Study also aims to take qualitative insights from stakeholders on enablers and challenges for each sector, way forward in terms of specific policy level actionable recommendations
Inclusions over the previous study	<ul style="list-style-type: none">▪ Study led by industry – Sector Skill Councils and a panel of professionals from different sub-sectors were consulted for their inputs on industry trends, key takeaways in terms of skill requirement, qualitative insights to understand specific interventions required for each sector and to validate the quantitative results and recommendations▪ 6 sectors were added to the list of NSDC priority sectors for studying the skill gaps <p>Updated study also includes</p> <ul style="list-style-type: none">▪ Identification of top 20 job-roles in each sector, case studies around good training practices, sub-sector level indicators and growth factors▪ Study also includes understanding of existing training infrastructure, work-force characteristics and employment clusters,▪ Macro economic factors, central and state governments policies and their envisaged impact▪ Synchronisation of the sector wise demand from the district level skill gap studies▪ Recommendations for key stakeholders - Industry, NSDC, Training organizations and Government▪ Environment scans every year till 2015-16 including SWOT analysis for the sector

Industry classification

Industry classification

Coverage as per NIC classification

Telecommunications Sector and sub sectors as per NIC classification		
Sectors	Sub-sectors	NIC code
Service providers	Telecommunications service providers	61202
	Internet service providers	61104, 61201, 61301
	DTH service providers	61309
	Radio/digital trunking	61102, 61202
Infrastructure providers	Passive infrastructure	61900
	Vendor/service providers for passive infrastructure	61900
Network and IT vendors	Network service providers	61102, 61202
	IT service vendors	62020
	Manpower service providers	
Telecommunications equipment manufacturers	Network equipment manufacturers	26303
	Handset manufacturers	26305
	Others (routers, switches, cables, modems and set-top boxes)	26303, 26304
Retail and distribution	Retail of handsets	47414
	Distribution of handsets	46524 — wholesale
	Unorganised segment — SIM card and handset sales	

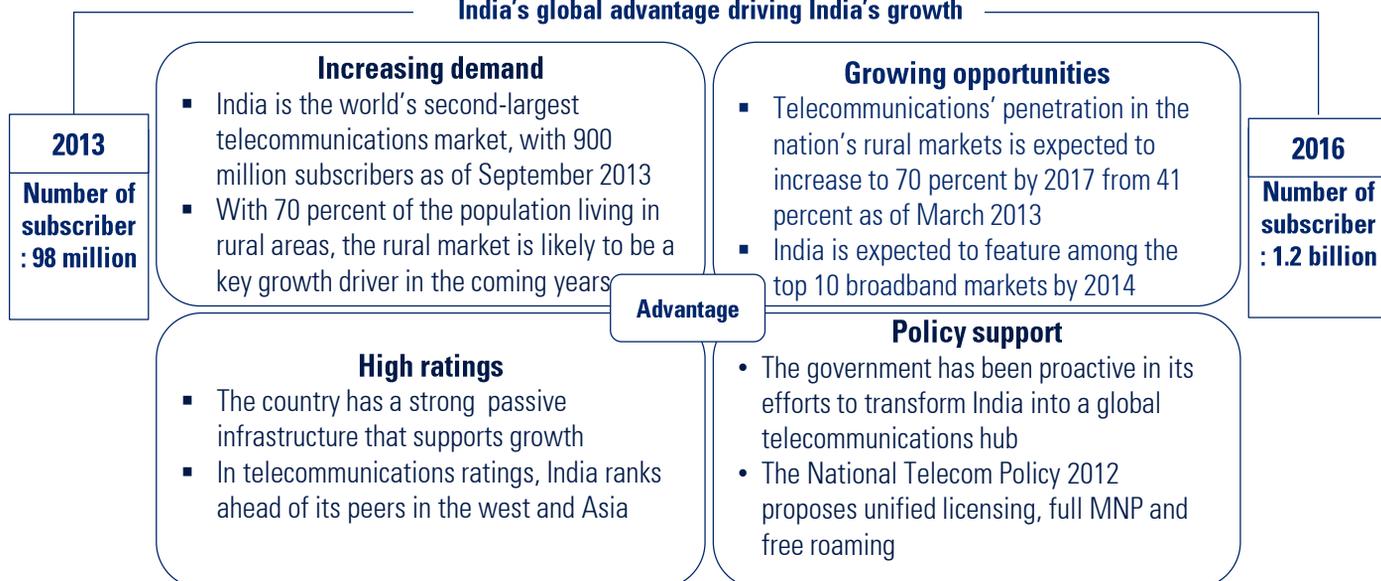
Source: NIC Classification 2008

Industry overview

Changing dynamics of the sector would require significant efforts to train the workforce to cater to a rapid growing demand

- The growth of the Indian telecommunications sector has outpaced the overall economic growth in the last five years. The sector is poised for strong growth of about 15 percent in short term during 2013–17, driven by growth in organised retail, technological advancements, changing consumer preferences and government support.
- With approximately 900 million subscribers, the gross revenue of the sector stands at about INR 57,400 crore as of September 2013, which has increased by 0.33 percent as compared to the last quarter and is likely to grow at the same rate.
- In the next few years, the telecommunications industry is expected to generate a significant number of new jobs, primarily in the supervisory and managerial profiles. Key segments include:
 - Retail and distribution
 - Service providers and
 - Network and IT vendors (managed services)
- There exists a significant skill gap in various segments of the telecommunications value chain that should be addressed. This includes the telecommunications sector as well as sub-sectors.
- Growing quality consciousness would require the workforce to acquire core technical skills and adapt to technological advancements. Moreover, the workforce will be required to shift focus to specialised areas, as the telecommunication sector will soon require specialists in various fields.
- The front-end staff should also shift its focus towards developing customer relationship management skills, which are integral to maintaining a healthy relationship with institutional landlords (passive infrastructure vendors) and end consumers (retail).
- Senior-level executives well-versed in strategy and business development would also be critical in this regard.
- The wide gap in terms of knowledge and skills at the service providers' end underlines the need for operator staff to be proactively engaged in operational enhancement strategies, which requires advanced technical knowledge, expertise and valuable industry knowledge to impart insights.

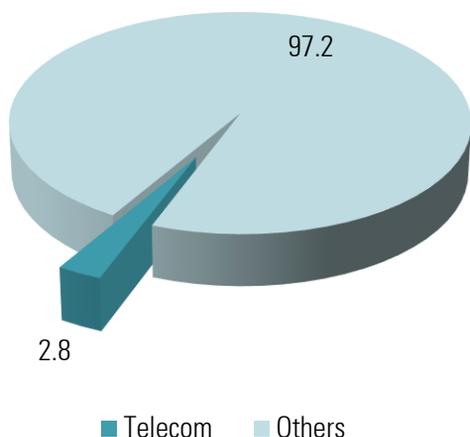
India's global advantage driving India's growth



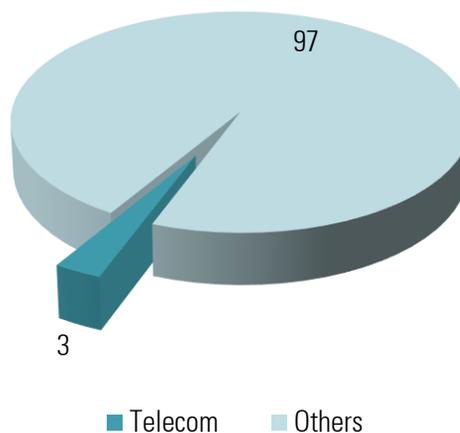
Source: Press releases, KPMG in India analysis

Telecommunications is among the largest sectors in terms of contribution to the GDP

Contribution of the telecommunications sector to India's GDP (FY07)



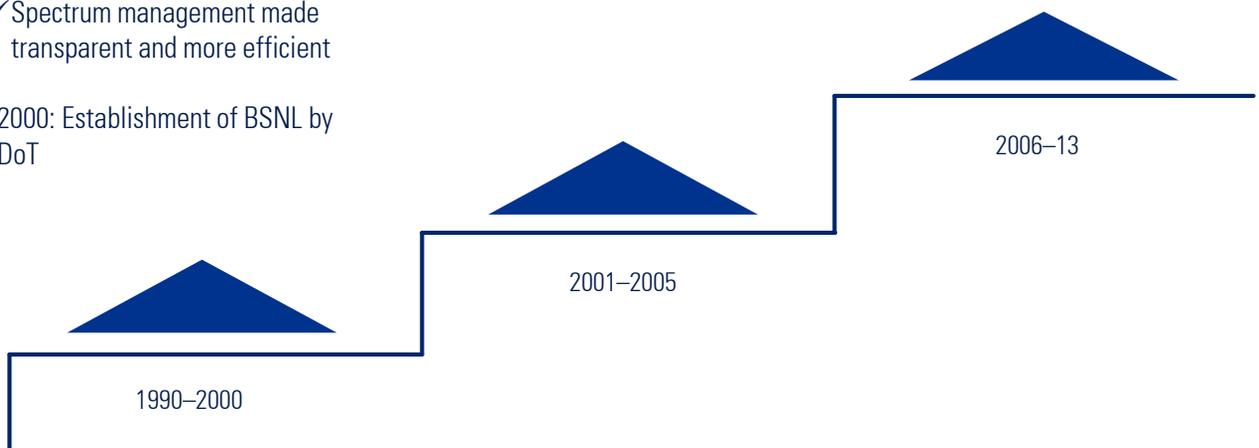
Contribution of the telecommunications sector to India's GDP (FY13)



- Telecommunications contributed 3 percent to India's GDP in FY13, which has grown from a 2.8 percent contribution in 2007.
- The telecommunications sector delivered a significant value addition as compared with the employment it generated, highlighting high efficiency and increasing revenue.
- High revenue and CAGR of about 30 percent has enabled the sectors to pay 'above average' remuneration to the workforce. However, the remuneration is low as compared to other sectors due to high corporate tax liability (62 percent) of the operators.
- Moreover, the telecommunications sector requires people with varied skills and experience, right from high school graduates to postgraduates and people with technical skills in different areas.
- Expansion in telecommunications services and operations in the country in the coming nine years are also likely to significantly drive the creation of indirect jobs.

Evolution of telecommunications in India

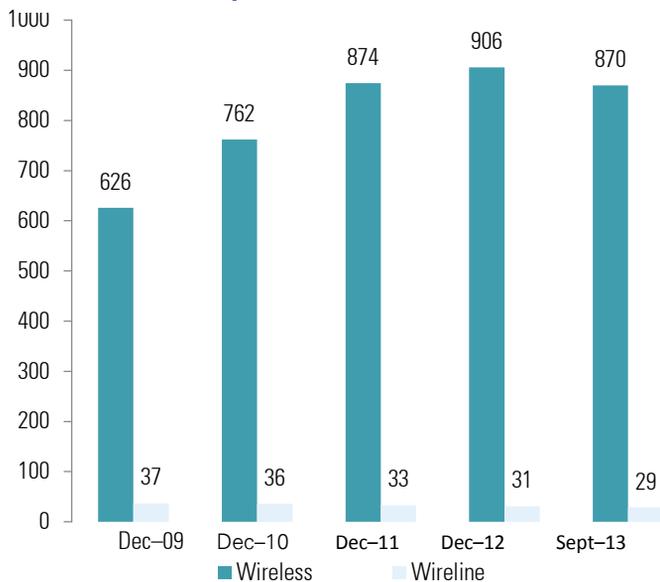
- 1991: Telecommunications equipment manufacturing completely deregulated
- 1992: VAS opened to private sector participation
- 1994: NTP 1994
 - ✓ Issuing of eight licenses for CMTS in the four metro cities of Delhi, Mumbai, Kolkata and Chennai to eight private companies
- 1997: Establishment of TRAI
- 1999: NTP 1999
 - ✓ NLD services opened to private operators
 - ✓ ILD services opened to the private sector
 - ✓ Private telecommunications operators licensed on a revenue-sharing basis and a one-time entry fee was levied
 - ✓ Direct interconnectivity and sharing of network with other telecommunications operators within the service area was permitted
 - ✓ DTS corporatized in 2000
 - ✓ Spectrum management made transparent and more efficient
- 2000: Establishment of BSNL by DoT
- 2001: License fee for cellular services fixed at 12 percent, 10 percent and 8 percent of AGR for metros and cat. A, cat. B, and cat. C circles, respectively
- 2002:
 - ✓ ILD services were opened to competition
 - ✓ Internet telephony initiated
 - ✓ Reference Interconnect order was issued
- 2003: Unified Access Service License (UASL); Interconnect Usage Charges (IUC); and calling party pays (CPP)
- 2004: Broadband policy and guidelines for intra-circle M&A
- 2005: FDI limit was increased from 49 percent to 74 percent
- 2006: DoT announces criteria for additional spectrum
- 2007: Cap on the number of players in a circle revoked
- 2008:
 - ✓ New licenses granted by DoT
 - ✓ Active sharing permitted
 - ✓ Abolition of ADC
- 2010: 3G and BWA spectrum auction
- 2011: Launch of mobile number portability
- 2012: NTP
 - ✓ One nation, one license
 - ✓ One nation, free roaming
 - ✓ One nation, full MNP
- 2013:
 - ✓ Cancellation of licenses in 2012 led to consolidation
 - ✓ Shift towards data as primary service offering due to introduction of 3G and 4G technology



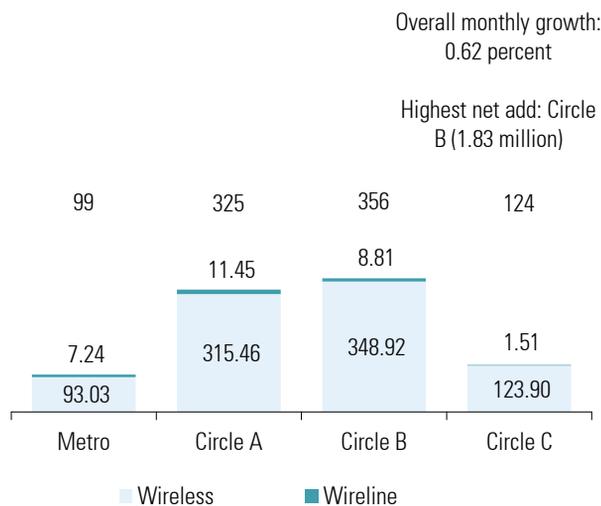
Industry overview

Changing landscape of the sector requires efforts to revisit and revise the strategies related to skill development

Year-on-year subscriber base (in millions)



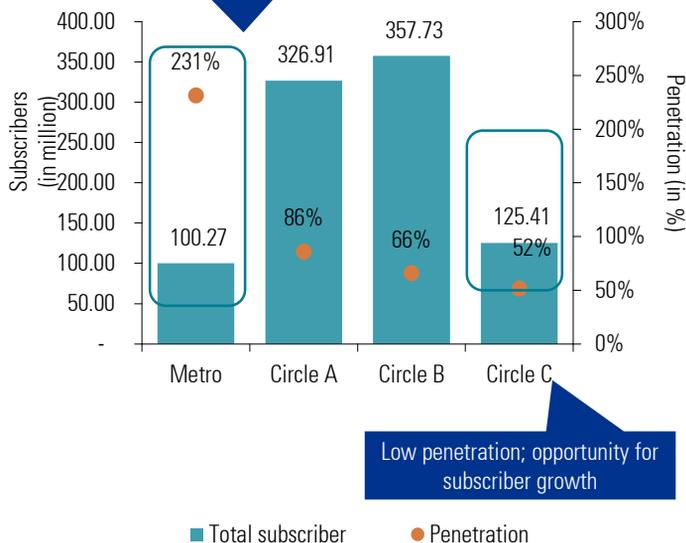
Subscriber base (million) and penetration (percent) as on 30 November 2013



Increase in network coverage and competition-induced decline in tariffs are catalysing growth in the subscriber base. The growth story and the sector's potential have also served to attract new players. Consequently, competition continues to intensify, leading to a substantial requirement of personnel with varied skills.

- Internet subscribers in India grew to 164.81 million as of 31 March 2013, with as many as seven out of eight internet users in the country accessing the services via their mobile phones, suggesting a possible growth in the mobile applications market. This, in turn, underlines the requirement of application developers.
- The number of non-mobile internet subscribers in the quarter ended 31 March 2013 grew to 21.61 million from 21.57 million, registering a quarterly growth rate of 0.16 percent.
- The telecommunications sector, at its current growth rate, holds promise for employment in the near future.

Key strategy: To retain subscriber base
Circle importance: High-ARPU customers

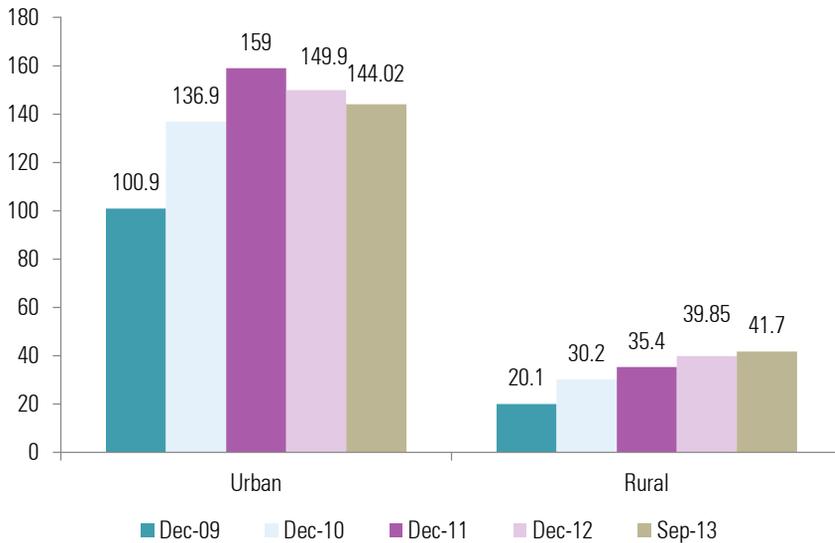


Source: TRAI; KPMG in India analysis

Industry overview

Rural-urban divide

Tele-density of urban and rural subscribers



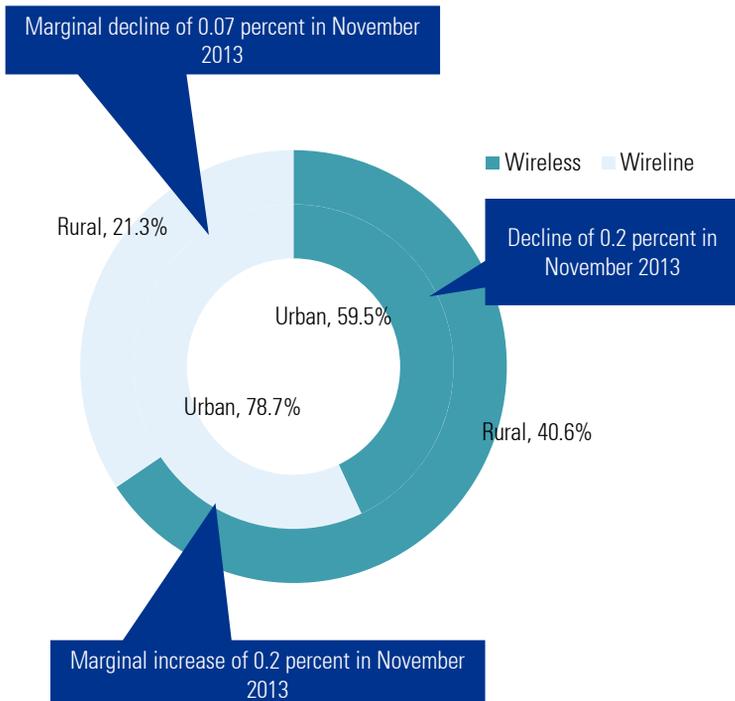
Government target for rural Tele-density

- 2017: 70 percent
- 2020: 100 percent

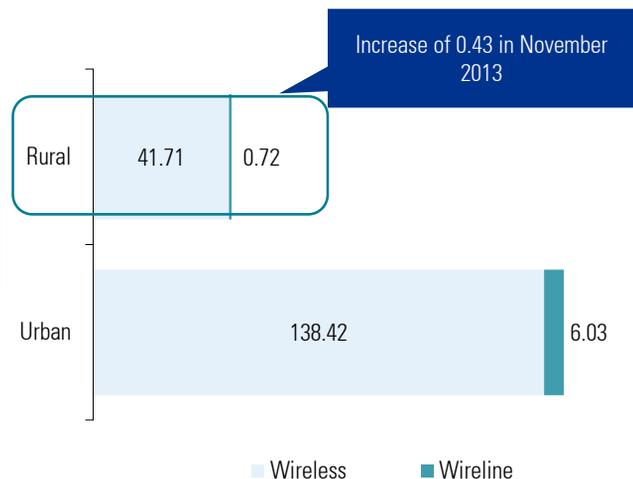
Key issues

- High infrastructure cost
- Low ROI in under-penetrated rural areas
- Lack of clarity on certain key regulatory issues
- Low ARPU from rural areas

Subscriber share (November 2013)



Teledensity (connections per 100 individuals)



Source: TRAI; KPMG in India analysis

India's position as compared to the global scenario

- The economic success of the Indian telecommunications sector has been laudable, as it has registered a consistent overall growth rate of more than 35 percent over the past decade in terms of subscribers, which exceeds the growth of a majority of global operators
- The Indian telecommunications network is the second largest in the world after China
- India ranked third in terms of total internet users in 2012
- Telecommunications is the third major sector attracting FDI inflows after the services and information technology sectors

Network readiness index	Rank (out of 144)	Score (1–7)
2013	68	3.9
2012 (out of 142)	69	3.9
A. Environment sub-index	85	3.8
1 st pillar: political and regulatory environment	75	3.7
2 nd pillar: business and innovation environment	99	3.8
B. Readiness sub-index	68	4.7
3 rd pillar: infrastructure and digital content	111	2.8
4 th pillar: Affordability	1	7.0
5 th pillar: Skills	95	4.3
C. Usage sub-index	81	3.4
6 th pillar: individual usage	121	2.0
7 th pillar: business usage	45	3.7
8 th pillar: government usage	40	4.5
D. Impact sub-index	56	3.7
9 th pillar: economic impacts	43	3.6
10 th pillar: social impacts	73	3.7

- India progresses by one rank to stand at 68 (out of 144) countries in the network readiness index; it is consistently considering further growth, which would drive expert manpower requirement in the network domain
- The most worrisome aspects are the mediocre quality of the political, regulatory, and business environment (rank 85), as well as its lack of digital infrastructure (rank 111)
- Widespread red tape hampers businesses, and corporate tax at 62 percent of profit is among the highest in the world. This may reduce the payment potential of telecommunications operators
- Other variables within the environment sub-index fare better:
 - Availability of new technologies (rank 47)
 - Availability of venture capital (rank 26)
 - Intensity of local competition (rank 34)
 - Quality of management schools (rank 33)
- To leverage the above mentioned resources, a pool of innovative management professionals will be required in the next five years to develop skills among the existing manpower
- Literacy rate is one of the critical determinants of a country's readiness and India fares poorly in this regard (63 percent)
- Intense competition in the sector and innovation at the 'bottom of the pyramid' helped India lead in terms of affordability, thus providing a significant boost to its readiness and indicating the availability of inexpensive labour

Telecommunications industry ranking for Asian countries

Countries	Industry rewards	Country rewards	Industry risks	Country risk	Telecommunications' rating
India	60	32.1	60	56.4	52.6
China	63.3	31.7	70	67.9	57.2
Indonesia	62.5	45	60	57.7	57.1
Philippines	45	46.7	60	51	48.6
Pakistan	55	42	60	37.6	50
Bangladesh	52.5	36.7	60	46.8	48.9
Laos	40.5	39	50	39.7	41.4
Cambodia	44	38.3	50	36.8	42.4
Thailand	47.5	32.7	60	56.8	47.1
Vietnam	40	33.3	60	46.9	42.4
Sri Lanka	33.8	26.7	50	48	36.6

Note: Scores out of 100, with 100 highest. The telecommunications risk/reward rating is the principal rating. It comprises two sub-ratings, 'reward' and 'risk', which have a 60 percent and 40 percent weight, respectively. In turn, the 'reward' rating comprises 'industry reward' and 'country reward', which have equal weight and are based on growth/size of the telecommunications sector (market) and the broader economic/socio-demographic environment (country). The 'risk' rating comprises 'industry risk' and 'country risk', both of which have 20 percent weight and are based on a subjective evaluation of the sector's regulatory and competitive issues (market) and the sector's broader country risk exposure (country), which is based on BMI's proprietary Country Risk Ratings. Source: BMI.

- In terms of Telecommunications ratings, India competes primarily with China, Indonesia and the Philippines
- In terms of country risk, India has an edge over the Philippines, Pakistan, Bangladesh, Laos, Cambodia, Thailand, Vietnam and Sri Lanka

Cumulative FDI in the telecommunications sector since April 2000 (INR, crore)



- Telecommunications infrastructure in India is expected to increase at a compound annual growth rate (CAGR) of 20 percent during 2008–15 to reach 571,000 towers in 2015
- The telecommunications sector attracted foreign direct investments (FDI) worth INR 77,196 crore during April 2000 to June 2013, an increase of 7 percent to the total FDI inflows

Source: BMI, Aranca research; official DIPP website, KPMG in India analysis

Industry overview

The approval of 100 % FDI in basic and cellular services has opened doors for foreign investors to take control of Indian operations while giving opportunities to Indian investors

Quick view

	Old regime	New policy
Overview	Entry in the sector possible through partnership with Indian stakeholders	Foreign investor/telecom operator can enter without the compulsory partnership with Indian stakeholders
FDI cap	74 percent	100 percent
Automatic route	49 percent	49 percent
FIPB approval	Post 49 percent, up to 74 percent	Post 49 percent up to 100 percent
Impact	Lack of control by the foreign investor with the majority shareholding over Indian operations	<ul style="list-style-type: none"> Full autonomy over Indian operations Exit route to Indian investors Likely to increase FDI inflow in the country

Key FDI developments

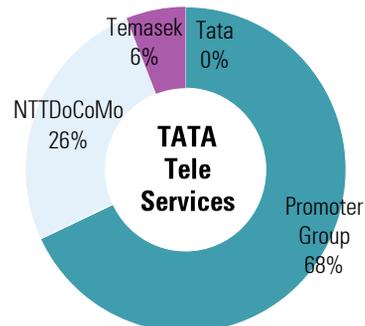
Vodafone

- The cabinet cleared Vodafone's FDI proposal to buy out Indian investors' stake of 35.62 percent for INR10,141crores

Singtel

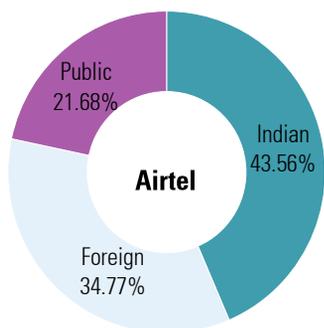
- FIPB approves SingTel's proposal to buy out the Indian stake in the joint venture Sing Tel Global India (provider ILD services) for INR 2.98 crore

Major operators with foreign shareholding



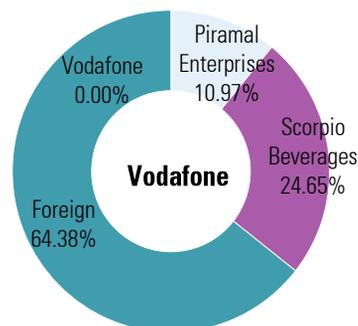
Major foreign investor(s)

- NTTDoCoMo
- Temasek



Major foreign investor(s)

Singapore telecommunications



Major foreign investor(s)

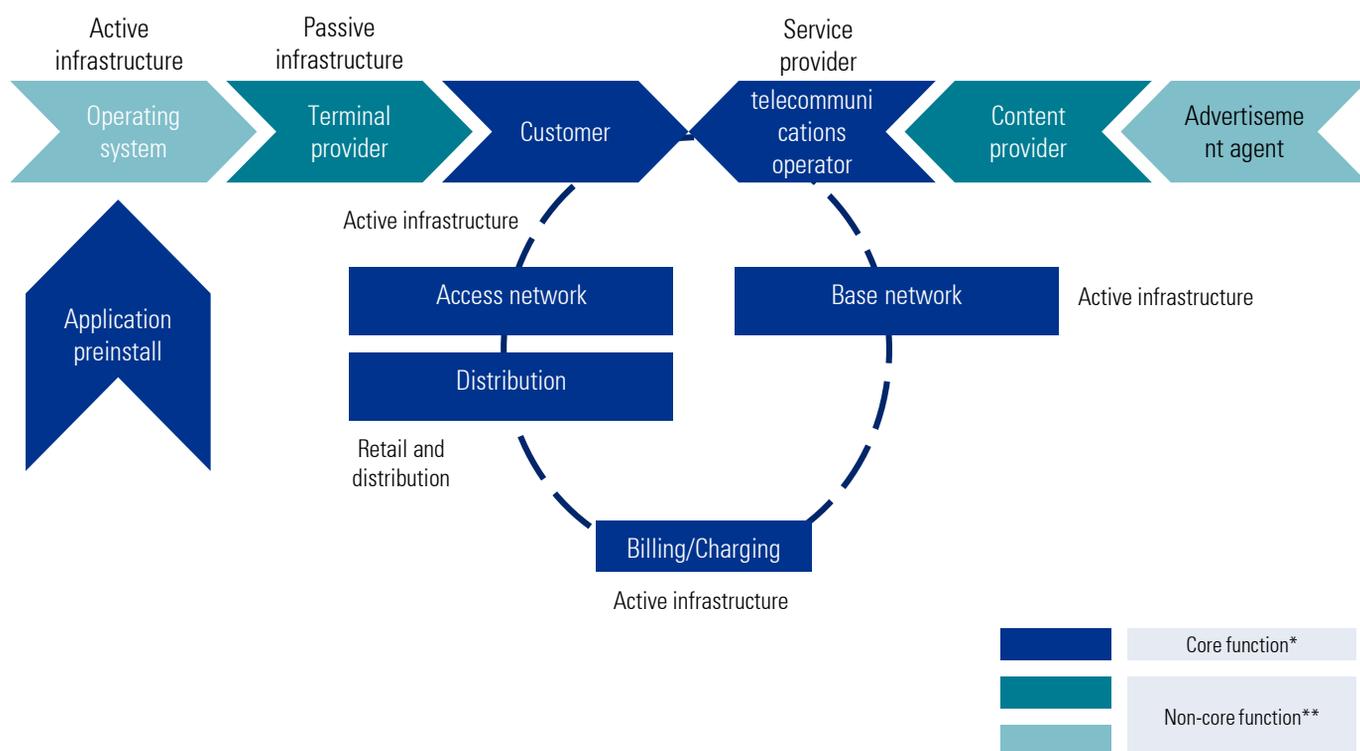
Vodafone International holdings

Source: Press releases, company website; KPMG in India analysis

Industry overview

Value-chain of the sector

Telecommunications sector value chain



What is likely to affect telcos' revenue streams in the near future:

- Voice over IP (VoIP) telephony is eliminating the need for traditional, landline phones.
- Free chat apps are replacing profitable services such as text messaging.
- Online video telephony is emerging as a free service.
- Future data tariffs will only compensate for a share of these losses, even after more bandwidth and increased data usage have been factored in.
- Young, tech-savvy customers are getting used to interacting from within the service ecosystems established by over-the-top (ott) players and are just a click away from the latter's all-in service offerings.

* Core functions includes operations, passive and active infrastructure, network and managed services, manufacturing, network, retail and distribution

** Non-core functions include functions other than core functions, such as supply chain, finance, HR etc.

Industry overview

Key drivers of growth

Rising incomes and growing rural market

- Rising incomes has been a key determinant of demand growth in the telecommunication sector in India
- Nominal per capita income is estimated (IMF) to have recorded a CAGR of 11.2 percent over 2000–12 (INR 89,514)
- The emergence of an affluent middle-class is triggering demand for the mobile and internet segments
- A young and growing population is aiding this trend (especially demand for smartphones)

Subscriber base

- The mobile subscriber base in India is estimated to rise by 9 percent in 2014, according to the technology research agency Gartner
- The mobile service penetration in the country is currently at 51 percent and is expected to grow to 72 percent by 2016
- Circles in category A show the highest net addition in subscriber base and the circles in category C show highest rate of monthly growth in wireless segment.
- In the wireline segment, circles in Category A have shown the highest reduction and highest rate of decline in subscriber base from May 2013 to June 2013.

M&A policy

- The inter-ministerial panel telecommunications commission approved the guidelines that will allow telecommunications companies to acquire operators in a manner that the market share of the resultant entity does not exceed 50 percent
- The M&A policy is expected to further infuse investment in the sector

Mobile value-added services (MVAS)

- The existing MVAS sub-segment in India has an estimated size of INR 16,200 crore
- The segment derives its revenues majorly from the top five to six products, such as game-based applications and music downloads, which continue to comprise about 80 percent of VAS revenues
- The Indian MVAS segment is estimated to grow to INR 64,800 crore by 2015, with semi-urban and rural areas expected to drive the next wave of growth in subscriptions

Handsets

- The handset market's revenues in India will grow to INR 46,800 crore in 2016, according to a TRAI report
- India is the second-largest mobile handset market in the world and is set to grow further with unit shipment of 208.4 million in 2016 at a CAGR of 11.8 percent from 2010 to 2016
- The handset market posted revenue of INR 35,946 crore in 2012–13, compared to INR 31,330 crore in the earlier fiscal year on the back of increasing sales of smartphones
- In 2012–13, Karbonn grew 73.1 percent, Samsung ended the year with a revenue of INR11,328 crore compared to INR 7,891 crore last year, demonstrating a growth of 43.6 percent

Source: TRAI, KPMG in India analysis

The telecommunications sector has significant employment potential

- Telecommunications providers are tapping the potential of services that are rendered on mobile and connected devices (like television and the internet). These companies require large CAPEX and skilled manpower for their expansion to host and provide these services.
- A host of jobs are related to the development and maintenance of devices, lines, systems and networks that facilitate communication. This offers a wide range of career prospects, and one can pursue a career in:
 - ✓ Application/product development
 - ✓ Application testing
 - ✓ ERP implementation/integration
 - ✓ ERP implementation/integration
 - ✓ Network planning
 - ✓ Data networking
 - ✓ Mobile application development and value-added services

General trends in employment

- Product companies largely seek engineering graduates (who have a background in computers, electronics or telecommunications) since the nature of the job is technical
- Application development and maintenance provides opportunities to application developers with strong programming skills in database and GUI development
- Engineers with a background in IT, computers and electronics have an edge over others due to their knowledge of computer architecture and systems design
- Skills like coding and software testing are essential in the development domain of the telecommunications sector
- Entry-level roles in telecommunications can vary from a management trainee to an executive of any vertical in the present-day telecommunications sector

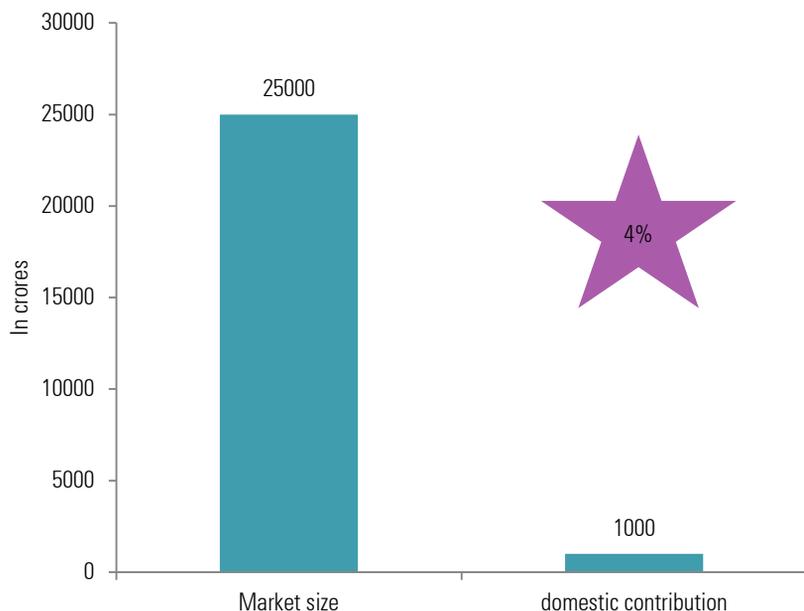
Challenges faced by recruiters

- Candidates lack exposure, technical depth, analytical and logical reasoning
- There are less institutes imparting core telecommunication education and developing skill-set required in the telecommunications sector
- High attrition rate in entry-level roles poses a significant challenge for service providers and other sub-segments
- Candidates fail to develop a combination of skills, resourcefulness and entrepreneurial abilities

Industry overview

Currently, over 90 percent of telecommunications gear in India's 50,000 crores market is imported

Market size for core network equipment vis-a-vis Indian contribution



- Industry expects to spend 46,000 crores on buying gear excluding headsets
- The bulk of this money will be spent on buying imported equipment from China and Europe
- Indian firms that design, manufacture and also have IP had only 3 percent share in 50,000 crore
- The work in India is limited to system integration and packaging

Government tenders, impose restrictive clauses that either result in cost disadvantage or no Indian company meeting the condition

Key aspects of policy affecting manufacture of telecommunications gears in India

- Finished telecommunications equipment can be imported at zero duty, but components bear duty from 10–15 percent
- Indian telecommunications gear makers pay 16–18 percent interest on loans, far above Chinese
- Attempts to coax foreign equipment manufacturers to set up facilities in India were made a few years ago. Of late these clauses are not insisted upon

Case study India vs South Korea — Support to local manufacturers

BSNL has put out an order for routers to cater to the INR15,000 crore national network for spectrum project with the condition that the manufacturer should have deployed a substantial number of similar products (such as routers) in the country. It is a challenge for an Indian manufacturer to meet this requirement

When the South Korean Government decided to adopt the CDMA technology, it followed it up with a policy to back local manufacturers. Seoul identified five South Korean companies and gave them an initial order of one million handsets each.

Current manufacturing policy in the telecommunications sector very limited presence of clusters in the area of telecommunications exists in India.

Key development in the telecommunications sector

Reduction in license fees

The Government of India intends to decrease license fee by up to 33 percent for operators that cover services for over 95 percent of the residential areas in a calling circle

Abolishment of roaming charges

During May 2012, the Union Cabinet declared to abolish roaming charges and allow mobile number portability even outside the designated circles (without having to pay extra charges)

Relaxed FDI norms

Up to 74 percent FDI is allowed in basic and cellular, unified access, national/international long distance, and V-Sat services as well as public mobile radio trucked services

Unified license

UL allows operators to offer any service by paying an entry fee of INR15 crores, which is likely to result in reduced license cost

Establish internet connections

The 12th FYP has a target of achieving 175 million broadband (2–100 Mbps) connections by 2017. Further, the National Telecom Policy 2012 proposed 600 million such connections

Expansion to rural areas

The National Optical fibre Network (NOFN) is a INR 20,00 crores project initiated by the Government of India to provide broadband connectivity to all the 2,50,000 Gram panchayats (GPs) in India

Financial support

USOF is expected to extend financial support to operators providing service in rural areas and encourage active infrastructure sharing among them

Enhanced spectrum limit

An increase in the prescribed limit on spectrum from 6.2 MHz to 2x8 MHz (paired spectrum) for GSM technology in all areas other than Delhi and Mumbai, where it will be 2x10 MHz (paired spectrum)

Relaxing M&A norms

The government has recommend a liberal norm of up to 35 percent market share for the resultant entity as 'safe harbour' for mergers and acquisition in the Indian telecommunications sector, subject to the presence of 12 or more service providers in that circle

Key challenges hindering the growth of the telecommunications sector



Key challenges

Prioritising data: There is a shift from the traditional voice-driven consumer market to data-driven market and, hence, there is additional pressure on telecommunications operators to provide extra bandwidth even if they do not own any OTT services

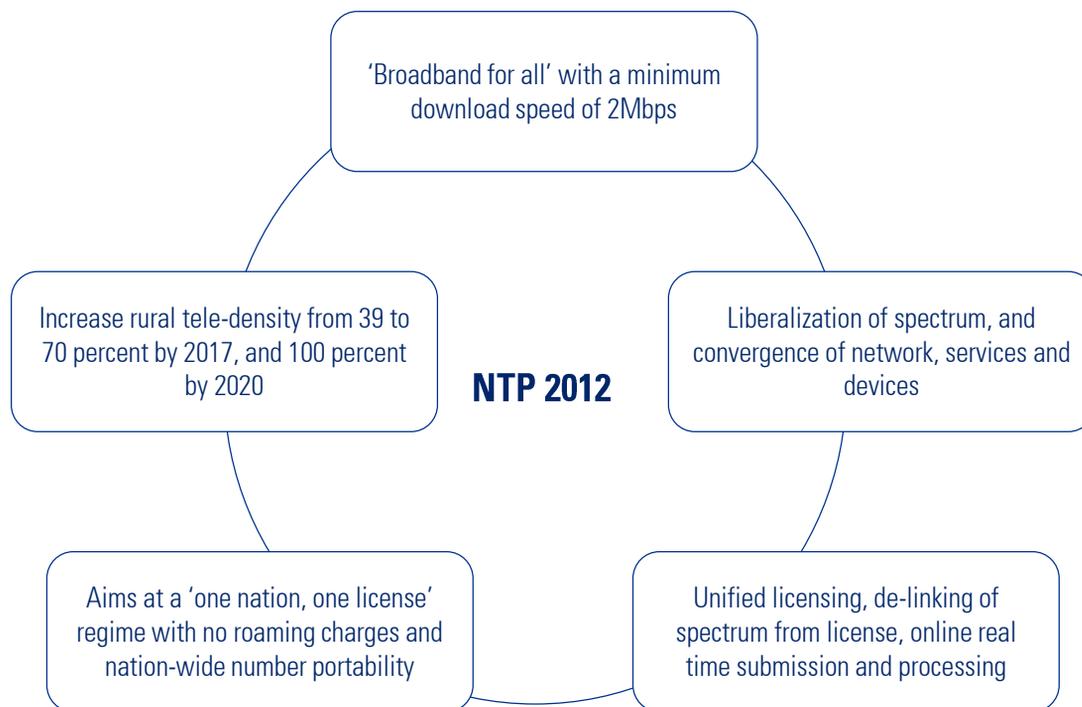
Monetising new services: With the advent of new technologies, such as VoIP in the market, there is tremendous pressure on telecommunications operators to bring something new to the table in a short span of time, to sustain competitive advantage

Leveraging the right infrastructure: Increasing demand by consumers is resulting in increased demand for CAPEX for telecommunications operators, leading to low profitability in the short-term

Regulatory charges: Multiple levies impede the smooth implementation of telecommunications projects in India. Continuously declining ARPUs and low tariffs, sustaining the current growth rates of the industry, require urgent attention towards rationalising the convoluted tax structure in the sector

Skill gaps:

- i. Changes in technology and markets have created a general need for new skills that are not immediately available
- ii. Older organisations may face a challenge in terms of obsolete specialist skills
- iii. Younger organisations often have to develop more formal management processes and new management skills, as they gain maturity



Impact of NTP on the telecommunications sector

- Growth of broadband subscribers
- NTP 2012 aims at increasing rural penetration by 202 and tele-density to 70 percent from the current 39 percent
- NTP 2012 will eliminate the need for companies to apply for separate licences for every circle/service area, leaving operators with more CAPEX to spend on developing skills and enhancing manpower
- The government hopes that the new policy will accelerate inclusive socio-economic development and bring about the much-needed consolidation
- NTP 2012 will encourage the resale of mobile services, which may help operators improve profitability from voice services

Few major concerns

- Telecommunications operators are concerned about the Cabinet's decision to approve spectrum reframing, as it is expected to have adverse financial implications for the incumbents, leading to a slow growth rate in employment
- NTP 2012 is not firmly focused on the provisions for network security, communication security and communication assistance to law enforcement agencies
- The crisis management plan for the prevention of cyber attacks on power utilities in India has still not been incorporated in NTP 2012

Strengths	<ul style="list-style-type: none"> ▪ The Indian telecommunications market is one of the fastest growing markets in the world ▪ The total number of Indian subscribers was about 903 million in June 2013 ▪ The monthly growth in the subscriber base is about 3 percent and it is constantly increasing ▪ Current CAGR of the telecommunications sector is about 20 percent, which holds promise for the next few years ▪ An increase in the rural penetration, as compared to the last few years, has made way for further growth
Weaknesses	<ul style="list-style-type: none"> ▪ India has one of the lowest ARPUs in the global telecommunications sector ▪ Prepaid customers constitute a major reason for low ARPU, which also affects return on investment ▪ Due to high initial investment and slow RoI, telecommunications infrastructure in rural areas is developing slowly ▪ There is a network of independent vendors with no allegiances to any carrier ▪ The government draft rule as on 15 October 2013 states that any acquiring company “will be required to pay to the government the differential between the entry fee and the current auction price of spectrum” in the industry, thus, hindering the elimination of price wars in the near future
Opportunities	<ul style="list-style-type: none"> ▪ NTP 2012 <ul style="list-style-type: none"> ✓ One nation, one roaming ✓ Full mobile number portability ✓ Broadband on demand ✓ Rural penetration ▪ Development of telecommunications infrastructure ▪ Growth in MVAS and cloud computing ▪ Impressive growth in the telecommunications equipment market ▪ Increasing mobile subscribers ▪ Rising internet penetration
Threats	<ul style="list-style-type: none"> ▪ ARPU is declining rapidly as the competition level increases in the country ▪ Lack of telecommunications infrastructure in sub-rural and rural areas could be a major hindrance in tapping the rural market. ▪ Intense competition in the industry with 12 operators across 23 wireless circles, with six to eight competing operators in each circle. ▪ Regulatory charges in the telecommunications sector have a complicated structure because multiple levies impede the smooth implementation of telecommunications projects. ▪ The Indian economy remains highly underpenetrated in terms of broadband connections. High cost of devices (PC and laptop), high internet charges and low wireline connections have been some major factors inhibiting broadband penetration.

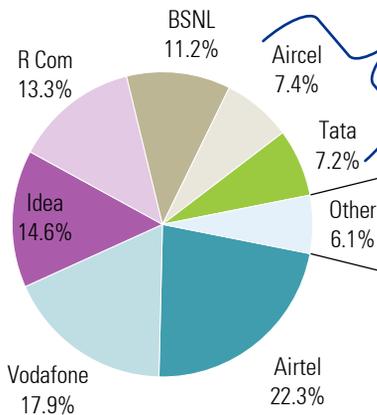
Sub-sectoral overview

Sub-sectoral overview

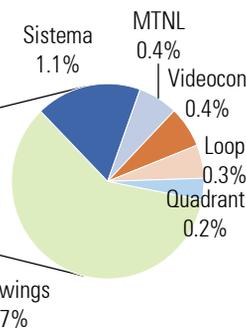
Service providers

Top players in the service providers' sub-sector and their market share

Bharti Airtel, Vodafone and Idea Cellular dominate the market



Constant struggle for the fifth and sixth positions



Telewings-owned Telenor plans to expand in Circle B and C

Workforce skills

Critical job roles — transmission engineer, network management engineer and fault management engineer

Major skills required:

- Core technical skills
- Active infrastructure management
- Analytical skills
- Operation management
- Revenue assurance

Industry insights

- With the emergence of new players, competition in the industry has intensified. The market share of telecommunications operators of the telecommunications companies reflects the fragmented nature of the sector, with as many as 15 players
- Airtel leads the market (22 percent share), Reliance (13 percent), Vodafone (18 percent), Idea (15 percent), BSNL (11 percent), Tata (7 percent), and Aircel (7 percent), with the remaining share being held by other small operators
- Bharti is ahead of its competitors with about 22 percent market share in India while Vodafone (18 percent) and Idea (15 percent) are closely competing
- Among small operators, Telewings has the largest market share and, despite entering the market late, it is growing rapidly
- The market share divide is likely to remain static in the coming two to three years
- Currently, 87 percent of the total mobile subscribers access internet through phones. Hence, going forward, the majority of revenue would be driven through data and new upcoming technologies instead of traditional voice and text services
- Improving rural tele-density and policy reforms focused on improving rural penetration opens new avenues for service providers
- Service providers have expanded the range of service offerings to adapt to the changing market requirements, which is expected to continuously drive innovation in future
- Call rates in India are the cheapest in the world with the average realisation per minute (ARPM) of INR 0.48. Hence, there is scope of significant tariff hike in future

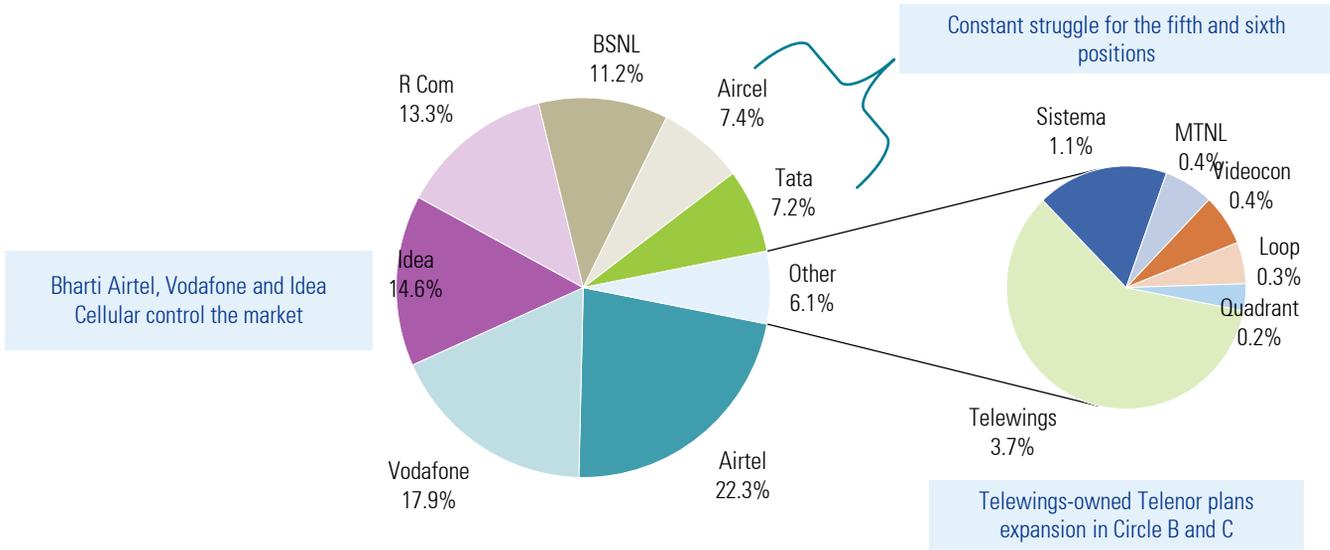
Source: Corporate catalyst India report, KPMG in India analysis

Sub-sectoral overview

Wireless

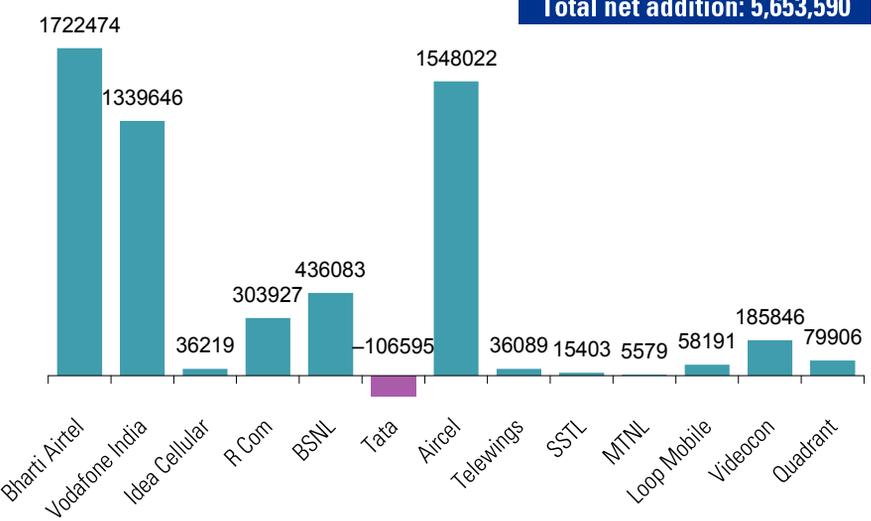
Top three telcos (Bharti Airtel, Vodafone and Idea) control more than 50 percent of the subscriber market

Mobile subscriber market share as on 30 November 2013



Net additions as on 30 November 2013

Total net addition: 5,653,590



Maximum gain:

- Bharti Airtel (30.5 percent)
- Vodafone India (23.7 percent)
- Aircel (27.4 percent)

Maximum loss:

- Tata (1.9 percent)

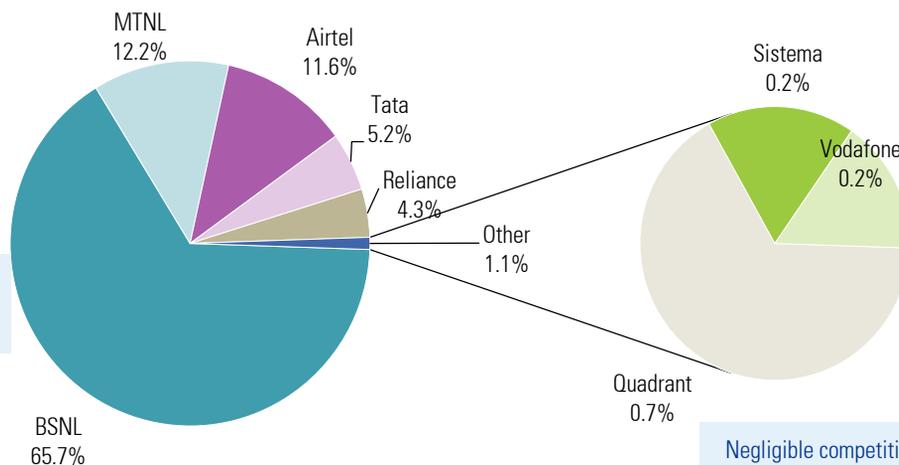
Source: TRAI, TSSC, KPMG in India analysis

Sub-sectoral overview

Wireline

BSNL controls the wireline market with ~66 percent market share

Wireline subscriber market share as on 30 November 2013



BSNL dominates the wireline subscriber market

Negligible competition among private players for the wireline subscriber market

Net additions as on 30 November 2013

Tata	7,552
Vodafone India	2,670
Quadrant	1,790
Bharti Airtel	1,322
Sistema	704
Reliance Communications	-49
MTNL	-2,943
BSNL	-88,609

Maximum gain:

- Tata (7.15 percent)
- Vodafone India (2.53 percent)

Maximum loss:

- BSNL (83.33 percent)

Source: TRAI, TSSC, KPMG in India analysis

Sub-sectoral overview

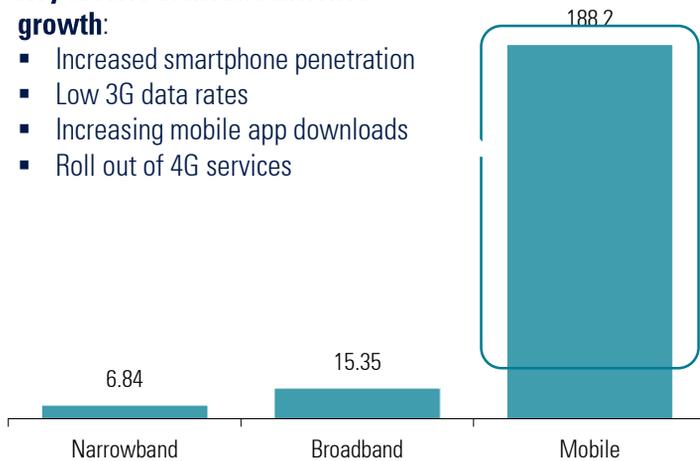
Internet

Mobile internet is driven by high data usage, smartphone penetration and lower tariffs

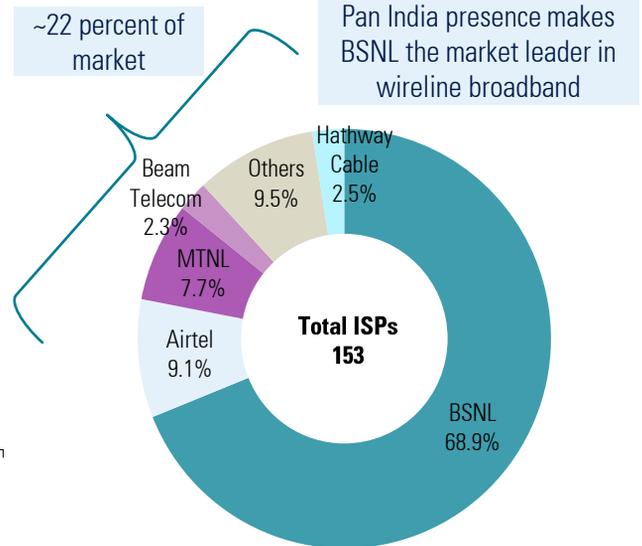
Internet subscribers as on September 2013 (millions)

Key factors of mobile internet growth:

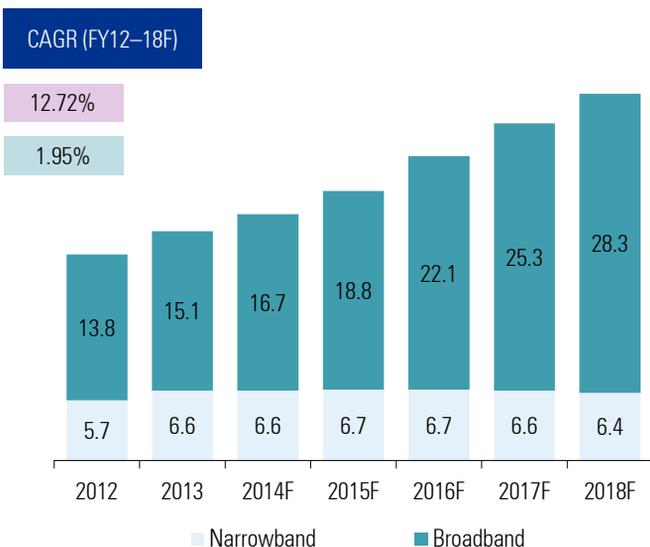
- Increased smartphone penetration
- Low 3G data rates
- Increasing mobile app downloads
- Roll out of 4G services



Wireline broadband subscriber market share as on November 2013



Internet subscribers as on September 2013 (millions)



Key takeaways

Key factors for broadband growth:

- Availability of online services such as mobile banking and education
- Government initiatives
- Increasing access to broadband services by households
- Adoption of cloud computing to increase business demand

Roadblocks in broadband growth:

- Lack of last-mile connectivity
- Poor quality of service due to high contention ratio and low bandwidth per subscriber
- Reluctance of private players to offer services in low ARPU regions

Key factors for the declining demand of narrowband or dial-up connections

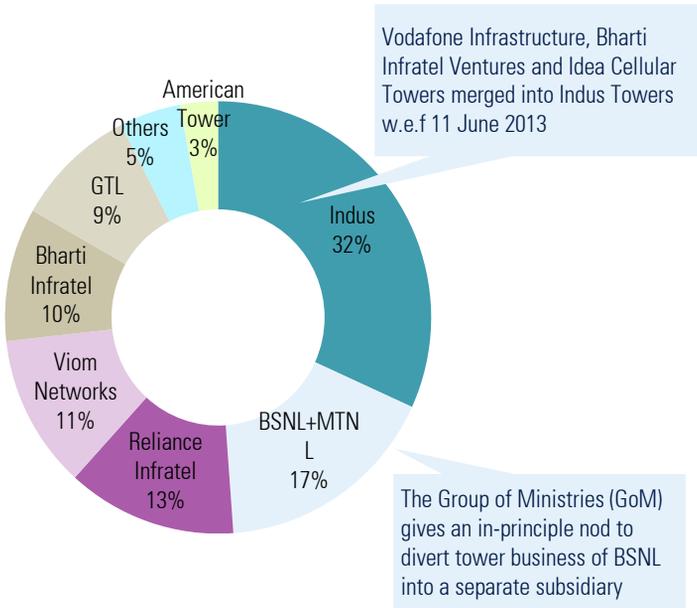
- Lack of flexible bandwidth on demand in dial-up services
- Availability of high-speed internet services at affordable prices

Source: TRAI, TSSC, KPMG in India analysis

Sub-sectoral overview

Infrastructure providers

Top players in the infrastructure providers sub-sector and their market share



Industry insights

- Indus, which is a merger of Vodafone infrastructure, Bharti infratel ventures and Idea cellular towers, has the largest market share (32 percent)
- Together, BSNL and MTNL have a 17 percent market share in the overall passive infrastructure
- The remaining market is divided among Reliance Infratel, Viom networks, Bharti Infratel and GTL
- Tower additions and rentals are likely to remain unchanged due to shifted focus on increasing tenancy levels for profitability
- In the coming years, employment is expected to remain constant in the passive infrastructure segment
- In future, specialised skills would be required to manage various aspects of passive infrastructure
- The telecommunications infrastructure market is likely to be dynamic, as new factors come into play, such as network virtualisation and cloud-based services

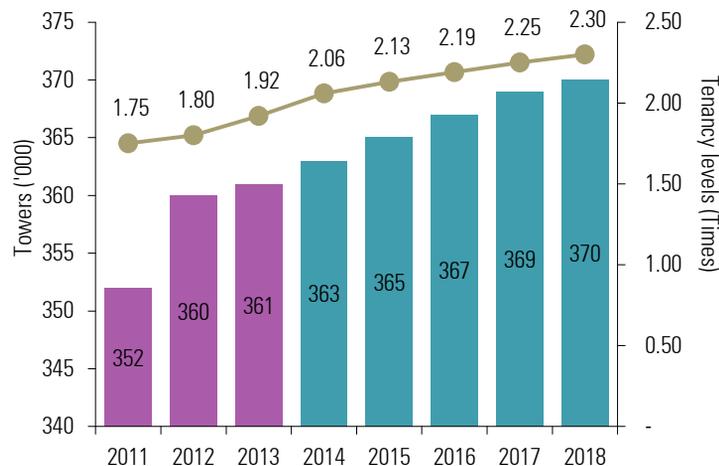
Workforce skills

Critical job roles — tower technician, cluster in-charge and optical-fibre technician

Major skills required :

- Core technical skills — electrical concept and equipment handling
- Responsiveness and reliability
- People management
- Training on OHS

Tower additions to decelerate as focus shifts on improving tenancy levels



Source: Crisil India report, KPMG in India analysis

Sub-sectoral overview

Towers — revenue growth market share analysis

Indus Towers

Revenue growth remains low compared to market share. Recently achieved tenancy ratio of ~2 likely to improve overall revenue

GTL

Maintains a stable rate of revenue growth even though its tower rental remains lower than peers. With 4G roll out inevitable, its strong presence in 22 circles is likely to improve its revenue in near future



9.05%
2.90%

Bharti Infratel

Plans to sell the loss-making tower business in Nigeria and Bangladesh, which is likely to impact the company's consolidated revenue



9.76%
7.30%



31.09%
9.60%

Reliance Infratel

In addition to dealing with Reliance Jio, the company is in discussion with other three operators. Should these discussions materialize, the company is likely to witness a surge in its revenues.



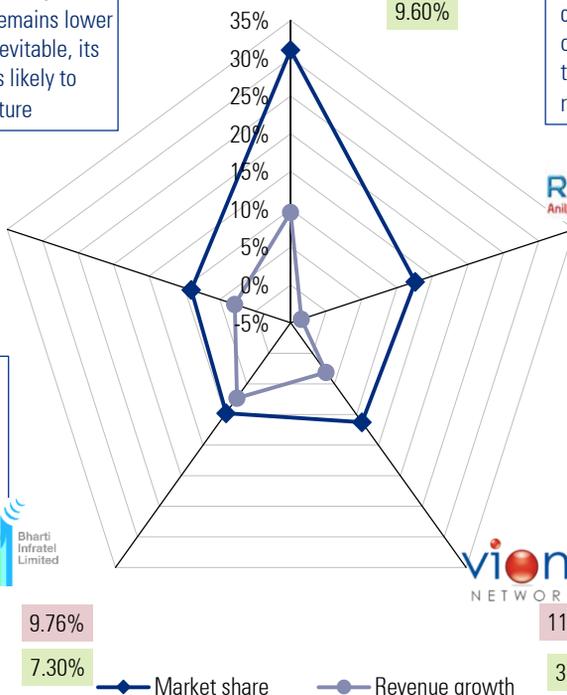
12.59%
-3.50%

Viom Networks

Demonstrating profitability in FY13, for the first time since its inception, the company plans to go international and offer managed services to improve its portfolio.



11.26%
3.10%



Players	Towers (in number)				Tenancy ratio
	FY 10	FY 11	FY 12	FY 13	
Indus	102,938	109,073	109,114	111,819	1.99
BSNL	37,000	45,000	61,340	61,622	1
Reliance Infratel	50,000	58,000	50,000	50,000	1.7
Viom Networks	23,500	40,000	42,000	42,000	2.4
Bharti Infratel	30,568	33,042	33,326	35,119	1.8
GTL Infra	28,809	33,681	42,007	29,500	1.5
American Towers	3,200	8,000	9,000	11,500	1.8
Tower Vision	NA	NA	8,500	8,400	1.6
Ascend Telecom	NA	NA	4,000	4,100	1.7
MTNL	1,550	2017	3,800	4,000	1
Others	19,000	25000	13,100	13,450	1
Total	296,565	353,813	376,187	371,510	

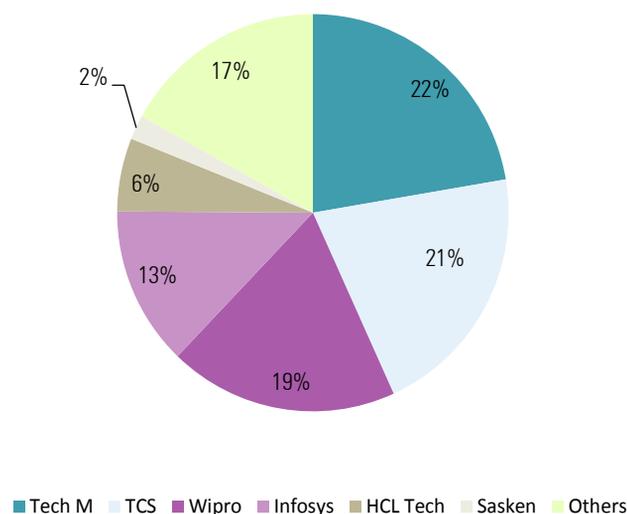
Note: Market share (as on March 2013) is based on number of towers. Revenue growth is for FY13.

Source: Press articles, Capitaline database; KPMG in India analysis

Sub-sectoral overview

Network and IT vendors

Top players in the network and IT vendors sub-sector and their market share



Workforce skills

Critical job roles — product specialist, core engineer, application developers, integration engineer

Major skills required :

- Project management
- Technological know-how
- Innovation (IT)
- Issue identification and resolution
- People management and development

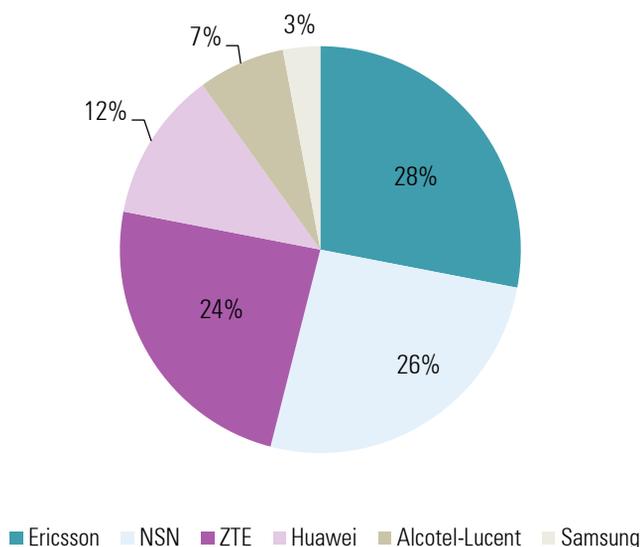
Industry insights

- The market share of Tech Mahindra, TCS and Wipro in the network and IT vendor quarters is comparable at 22 percent, 21 percent and 19 percent, respectively.
- The remaining market is fragmented with Infosys as the biggest player.
- This segment is likely to witness growth in the coming years due to increase in the demand of innovative offerings from telecommunications operators as these companies will help in the integration of all these offerings
- New and innovative technologies and tools are being developed by these companies to tap the unsaturated zones in telecommunications, such as application development, application integration and managed services
- Due to increasing financial pressure and consolidation of network and IT vendors, managed services are likely to grow at a modest rate in the next decade or so.
- As service providers contemplate transforming their CAPEX model to OPEX model, there will be a requirement of network and IT vendors in the coming years in the telecommunications sector
- Due to a shift in the focus towards more innovative product and service offerings, service providers are likely to depend more on network and IT vendors introducing avenues for growth for existing companies and facilitating the entry of new companies with better solutions, in India.

Sub-sectoral overview

Telecommunications equipment manufacturers

Top players in the telecommunications equipment manufacturing sub-sector and their market share



Workforce skills

Critical job roles — operator and production manager

Major skills :

- Machine operating skills
- Advanced skills for new technology
- Cost optimisation and efficiency enhancement

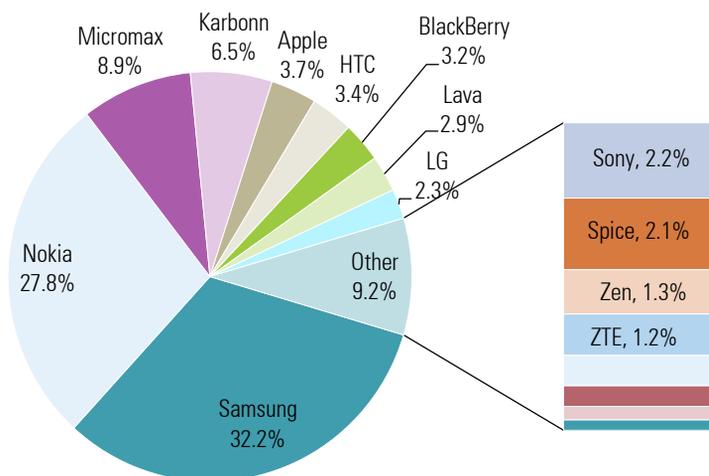
Industry insights

- Ericsson is the market leader with 28 percent market share and a client portfolio like Airtel and Uninor
- NSN is catching up with Ericsson with 24 percent market share and serving a bigger portfolio, which includes BSNL, Airtel, Idea, Vodafone and MTNL
- Economic instability, intense competitive pressures and decreased spending by service providers are forcing networking equipment vendors to streamline and refocus their business strategies to maintain profits
- Equipment manufacturers are placing significant emphasis on professional services and software product enhancements that can enable them to access service providers OPEX budgets in addition to capital budgets
- Equipment manufacturers are considering selling software-based product offerings and value-added services in addition to network equipment as a way to drive margin expansion

Sub-sectoral overview

Retail and distribution

Top players in the retail and distribution sub-sector and their market share



Workforce skills

Critical job roles — in-store promoter, sales executive and area sales manager

Major skills required:

- Understanding of market and customer requirements
- Presentation skills
- Customer relationship management (CRM)
- People management and development
- Soft skills
- Product knowledge

Industry insights

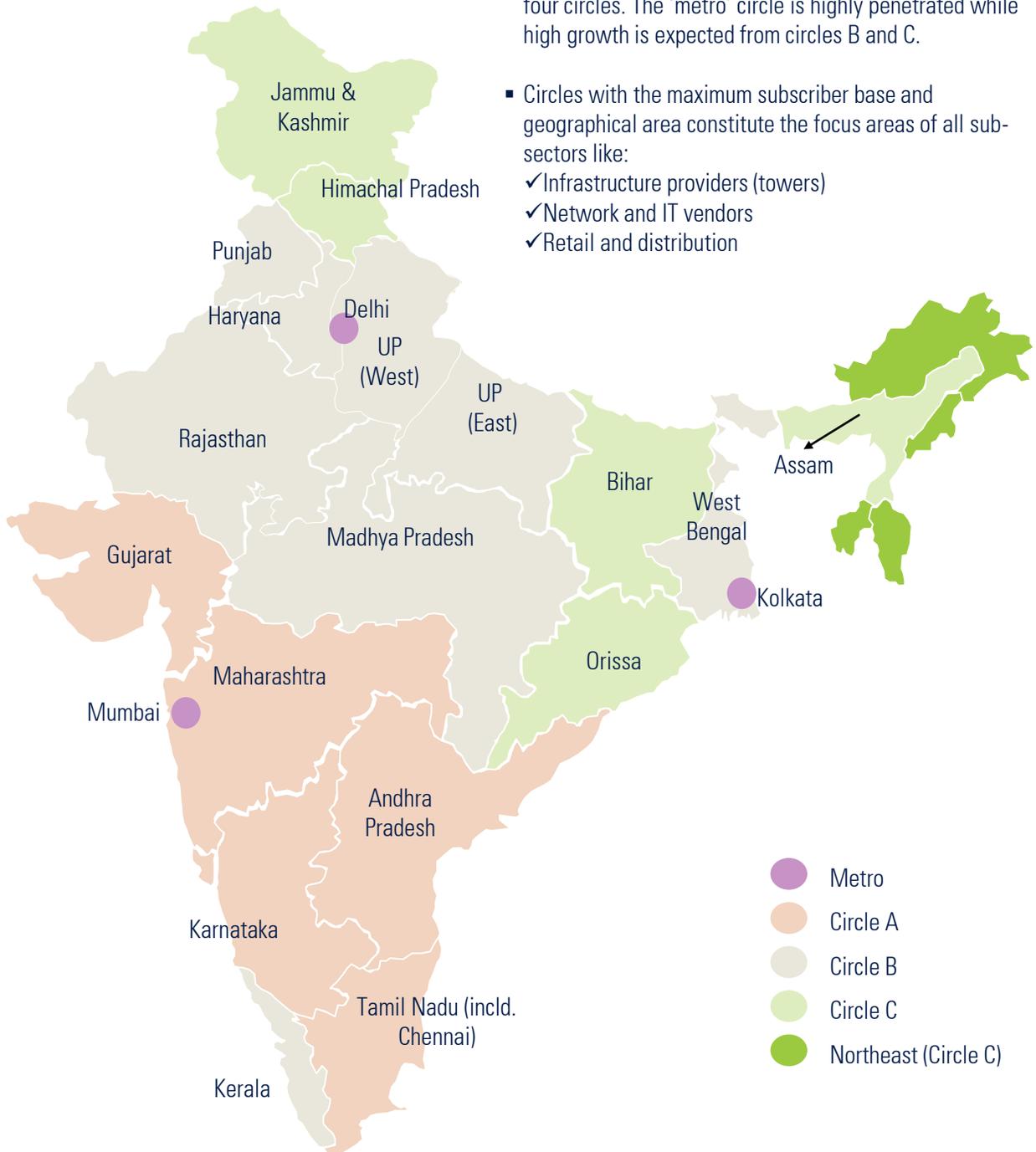
- Mobile penetration and low-cost smartphone and feature phones to increase domestic handset sales
- **Samsung** covers all bases through smartphones for high, mid and low-end markets
- **Nokia** regains success:
 - The Lumia series of smartphones helped in gaining market share
 - It is planning an Android-based smartphone to capture the market further .
- Indigenous brands, such as **Micromax** and **Karbons**, are gaining entry in to the market by debuting low-cost smartphones loaded with features.
- **Apple** to restart the manufacturing of iPhone 4 for India to gain market
- Releasing LTE-enabled smartphones would be one of the priorities of vendors in the coming years
- Overall, the retail industry looks lucrative in the next decade due to the advent of new technologies
- With increasing confidence and reliance of Indian consumers on online retailing, particularly after the emergence of successful platforms like Flipkart, the role of 'e-Tailing' has gained importance for emerging brands, which, for various reasons, cannot establish their physical distribution network across the country, particularly in non-metro cities and towns

Geographical clusters

Geographical clusters

Geographical clusters — services distribution across India

Service areas



Source: TRAI, KPMG in India analysis

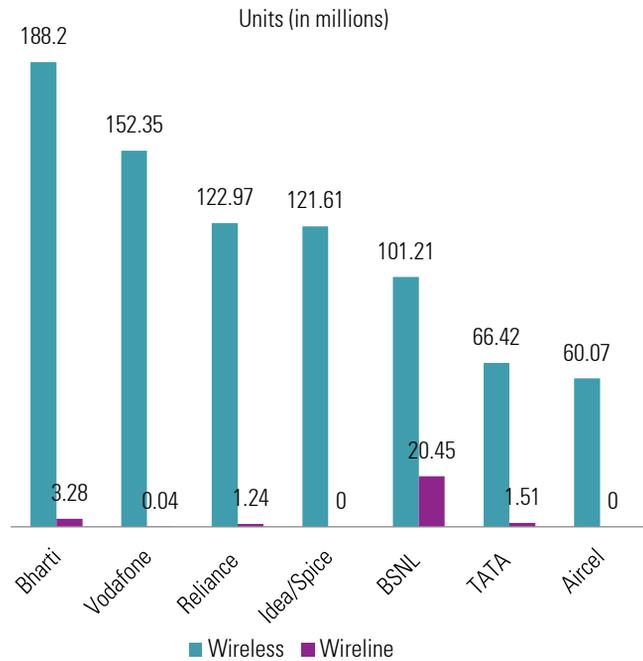
Geographical clusters

Geographical distribution

- India has been divided into three circles apart from the metros. The following map depicts the states under each circle.
- The highest subscriber base (357,439,756) as on 30 September 2013 was in circle B, followed by circle A with 322,918,180 subscribers. Circle C had a total of 126,122,751 subscribers and the metros were registered with 98,193,222 subscribers.
- There are nine major telecommunications operators in India along with other upcoming and small operators providing telecommunications services.
- Bharti Airtel is the market leader with 21.7 percent share of total subscription; Vodafone follows with 17.6 percent share market share.



Market standing of telecommunications operators on the basis of subscriber base



On the basis of the above map, we can segregate the operators into three categories — large, medium and small. Large operators constitute over 79 percent of the total subscribers, collectively.

Large	Medium	Small
BSNL	TATA	MTNL
Bharti	Aircel	Quadrant
Reliance	Unitech	Videocon
Vodafone		Loop
Idea/Spice		

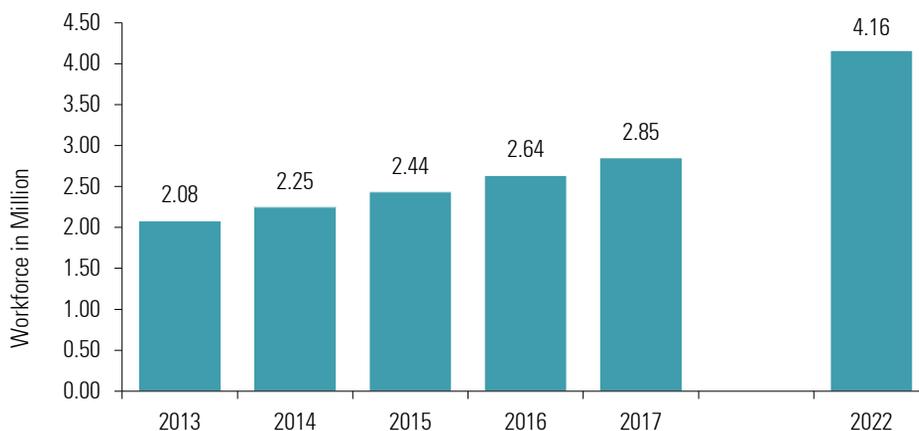
Source: TRAI, KPMG in India analysis

**Incremental human
resource
requirement
(2013-17, 2017-22)
and skill gaps**

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Current workforce of 2.08 million (2013) is expected to increase to ~4.16 million by 2022

Sector workforce in 2013–22

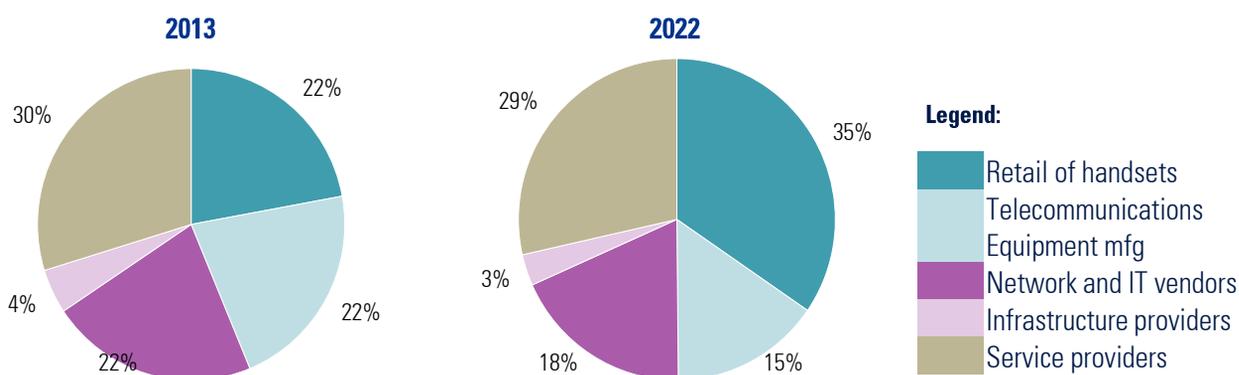


Source: Primary Interactions, NSSO 68th Round of EU Survey, KPMG Analysis

The sector currently employs over 2.08 million employees and is slated to employ more than 4.16 million employees by 2022. This implies additional creation of ~2.1 million jobs in the nine-year period.

The period 2013–17 will see a marginally higher growth in employment vis-a-vis 2017–22 due to expected changes in infrastructure integration and shared services along with increasing share of organised retail leading to higher productivity levels of workforce.

Sub-sector division of the workforce in 2013–22



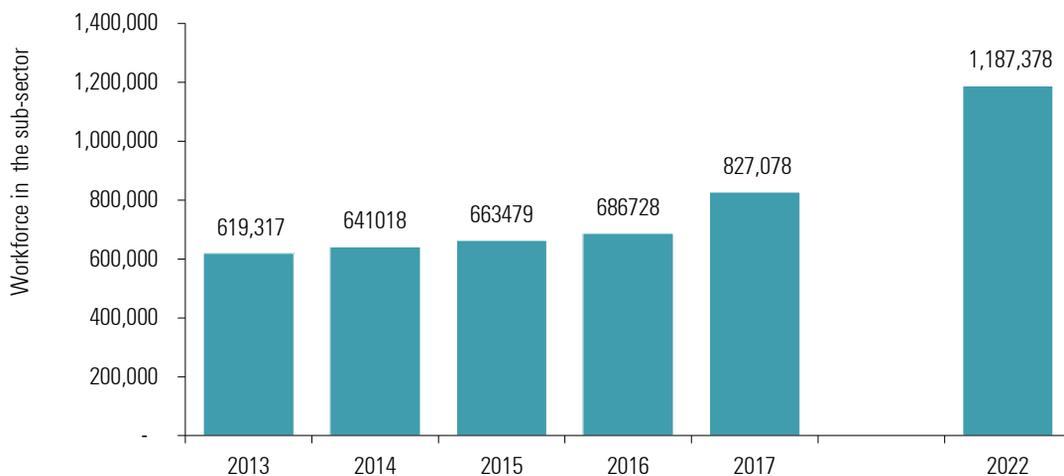
Source: Primary Interactions, KPMG Analysis

The analysis of the break-up of workforce by sub-sectors indicates that retail segment would show strong employment growth in absolute numbers increasing the share of overall sectoral employment from 22 percent in 2013 to 35 percent by 2022.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Service providers

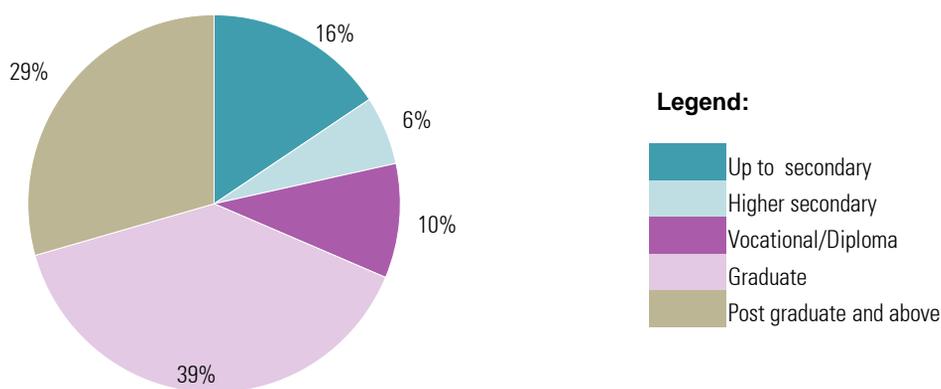
Workforce projection during 2013–22



- Service providers' sub-sector currently employs ~0.62 million employees, which is expected to reach to 1.2 million by 2022.
- Increase in workforce is likely to be driven by rise in rural tele-density and policy reforms focused on improving rural penetration.

Source: NSSO, KPMG in India analysis

Division of the incremental HR requirement by education (2013–22)



Within the service providers' sub-sector, nearly 70 percent of the workforce requirement is expected to happen in Graduate and above category.

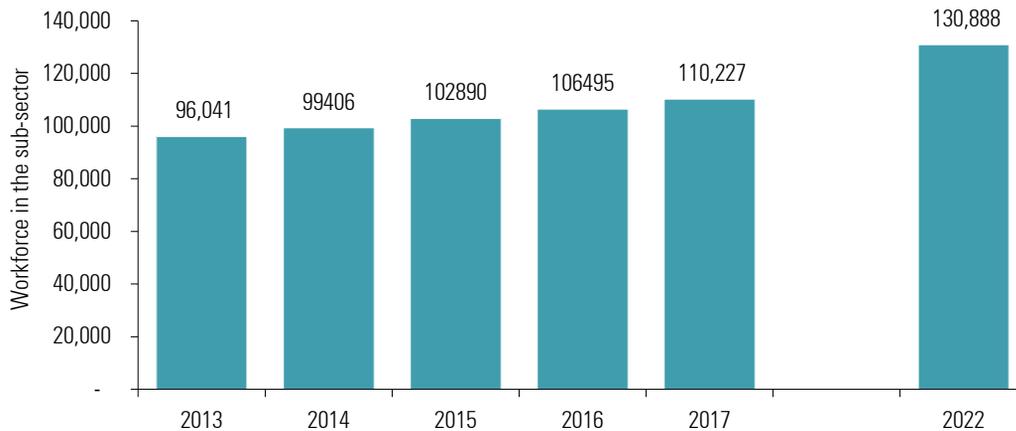
Zonal technical manager, Manager-RF manager, O&M Head, BTS engineer(Team lead), Network engineer, Territory sales manager-prepaid, territory sales manager-post paid, Team manager(CCE), Team manager(broadband) are key roles in graduate and above category

Source: Primary Interactions, KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Infrastructure providers

Workforce projection during 2013–22

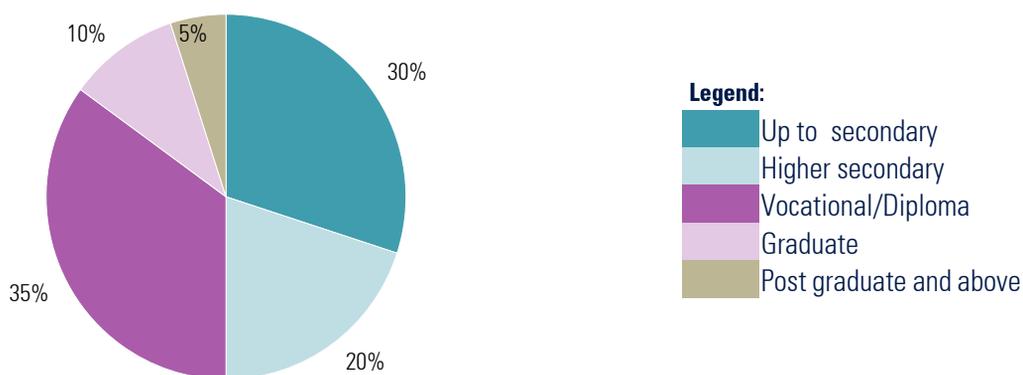


Infrastructure providers, the sub-sector, currently employs ~ 0.1 million employees; this is expected to reach to 0.13 million by 2022.

This segment is not expected to witness a jump in human resource requirement owing to the trends in market — shared services and consolidation of telecommunications infrastructure.

Source: NSSO, KPMG in India analysis

Division of the incremental HR requirement by education (2013–22)



Within the service providers' sub-sector, nearly 35 percent increase in the workforce requirement is expected in vocational education category.

Site technician, Energy executive, Operations support executive, Infrastructure executive are among the key job roles requiring skilled workforce through vocational training.

Source: Primary Interactions, KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Tele-communications equipment manufacturing

Workforce projection during 2013–22

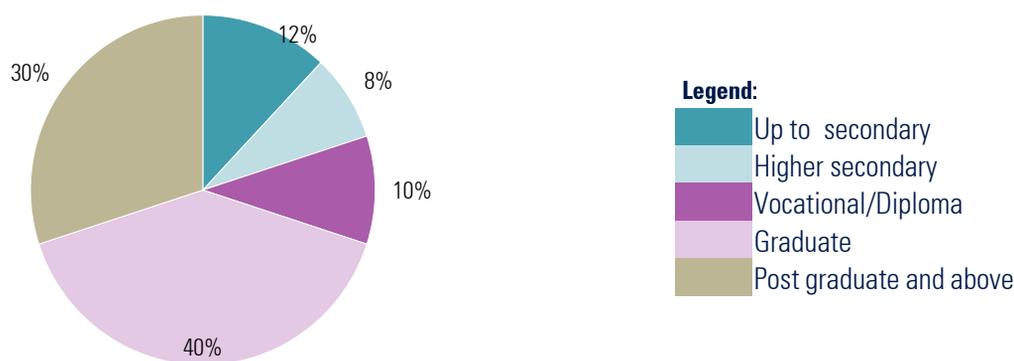


Telecommunications equipment manufacturing sub-sector currently employs ~0.45 million employees, which is expected to reach up to 0.64 million by 2022.

This increase will be driven by replacement in telecommunications infrastructure owing to technological upgrade.

Source: NSSO, KPMG in India analysis

Division of the incremental HR requirement by education (2013–22)



Within the service providers' sub-sector, nearly 70 percent increase in the workforce requirement is expected in graduate and above category.

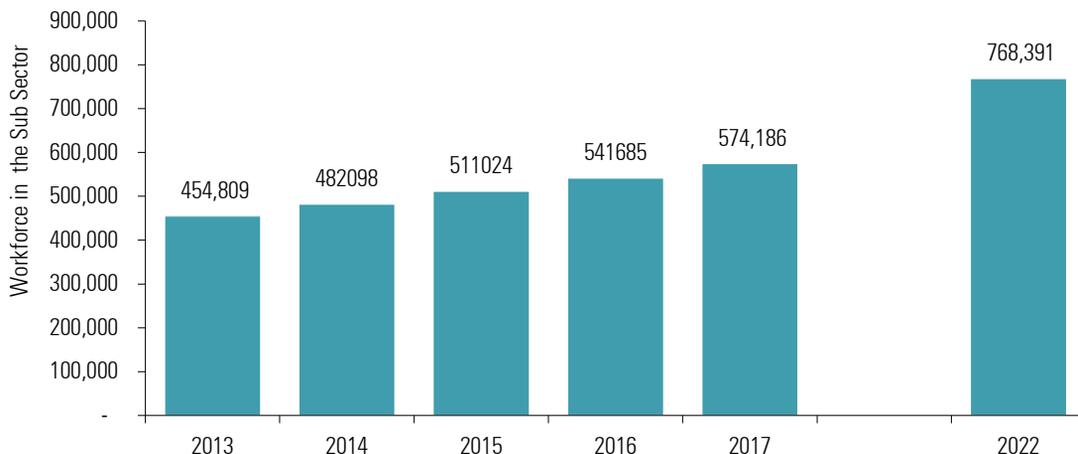
Engineer trainee, Engineer (R&D) are among key roles in graduate and above category

Source: Primary Interactions, KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Network and IT vendors

Workforce projection during 2013–22

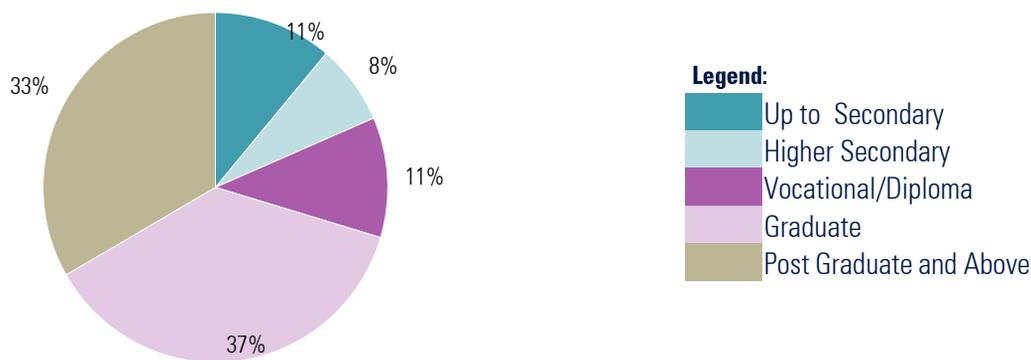


Network and IT vendors sub-sector currently employs ~0.45 million employees, which is expected to reach to ~0.77 million by 2022

This increase will be driven by new and innovative technologies that are developed by the companies in this segment.

Source: NSSO, KPMG in India analysis

Division of the incremental HR requirement by education (2013–22)



Within the Network and IT vendors sub-sector, around 70 percent increase in the workforce requirement is expected in graduate and above category.

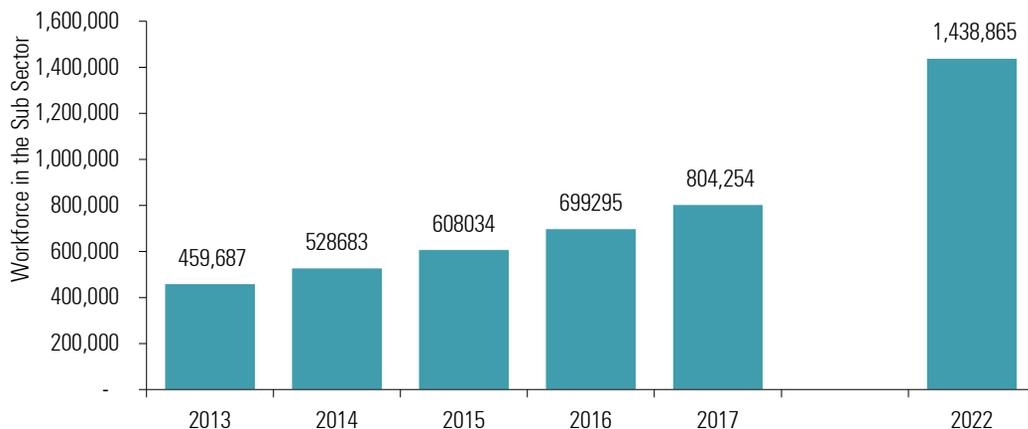
Field Technician/Engineer, RF Engineer, Transmission engineer, BSS engineer, Network Engineer, NSS/Core Engineer are among the key roles in the graduate and above category.

Source: Primary Interactions, KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Telecom Retail

Workforce projection during 2013–22

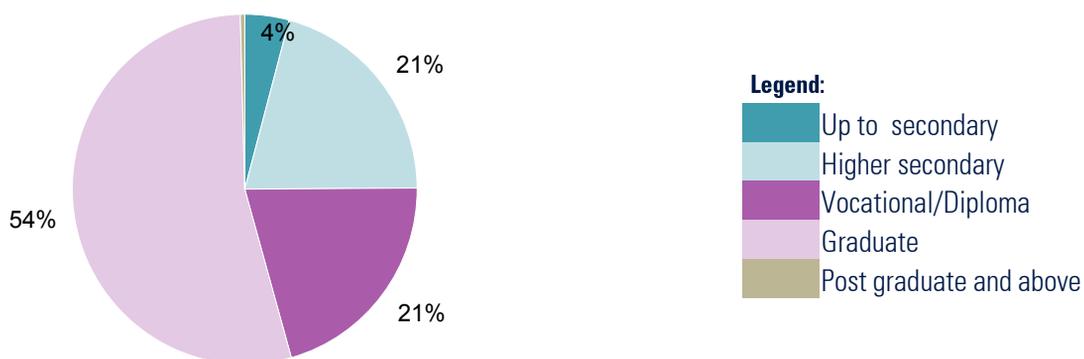


Retail sub-sector currently employs ~0.5 million employees, which is expected to reach to 1.43 million by 2022.

This increase will be driven by growth of specialised mobile retail stores along with the service and repair market increasingly following a replacement trend.

Source: NSSO, KPMG in India analysis

Division of the incremental HR requirement by education (2013–22)



Within the Network and IT vendors sub-sector, an increase of nearly three-fourth of the workforce is expected in graduate and vocational training categories.

Sales executive, Assistant sales manager, Territory sales manager and Sales manager are among the key roles in this category.

Source: Primary Interactions, KPMG Analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Mapping critical job roles in the telecommunications sector

Certain critical job roles in each sub-segment

Sub-sector	Positions
Service providers (active infrastructure)	BSS engineer
	Core engineer
	Field maintenance engineer
	Transmission engineer
	Fault management engineer (FME)
	Product specialist engineer (PSE)
	Installation engineer — SDH, DWDM
	Installation engineer — L2 & L3
	Network management eng
	Customer Care Executive (repair centre)
Passive infra segment	Tower technician
	Cluster in-charge
	Cluster manager
	Optical fibre splicer (OFS)
	Optical fibre technician (OFT)
Network and IT vendors	IT support engineer
	Application developer
	IT staff manager
Telecommunications equipment manufacturing	Production engineer
	Operator
	Quality engineer
Retail and distribution (including sales and service)	Customer care executive (call centre)
	Customer care executive (relationship centre)
	Distributor sales representative
	Territory sales manager
	In store promoter
	Service/Repair Executive

A variety of roles in sub-sectors — passive infrastructure and network and managed service providers — are outsourced to manpower providers.

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Mapping the most critical job roles in various sub-sectors of the telecommunications sector

Understanding the top critical job roles in various sub-sectors of the telecommunications industry

Sub-sectors	Top critical job roles	Description
Service providers	<ul style="list-style-type: none"> ▪ Middle-level (Fault management engineer) 	<p>Fault management engineer</p> <ul style="list-style-type: none"> ▪ Responsible for monitoring network from NOC location and maintaining network uptime by ensuring that faults are effectively resolved within short span of time ▪ Directing and coordinating with the field team to conduct corrective/change activities on the site in case field support is required
	<ul style="list-style-type: none"> ▪ Middle-level (Network management engineer) 	<p>Fault management engineer</p> <ul style="list-style-type: none"> ▪ Responsible for the provisioning of end-to-end circuit and managing network elements from a centralised server called the network management system
Infrastructure providers	<ul style="list-style-type: none"> ▪ Middle-level (Cluster in-charge) 	<p>Cluster in-charge</p> <ul style="list-style-type: none"> ▪ Ensure increase in site up-time and reduce energy cost ▪ Monitor preventive maintenance ▪ Corrective maintenance and on-site repair
	<ul style="list-style-type: none"> ▪ Managerial level (Cluster manager) 	<p>Cluster in-charge</p> <ul style="list-style-type: none"> ▪ Corrective maintenance and on-site repair ▪ Provide uninterrupted infra services to operators in cluster ▪ Ensure optimum utilisation of resources ▪ Efficiency in reducing energy and other operational costs
Network and IT vendors	<ul style="list-style-type: none"> • Middle-level (Staff supervisor) 	<p>Staff supervisor</p> <ul style="list-style-type: none"> ▪ Managing shared services staff at the client location ▪ Addressing the challenges faced by the IT staff and escalating them to senior management

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Mapping the most critical job roles in the various sub-sectors of the telecommunications sector

Understanding the top critical job roles in various sub-sectors of the telecommunications sector

Sub-sectors	Top critical job roles	Description
Network equipment manufacturing	Middle-level (Production engineer)	<p>Production engineer</p> <ul style="list-style-type: none"> Responsible for maintaining productivity levels on the operation floor Managing a small team
Retail and distribution	Middle-level (Territory sales manager — distributor, sales distributor)	<p>Territory sales manager (distributor)</p> <ul style="list-style-type: none"> Expanding distribution and coordinating with urban distributors Achieving sales targets in assigned territory, revenue target, people development, channel management, retailer education, range selling, increasing customer base and process compliance, in the coming years <p>Sales distributor</p> <ul style="list-style-type: none"> Generating sales for mobile handset and related accessories Steering sales as per an organisation's target matrix Increasing width and depth of distribution and work in a specified area as per the beat plan and route plan

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The changing environment has resulted in significant skill gaps across levels in the telecommunications sector

Changing skill set requirements		
	Skills required	Skill gap
Service providers		
Need supervision (Entry-level engineers and technicians)	Detailed understanding of the job to be conducted at this level	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ High attrition rates for tower technicians due to low pay scale ▪ Freshers possess theoretical knowledge but lack the training required to fit in the role ▪ Disconnect between the education imparted and industry requirements ▪ Lack of safety measures
	Thorough understanding of the service levels to be achieved	
	Ability and willingness to learn on the job	
	Aptitude to identify issues and resolve them by seeking expert guidance	
	Patience and perseverance	
Works independently (Transmission, installation and infra engineers)	Ability to identify issues and resolve them on their own with minimum supervision	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of people management skills
	Basic level of expertise and willingness to learn new skills	
	Ability to help and guide new recruits on the job	
Manages a team (Core engineers and network management engineer)	Ability to take decisions quickly	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of initiative to pursue tasks outside the designated role, which adversely affects innovation ▪ No replacements available in case attrition increases; significant up skilling is required ▪ Lack of training modules focusing on leadership, motivation and conflict management
	Analytical bent of mind	
	Ability to handle planning for new products, market research and strategy	
	Developing IT strategies and plans and establishing a system-driven IIT system	
	Stakeholder interactions	
	Aptitude to develop business and identify roadblocks	
	Thorough knowledge and understanding of the dynamics of the sector as well as sub-sectors	

Source: Primary interviews, KPMG in India analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The changing environment has resulted in significant skill gaps across levels in the telecommunications sector

Changing skill set requirements		
	Skills required	Skill gap
Infrastructure providers		
Needs supervision (Tower technicians and optical fibre splicer)	Hardworking and willingness to work for long hours	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Dearth of candidates with the required technical acumen ▪ Lack of diploma/degree colleges for specific telecommunications skill development
	Technical know-how and expertise in certain skills	
	Quick identification and resolution of problems	
Works independently (Cluster in-charge)	Ability to recruit, train, and manage people	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of technical skills and regular training to stay updated on the current norms ▪ Lack of people management skills
	Defining goals for junior-level technicians	
	Mentoring tower technicians and keeping a check on safety norms	
	Ability to communicate clearly and concisely	
Manages a team (Cluster manager)	Ability to take decisions quickly	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of initiative to pursue tasks outside of designated role, which adversely affects innovation ▪ No replacements available in case attrition increases; significant up skilling is required ▪ Lack of training modules focusing on leadership, motivation and conflict management
	Analytical bent of mind	
	Ability to responsibly handle new site planning and strategy	
	Effective management skills to manage optical fibre splicers and tower technicians	
	People skills to connect with workers and keeping a check on OHS norms	

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The changing environment has resulted in significant skill gaps across levels in the telecommunications sector

Changing skill-set requirements		
	Skills required	Skill gap
Retail and distribution		
Needs supervision (Customer care executive and sales executive)	Detailed understanding of various telecommunications sector offerings and processes	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ High attrition rates for call centre executives ▪ Workers possess theoretical knowledge but lack the training required to fit in the role ▪ Disconnect between the education imparted and actual requirements ▪ Lack of structured training programmes for CREs
	Knowledge of various third-party offerings with an attitude to sell	
	Awareness of regulatory norms to comply with	
	Understanding customers' needs and suggesting suitable offerings	
	Patience and perseverance	
	Good verbal and written communication skills	
	Ability to work with targets	
Works independently (Area sales manager, regional/zonal sales manager and national sales manager)	Ability to recruit, train, and manage people	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of technical skills and regular training to stay updated on the current norms ▪ Lack of people management skills
	Defining and assisting in achieving sales targets for individual executives along with ensuring retention and development of field force	
	Developing area managers and medical representatives	
	Ability to communicate clearly and concisely	
Manages a team (General manager — sales and vice president — sales)	Ability to take decisions quickly	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of initiative to pursue tasks outside of their role ▪ No replacements available in case attrition increase; significant up skilling is required ▪ Lack of training modules focusing on leadership, motivation and conflict management
	Analytical bent of mind	
	Efficient communication skills — visiting major clients and regional managers across the country	
	Organisational skills including changes in management	
	Recruiting sales staff	
	Ability to handle new product planning, market research, strategy and sales responsibility	
	Developing sales strategies, establishing system-driven national sales mechanism	
	Thorough knowledge and understanding of the dynamics of the sector as well as sub-sectors	

Source: Primary interviews, KPMG in India analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The changing environment has resulted in significant skill gaps across levels in the telecommunications sector

Changing skill-set requirements		
	Skills required	Skill gap
Works independently (IT staff supervisor/ manager)	Strong networking abilities and communication skills	<ul style="list-style-type: none"> Aspiration gap between candidates' expectation from their profiles and what the role really involves Lack of people management skills
	Thorough technical knowledge and data analysis skills	
	High level of accountability and ability to maintain stakeholder confidence	
	Ability to take decisions quickly	
Network and IT vendors		
Need supervision (IT support engineer and technician)	Requisite technical knowledge to provide advisory expertise to all divisions	<ul style="list-style-type: none"> Aspiration gap between candidates' expectation from their profiles and what the role really involves
	Provide guidance to project managers on various IT and network-related aspects	
	Good verbal and written communication skills	
	Awareness of regulatory norms to comply with	
Manages a team (Director/senior manager IT)	Efficient management skills — managing technical staff, budgets and procedures	<ul style="list-style-type: none"> Dearth of candidates with technical and management profiles
	Awareness of the required stakeholders expectations to formulate procedures to deliver expert services to meet the expectations	
	Analytical bent of mind to develop new solutions and programmes to support product development and enhance revenues	

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

The changing environment has resulted in significant skill gaps across levels in the telecommunications sector

Changing skill-set requirements		
	Skills required	Skill gap
Equipment manufacturing		
Need supervision (Operators and team leaders)	Requisite amount of technical knowledge to operate sophisticated machinery	<ul style="list-style-type: none"> ▪ Aspiration gap between candidates' expectation from their profiles and what the role really involves ▪ Lack of motivation due to low-pay scale
	Good communication and reporting skills (for team leaders)	
Works independently (Group leader, Production manager, Training manager)	Ensuring safety compliance in the plant	<ul style="list-style-type: none"> ▪ Lack of safety awareness training ▪ Lack of structured training modules due to focus on cost control ▪ Lack of candidates with know-how on management and communication skills
	Ensuring cost efficiency	
	Ensuring a seamless bridge between the management and operational staff	
	Ability to manage small teams and groups	
Manages a team (Factory head and senior manager)	Effective management of production lines of an organization	<ul style="list-style-type: none"> ▪ Lack of focus on technical skills and hence, limited understanding of cost optimization ▪ Lack of innovative ideas, increased focus on reverse engineering
	Superior technical skills	
	Patience and perseverance	
	Efficient management skills to head the production department	
	Promoting continuous innovation and driving cost optimization	

Source: Primary interviews, KPMG in India analysis

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Skill gaps in informal segment

Informal employment is largely concentrated in retail and service repair segments with OTC products, such as handsets and mobile SIMs. There is a large number of small-size units that operate in this segment driven by entrepreneurs employing one to three persons.

Gaps observed (unorganized setup / Informal jobs):

KYC and documentation Knowledge	<ul style="list-style-type: none"> ▪ As per required guidelines, retailer needs to understand the mandatory KYC and documentation process and it's a skill severally in shortage. ▪ Understanding of risk attached and documentation process with service providers is also an area of skill-gap.
Book Keeping, Financial Management and Stock Management	<ul style="list-style-type: none"> ▪ Most of the employment in informal segment happens at small-sized units which are owner driven. ▪ They need adequate book-keeping, financial discipline and supply chain understanding. ▪ Understanding of banking practice, credit score etc. is also a significant gap
Product Knowledge	<ul style="list-style-type: none"> ▪ As handset market flushed with new product launches, retailers as well as repair service provider needs to be aware with new technologies and features. ▪ Understanding trouble shoot options, effective selling with highlighting key features and new technologies, ability to repair new tech handsets is found lacking.

Training Infrastructure

Corporates have either set up captive training centres or tied with academic institutes to develop talent for the sector

Ericsson — EMPOWER training programme

- Ericsson's EMPOWER is a telecommunications certification programme that combines practical knowledge with simulated training, to empower and make young telecommunications engineers industry ready. Ericsson launched its brand, 'Empower', in September 2009, and joined hands with 12 engineering institutions and currently has association with 75 universities/technical education institutes across India

IITM - Institute of Telecom Technology and Management (MTNL)

- Setup by MTNL, Delhi, IITM has trained more than 900 students in various engineering colleges since 2011

ARTTC, Ranchi (BSNL)

- Advanced Regional Telecom Training Centre (ARTTC) is situated in the capital city Ranchi of Jharkhand. ARTTC is pioneer telecommunications training centre in India serving for the training needs on different fields of Telecommunication under rainbow umbrella of BSNL

NTTF and Indus Towers partnership to run certification programme

- Indus Towers runs a certification programme for two months to equip students in Cell Site Maintenance

Telecommunications centre of excellence has been established with government/private player support at select academic institutions

Associate institute	Sponsor	Work assigned
IIT Kharagpur	Vodafone Essar & Texas Instruments	Next generation network (NGN) and network technology
IIT Delhi	Bharti Airtel	Telecommunications technology and management of infrastructure
IISC (Indian Institute of Science), Bangalore,	Aircel & Texas instrument	Information security and disaster management of infrastructure
IIT Kanpur	BSNL & Alphion	Technology integration, multimedia and computational mathematics
IIT Chennai	BSNL & Alphion	Telecommunications infrastructure and energy
IIT Mumbai	TTeleservices	Rural applications
IIM Ahmedabad	Idea Cellular	Policy, regulation, governance, customer care and marketing

List of select training centres of BSNL and MTNL providing telecommunications training

S.No	Training Centre	PSU	Location
1	Advanced Level Telecom Training Centre (ALTTC), Ghaziabad	BSNL	Ghaziabad (UP)
2	Bharat Ratna Bhim Rao Ambedkar Institute of Telecom Training (BRBRAITT), Jabalpur	BSNL	Jabalpur
3	Advance Regional Telecom Training Centre (ARTTC), Ranchi	BSNL	Ranchi
4	Rajiv Gandhi Memorial Telecom Training Centre (RGM TTC), Meenambakkam, Chennai	BSNL	Chennai
5	Netaji Subhash Chandra Bose Telecom Training Centre (NSCBTTC), Kalyani	BSNL	Kalyani (WB)
6	Regional Telecom Training Centre, Ahmedabad	BSNL	Ahmedabad
7	Regional Telecom Training Centre, Bhubaneswar	BSNL	Bhubaneswar
8	Regional Telecom Training Centre, Maraimalainagar, Chennai	BSNL	Chennai
9	Regional Telecom Training Centre, Guwahati	BSNL	Guwahati
10	Regional Telecom Training Centre, Hyderabad	BSNL	Hyderabad
11	Regional Telecom Training Centre, Jaipur	BSNL	Jaipur
12	Regional Telecom Training Centre, Lucknow	BSNL	Lucknow
13	Regional Telecom Training Centre, Mysore	BSNL	Mysore
14	Regional Telecom Training Centre, Nagpur	BSNL	Nagpur
15	Regional Telecom Training Centre, Pune	BSNL	Pune
16	Regional Telecom Training Centre, Rajpura	BSNL	Rajpura (Punjab)
17	Regional Telecom Training Centre, Trivandrum	BSNL	Trivandrum
18	Institute of Telecom Technology and Management (ITTM), Delhi	MTNL	New Delhi
19	Centre for Excellence in Telecom Technology and Management (CETTM), Mumbai	MTNL	Mumbai

Recommendations for Stakeholders

Recommendations for Stakeholders

Recommendations

- Management (MBA) and engineering graduates who join the telecommunications sector lack basic knowledge of telecommunications and electricals
- Companies invest significant time and effort to impart basic skills in telecommunications and related areas. The existing curricula do not impart the skills that can make students employable
- The technical nature of job(s) requires practical/on-the-job training.

- Sales executive representing their telecommunications companies possess weak soft and presentation skills, and industry/domain knowledge

- Training for certain job roles may require high capital investment, thus, resulting in increased training fee

- Setting up of manufacturing focused telecommunications training institutes is capital expenditure heavy making it difficult to develop commercially viable training models in the space

Recommendation 1: Include telecommunications and related areas as super specialisations in engineering and MBA colleges

- Engineering/management colleges and training institutes should include telecommunications as a separate specialized course
- Additionally, there can be a super specialized course in telecommunications. For example, engineering institutes may offer a specialized course in operations management with a focus on passive infrastructure
- Colleges need to focus on clarifying basic concepts in the field of telecommunications and electrical engineering.

Recommendation 2: Increased focus on soft skills

- Training institutes and colleges should focus on imparting communication skills to improve efficiency and the overall success rate of jobs

Recommendation 3: Introduce funding schemes to train potential candidates

- Banks may consider providing special soft loans to students keen on pursuing a course in telecommunications. This will give a boost to the supply side where the fees are usually on the medium to high-side due to the technical nature of the job

Recommendation 4: Government to develop PPP models in training for infrastructure sharing

- Develop mechanisms for sharing existing training infrastructure at BSNL, MTNL and other government training infrastructure for delivery

Recommendations for Stakeholders

Recommendations

- Certain job roles may require a trainee to spend considerable time on practical training to become employable
- This may come at the cost of earning better salary, thus, discouraging potential candidates from joining the sector

- Preference of job location near an individual's residence is one of the main reasons for attrition in segments, such as passive infrastructure.

- Bright students require avenues to get absorbed in quality jobs
- Currently, a few players possess the required technical knowhow and they use in-house academies to impart training. There is a need to disseminate this information to ensure capacity-building in the sector

Recommendation 5: Developing certified training programmes that help trainees 'earn while they learn'

- It is important to devise a structure for training programmes that includes an active practical learning component for trainees at a live working location. This should be supported with remuneration equivalent to that of an unskilled/ semi-skilled worker in the sector, besides providing financial assistance that helps the individual in investing in training

Recommendation 6: Providing incentives to employees working in remote tower sites and to: a central database for telecommunications employees

- To avoid attrition and motivate employees to work in remote tower sites, companies and the government can consider providing incentives
- A database on the vacancies in telecommunications firms would help employees locate jobs close to their hometown/preferred location, which, in turn, would reduce attrition

Recommendation 7: Government funding is required to create an ecosystem for engineering graduates

- The government needs to invest in areas like R&D to create an ecosystem for engineering graduates
- The government should take adequate steps to ensure dissemination of information/technical knowhow currently concentrated in the hands of vendors



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP



N · S · D · C
National
Skill Development
Corporation

Transforming the skill landscape

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