

From evolution to revolution

Advancing a decade of innovation in the Indian towerco industry

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taipa

Tower and Infrastructure
Providers Association

EY

Building a better
working world

Foreword

रविशंकर प्रसाद
RAVI SHANKAR PRASAD



मंत्री
संचार, विधि एवं न्याय
एवं
इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी
भारत सरकार
MINISTER OF
Communications, Law & Justice
and
Electronics and Information Technology
Government of India

MESSAGE

I am delighted to note that Tower and Infrastructure Providers Association (TAIPA) is celebrating 10 years of its constitution, on 21st September, 2020.

Over the years, Telecommunication has emerged as a key driver for social development and for bridging the digital divide in an increasingly knowledge intensive global economy. It is heartening to note that the Tower base has quadrupled since 2010 to reach more than 6 Lakh towers at present providing uninterrupted ubiquitous quality services to more than 1.2 billion consumers.

Telecommunication infrastructure in India is the backbone of industrial and economic development, the industry has been aiding delivery of voice and data services at a rapid pace due to faster rollouts, and thus has been revolutionising the human communication by introducing the novel concept of 'Infrastructure Sharing' which is now emulated world over.

The robust telecom infrastructure will help in the implementation of the visionary programmes of the present government like e-Governance, Broadband Highways, Public Internet Access Programme, etc. Telecom sector has played a stellar role during the current crisis.

I am sure that the telecom infrastructure will continue to play a pivotal role in ensuring the delivery of government services thus realising the vision of 'Digital India'.

On completing 10 years, I congratulate the industry body of the telecom infrastructure companies, and also wish great success ahead.

(RAVI SHANKAR PRASAD)



Foreword

डा० आर एस शर्मा
Dr. R S Sharma



अध्यक्ष
भारतीय दूरसंचार विनियामक प्राधिकरण
Chairman
TELECOM REGULATORY AUTHORITY OF INDIA



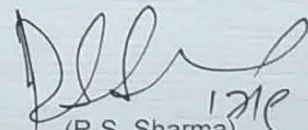
MESSAGE

I am happy to know that TAIPA is celebrating their 10th anniversary this year.

The telecom infrastructure industry has done a commendable service to the nation by keeping the networks up and running during the current crisis. The criticality of the sector has been proven beyond doubt now.

Going forward, the telecom infrastructure will have far more important role to play as the emerging technology would require tower densification and fiberisation to support new applications like enhanced broadband, IoT applications, AI, VR, AR and block chain etc. over 5G. The existing infrastructure would have to be complimented through small cell, Wi-Fi and In-building solutions. Thus, the role of telecom infrastructure providers will continue to be important and critical.

My heartiest congratulation to TAIPA having completed 10 years of an eventful journey. I am sure that TAIPA will continue to actively promote the cause of telecom infrastructure sector.


(R.S. Sharma)

Foreword



OFFICE OF
THE CHAIRMAN

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON



Mr. Ajit Pai
Chairman
Federal Communications Commission

Message

I am delighted to learn that the Tower and Infrastructure Providers Association (TAIPA) is celebrating its 10th Anniversary this year. I congratulate the Chairman of TAIPA and the team of dedicated professionals led by the Director General of TAIPA on this milestone in a remarkable journey over the past decade.

It is very exciting to know about the success story of TAIPA and the exemplary work done by the communications infrastructure sector in the last decade. I'm sure the challenges were substantial, and progress would not have been possible without your dedication and willingness to work in good faith.

In recent years, the growth in telecom and broadband connectivity in India, especially the expansion of 4G, has been remarkable. Further, the great work done by telecom infrastructure providers in ensuring uninterrupted telecom operations during COVID-19 exemplifies the commitment of TAIPA and its members towards their customers and the country.

With its commitment, expertise, and capabilities, TAIPA is well equipped to provide constructive guidance to all stakeholders, including the Government, on ways to promote strong digital communications infrastructure.

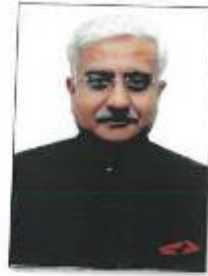
On this occasion of the 10th Anniversary, my best wishes to TAIPA for success in all their endeavors.

Foreword

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



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

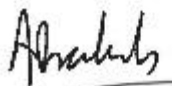


MESSAGE

I am happy to learn that Tower and Infrastructure Providers Association (TAIPA) is completing a decade since inception. In these ten years, TAIPA has certainly marked its presence as a leading Industry Association articulating the aspirations of the members and making a positive value addition for policy making.

The vision of Digital India and expanding broadband coverage across the length and breadth of the country is both a challenge as well as an opportunity. The challenge is for galvanizing infrastructure providers to match the pace of requirement for expansion of broadband. The opportunity, of course, is to be a partner and an important stakeholder in the Digital India journey. The National Broadband Mission launched in December last year scripts an important role for the Telecommunications Industry and, certainly, TAIPA is also expected to carry forward this mission.

On the occasion of tenth anniversary of TAIPA, I extend my best wishes to the Organization.


(Anshu Prakash)

Foreword

हिन्दी का मान : राष्ट्र का सम्मान

K. Ramchand
Member (Technology)



Message

I am delighted to extend my warm felicitations to Tower and Infrastructure Providers Association (TAIPA) on its 10th Anniversary.

It is an important milestone that deserves to be celebrated and I have been witness to their role as an apex industry body for development of Digital communication infrastructure in the Country over these years.

They have made significant contributions, interventions and initiatives in the area of policy and regulation that have been directed towards achieving Digital India mission of the Government of India. I must mention that the TAIPA and its members were one of the key groups that provided excellent inputs for the development of the National Digital Communications Policy (NDCP), 2018. They are also a key stakeholder in providing their valuable contribution to enable the country to achieve the targets under National Broadband Mission (NBM) of the Government of India.

I am confident that TAIPA will help address the future challenges of Policy & Regulation in the emerging Digital Economy, thereby taking the sector to greater heights.

I wish TAIPA all the best in its endeavors.


(K. Ramchand)

भारत सरकार
संचार मंत्रालय,
दूरसंचार विभाग
संचार भवन, 20, अशोका रोड़,
नई दिल्ली-110 001
Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhawan, 20, Ashoka Road,
New Delhi - 110 001
WEBSITE : www.dot.gov.in

Foreword



MR. AKHIL GUPTA
CHAIRMAN, TOWER AND INFRASTRUCTURE PROVIDERS ASSOCIATION (TAIPA)

FOREWORD

I am glad that TAIPA has reached an important milestone of a decade of its operations. The telecom infrastructure industry in India has clearly demonstrated the power and benefits of sharing of infrastructure among various operators on a non-discriminatory basis. Over the last decade, the telecom operators in India have saved billions of dollars in capex and opex due to investments by infrastructure companies and sharing.

TAIPA has made significant contributions towards policy and regulatory front during these years, that have yielded results in terms of transformational policy interventions by the Government. It gives me immense satisfaction that the industry has functioned with one voice and has worked through a collaborative and consensus building approach throughout these years.

It is a matter of satisfaction and pride for all the members of TAIPA to have continued to operate the infrastructure round the clock in wake of various natural disasters like floods, earthquakes, landslides and recent unprecedented lockdowns and disruptions due to COVID, as also other disturbances on account of law and order and insurgent activities from time to time.

The technology evolution is bound to happen in the telecom sector and the industry will have to gear up for the new challenges. New business opportunities will have to be explored to cater to the infrastructure requirements of emerging technologies – both on passive and active infrastructure.

I am confident that the Association will continue to address the future challenges in terms of policy, regulation and technology and continue to provide strong support to the national vision of Digital India and inclusive growth.

Foreword



Mr. Amit Sharma
Vice Chairman – TAIPA

Message

The year 2020 is a milestone year for Tower and Infrastructure Providers Association (TAIPA) as we mark our 10th Anniversary.

It has been an eventful journey so far as we continue to work towards the growth of telecom infrastructure industry each year. Over the past 10 years, telecom infrastructure industry has achieved an unparalleled growth, is a critical enabler of the voice and data services every Indian has come to depend on and the focus in the future will be to remain committed on the path.

TAIPA has achieved remarkable success in multiple areas including various policy and regulatory matters, with whole-hearted support from the Government and the industry even during the challenging times such as cyclones, floods, pandemic etc.

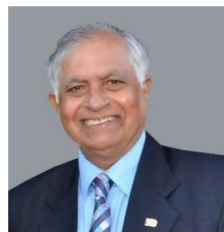
I would like to take this opportunity to thank all the team members of TAIPA led by the Director General, for their hard work over the last 10 years. This tremendous growth was not possible without their incredible dedication to TAIPA.

The coming years will bring a range of opportunities for the infrastructure providers and I am certain that TAIPA will continue to play its active role to support Digital India and enhance Government & Industry partnerships on behalf of its members.

I would also like to extend my heartiest gratitude to all TAIPA members for their support throughout this successful journey.

I wish the team at TAIPA the very best in their future endeavors.

Foreword



**From the Desk of
T R Dua, Director General, TAIPA**

It has been an exciting and quite eventful journey during last ten years. I am happy that TAIPA as an apex representative body for infrastructure providers has created its own identity with various authorities delving in public policy and regulatory during the last decade.

I am thankful to our members who have made excellent contributions towards policy, regulations and technical challenges. Our efforts have culminated into policy interventions which are truly transformational. The Government of India notified Indian Telegraph Right of Way rules, 2016 and National Digital Communication Policy 2018 and, thus, has laid the foundation for creation of resilient telecom infrastructure. National Broadband Mission has also been rolled out at the State level which will lead to much needed collaboration between States, Central Government and telecom industry and expedite the implementation of Right of Way policies.

The telecom infrastructure has been a bedrock for provision of telecom connectivity during the current crisis. This would not have been possible without the solid support extended by the Central Government and State Governments.

With the technology evolution and huge upsurge in data consumption, the telecom infrastructure is reshaping itself towards new solutions such as small cells, Wi-Fi, in building infrastructure and fiberisation. TAIPA continues to innovate and is well prepared to address the future challenges in the emerging era of digital economy, diversification towards new business opportunities by our members and to ensure the continued success of the sector.

We are thankful to the authorities for their cooperation and support during the last 10 years, and look forward to their continued support and cooperation as we move into the exhilarating times ahead.

A handwritten signature in black ink, appearing to read "T.R. Dua", written over a horizontal line.

T.R. Dua



Foreword



Prashant Singhal
Emerging Markets
TMT Leader, EY

The world has changed dramatically in the past few months. COVID-19 is upending the human society. The severity and magnitude of socio-economic impact that followed is unlike what we had ever experienced in our lifetime. In these unprecedented times, connectivity has been the greatest enabler to social engagement - bringing over a billion Indians together through voice and data services. The robust telecom ecosystem has emerged as the pulse of the connected economy, supporting 30% - 35% of India's GDP during these times.

Case in point - the telecom infrastructure industry has been a pivotal force shaping the connectivity revolution in India. In the past decade, wireless subscriber base has grown at a CAGR of 7.1%, and infrastructure build-out has kept pace to support the exponential growth.

The last decade of India's telecom revolution has been fuelled by a robust "towerco" industry. Between 2007-2020, number of towers have more than doubled and grown at a CAGR of 7.1% to reach 606,300. Today, India has 83% of its tower sites owned by towercos (including MNO backed towercos). This is second only to China (100%), and ahead of the US and Canada (70.8%), Europe (63.8%), South East Asia (27.3%)* and Oceania (12.8%).

With innovation at the core, the industry has carved a niche globally. India pioneered the concept of passive infrastructure sharing, which is now a global hallmark. The business model shift unlocked significant gains - from rapid market expansion and faster time to market, to opex and capex efficiencies, and offloading capex burden from telecom operators.

The strong fundamentals of the tower industry had enabled seamless entry and exit of market players, which otherwise would have been challenging given the massive capital commitments to roll out networks. With the changing sector narrative, the industry has demonstrated the ability to change, remodel and grow in diverse dimensions.

Today with data growth and the imminent launch of next gen 5G technology taking centre stage, the next decade holds exciting new prospects for towercos. Plenty of new opportunities are arising for tower companies to shift their attention from a macro tower focused business, towards new business models hinged on fibre, small cells, data centres, Wi-Fi, smart cities and beyond.

The Government is also bullish on India's digital growth and has unveiled a strategic blueprint of India's digital future. The National Digital Communications Policy (NDCP) 2018 is a progressive roadmap that embeds broadband in the fabric of India's digital economy. NDPC's pro infrastructure growth initiatives along with the Prime Minister's vision to connect 600,000 villages with fibre connectivity in 1,000 days, reinforces the importance of fibre first.

Now is the time for the tower industry to innovate, explore opportunities and adopt new business models to meet the objectives laid in the policy. The vision of providing 'broadband for all' and fibre connectivity across the country can be realized by enabling the shift from towercos to 'shared digital infrastructure' providers. With the right mix of accelerators and an enabling regulatory environment, the future is promising for the telecom infrastructure sector. As these multiple opportunities come to life, they will help in fulfilling the Vision 2030.

I thank TAIPA for their invaluable contribution to the tower industry and congratulate them on their 10th anniversary. I hope this report helps us in advancing the dialogue for accelerating the Hon'ble Prime Minister's vision of a Digital India.

*excluding India

Acknowledgements

EY report development team: Aadhar Gupta, Kanika Kakar, Gaurav Kapoor, Swapnil Srivastava, Swati Mahajan



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Telecom infrastructure - a decade of revolution

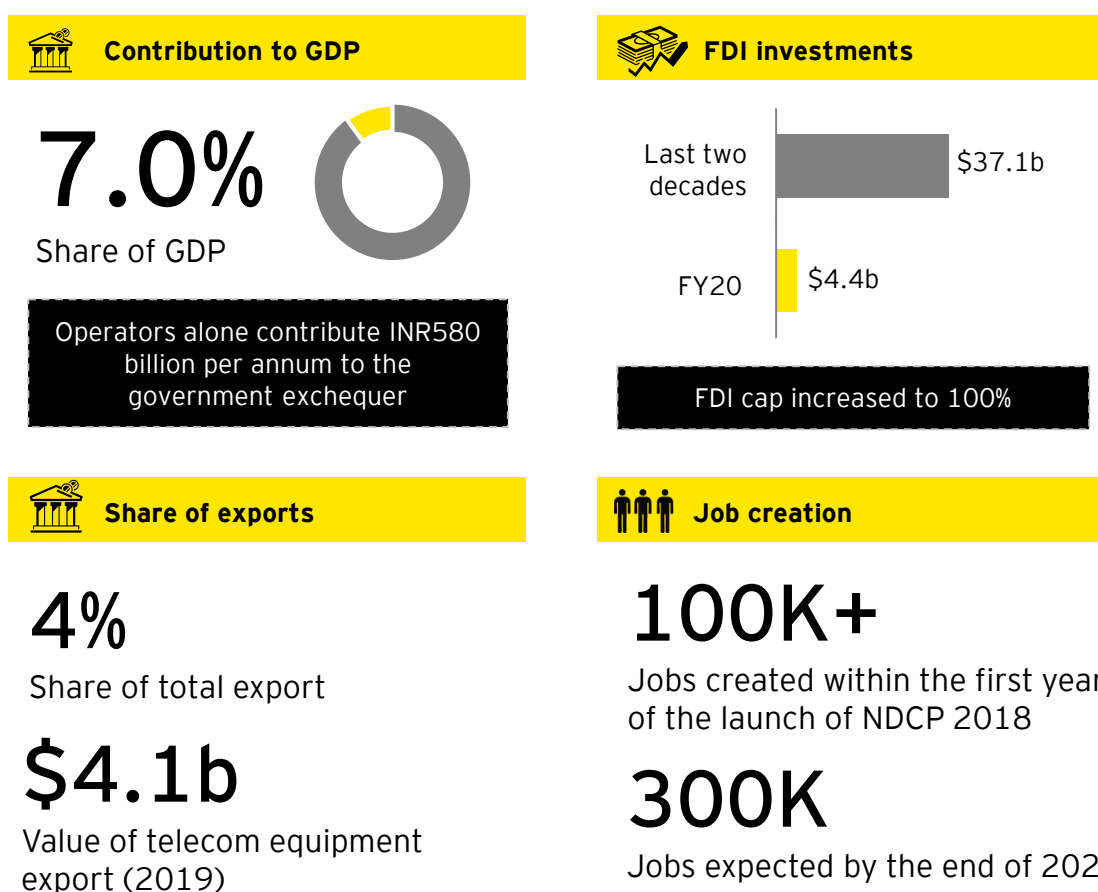


Telecom infrastructure - the cornerstone to India's telecom and digital growth story

The telecom revolution is one of the biggest success stories post-liberalization of India that has helped the country's visibility in global markets. Today, India is the second largest telecom market and the largest data consumer, globally. With 1.3 billion Indians accessing voice and data services at the world's lowest tariffs, the ubiquitous wireless network in India is unmatched for its reach and impact on people's lives.

This unprecedented success of India's telecom sector is attributable to wireless growth, backed by a robust telecom tower infrastructure which has played a pivotal role in bridging the digital divide and facilitating ubiquitous mobile connectivity. The Indian tower industry has laid a strong foundation of growth for the telecom sector and has supported the sector in keeping pace with the fast-paced technology advancements.

Figure: Telecom industry's contribution to the Indian economy



Source: TAIPA, FDI website, media articles

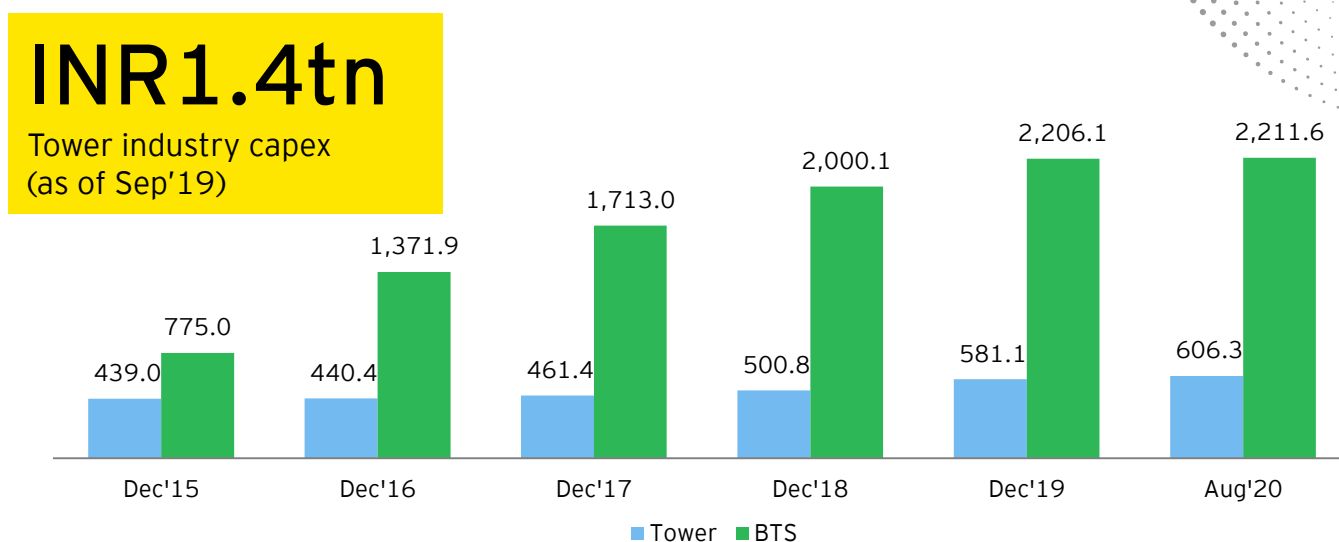
India had approximately 250,000 telecom towers in 2007, considerably less than the current tower count of over 606,300 towers. The turning point for India's telecom infrastructure was the granting of IP-I and IP-II licences in 2008, which was followed by telcos hiving off their tower assets into separate companies, and sharing assets based on a tenancy model. Over the last thirteen years, an average of 29,000 new towers have been built per year.¹ This pace and scale of tower deployment was possible due to the efficiency gains by towercos which also brought significant cost savings from the sharing model.

Infrastructure sharing came with significant set of benefits for telcos. Operators could share costs of deployment and operations of a tower site, while receiving better coverage and higher penetration of towers. It increased speed to market, as the tower deployment cycle shortened from three months to ~45 days.

It also brought in a lot of flexibility in the market for entry and expansion. The erstwhile 12 operator Indian market had been facilitated to a large extent by a strong tower network across the country. Also, the entry of the challenger operator in 2016 was supported by the presence of an extensive shared tower network in the country. Moreover, the exits from the Indian telco market post consolidation, could have entailed much higher debts and losses, had the telcos maintained the tower assets on their own balance sheets.

¹ TAIPA

Figure: Cumulative industry capex and yearly growth of towers and base stations (BTS) ('000s)



Source: TAIPA; Note: BTS - Base Transceiver Station

Figure: Synergies and benefits brought in by towerco industry for telcos

Efficiencies and benefits offered by telecom infrastructure providers

<p>Economies of scale</p> <p>More efficient use of capital for creating national assets with centralised planning</p>	<p>Reduced deployment time</p> <p>Quick set-up of towers led to faster go-to market time for telcos</p>	<p>Better coverage and quality</p> <p>Better penetration and service quality achieved through reduced tower proliferation</p>	<p>Capex saving for telcos</p> <p>Tenancy model allows capex and opex savings, leading to better EBITDA and cashflow management</p>	<p>O&M efficiency</p> <p>Focused management of distributed assets and handling real estate</p>
<p>Clearances and RoW management</p> <p>Know-how of RoW clearance processes and prescribed norms leads to efficient management of protocols</p>	<p>More flexibility for telcos</p> <p>Entry and exit from the market came with lower capex burdens</p>	<p>Faster network rollout</p> <p>Established tower base facilitated rapid technology deployments which helped in 3G/4G propagation</p>	<p>Standardisation</p> <p>Use of IIT/ TEC design for towers leads to a standard deployment processes</p>	<p>Societal benefits</p> <p>Optimum tower sites lead to reduced energy consumption and radio emission of networks</p>

Source: EY analysis, TAIPA

Cost savings from passive infrastructure sharing

During 2006-07, prior to the establishment of the towerco industry, an individual tower site used to cost US\$20,000, and towers represented 70% of network costs.² As a result, no operators had all India coverage.³ Infrastructure sharing has benefitted Indian telcos in reducing costs extensively.

For a towerco site, building, rigging, materials and power (i.e. building access to electrical networks to connect base stations to power) consists of more than 50% of capex for both developed and emerging markets.⁴ Sharing these costs can significantly reduce required costs and some telcos have experienced 35%-40% reduction in TCO (Total Cost of Ownership) due to sharing of passive infrastructure.⁵ Land rent, power and backhaul consist of more than half of opex in developed markets and almost half of opex in emerging markets.⁶ Again, sharing these components can significantly reduce costs.

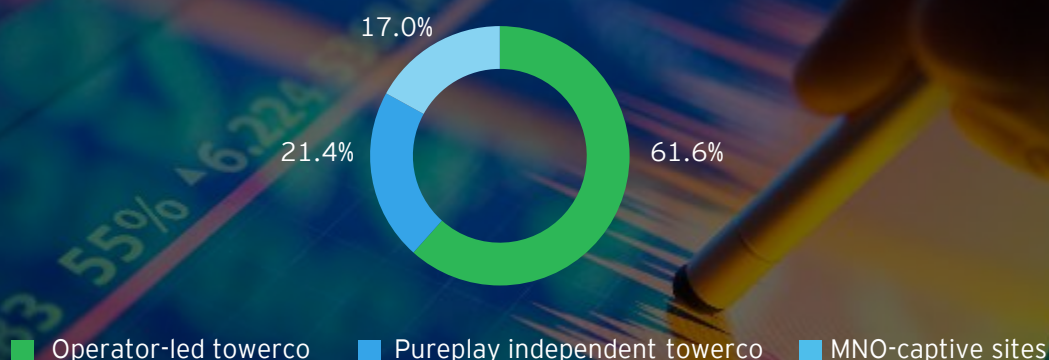
Figure: Capex saving estimates from infrastructure sharing

Sharing type	Savings in capex	Savings in opex
Passive infrastructure sharing	16-35%	16-35%
Active infrastructure sharing (excluding spectrum)	33-35%	25-33%
Active infrastructure sharing (including spectrum)	33-45%	30-33%

Source: TAIPA; Note: capex - capital expenditure, opex - operating expenditure

Today, India is one of the few countries in the world with an efficient sharing model for towers, facilitated by neutral, non-discriminatory tower companies who now own 83% of India's towers.⁷

Figure: Tower distribution by business models in India



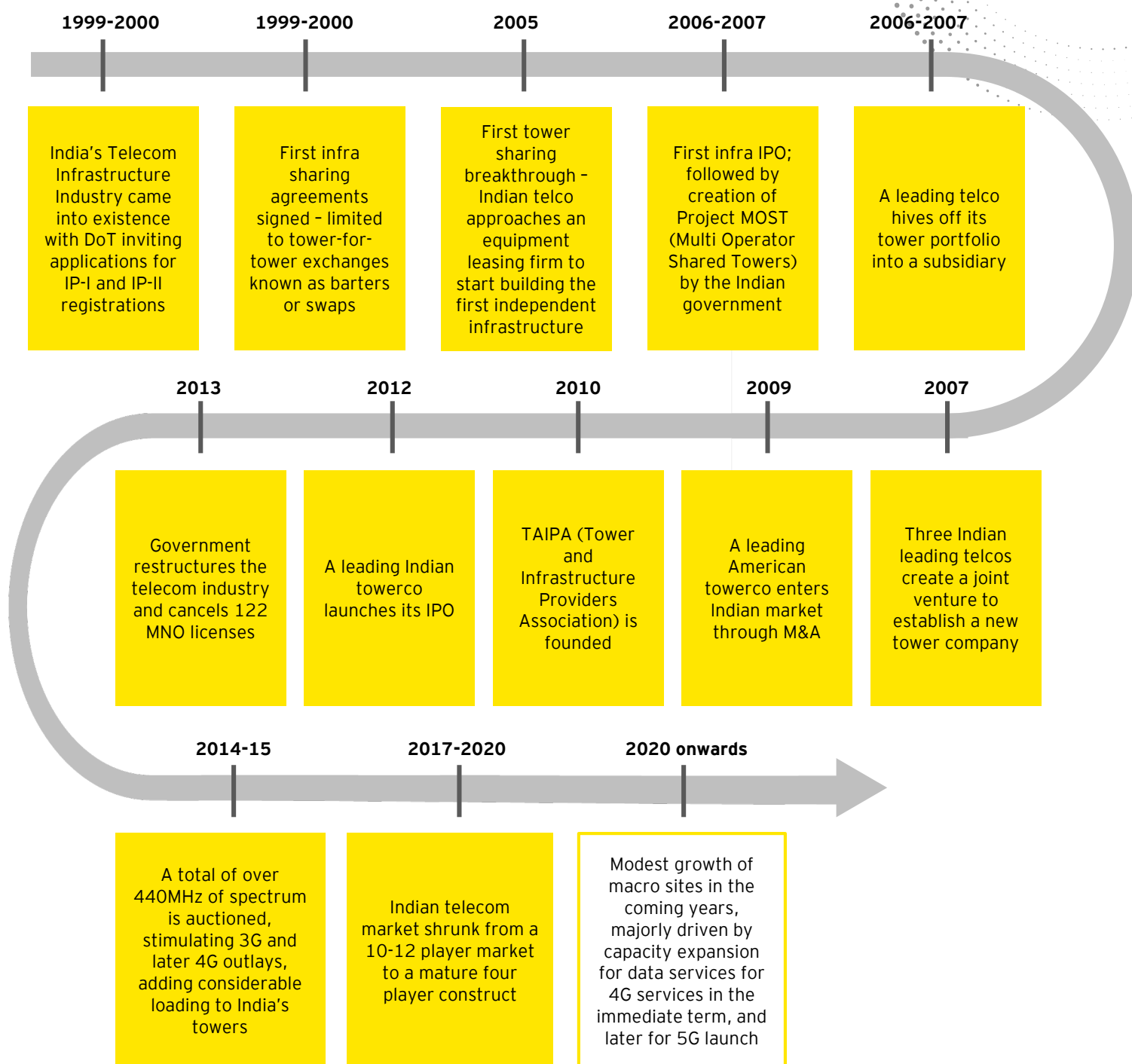
Source: TowerXchange, 3Q19

Historically, telcos had the infrastructure assets on their balance sheets and owning and operating towers was viewed as a competitive advantage. However, that business model came with its own set of challenges including duplication of infrastructure, under-utilization of towers and distributed focus between network services and asset maintenance. Further, continuous technology advancements required constant investments from telcos, resulting in significant cash outflow.

The towerco-based leaseback business model not only allowed telcos to save costs, but also gave them the bandwidth to focus on network rollouts. These factors have helped facilitate mobile operators' migration to next-generation technologies and allowed for optimum investment of capex towards network expansion and service delivery. It also enabled telcos to focus on the competition in the service layer with the infrastructure layer being taken care of.

2 TowerXchange
 3 TowerXchange
 4 TowerXchange
 5 IBID
 6 TowerXchange
 7 TowerXchange

Figure: Timeline of the Indian tower industry



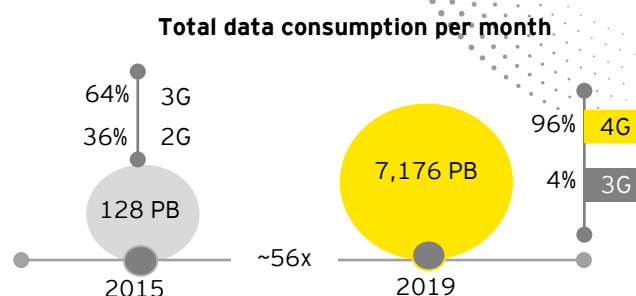
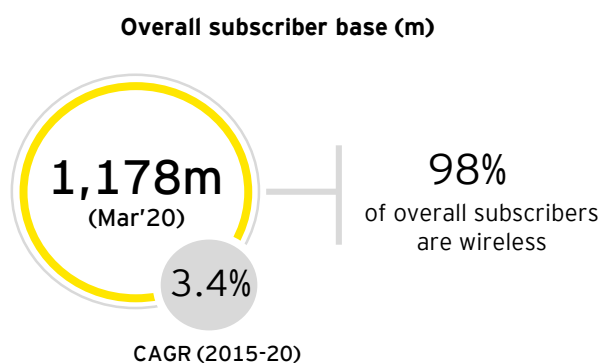
Source: TowerXchange, media articles

India's digital growth story backed by a robust infrastructure backbone

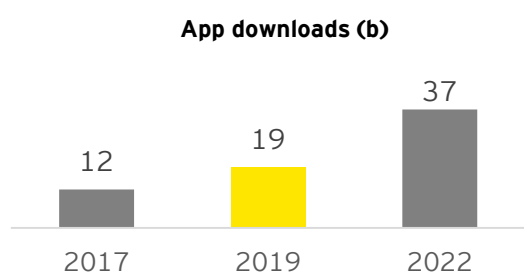
The cost savings from an efficient infrastructure sharing model, were also passed on to the consumer in form of better services and lower tariffs. Backed by a robust infrastructure industry, India has emerged as the second fastest digital adopter among seventeen major digital economies with a digital consumer base comprising of 1,178 million telecom subscribers and 743.2 million internet subscribers at the end of March 2020.⁸ Development of best-in class infrastructure for catering to the Gigabit society has been instrumental in India's transformation towards a digitally empowered economy and society.

⁸ TRAI

Figure: Increasing online presence of the Indian consumer

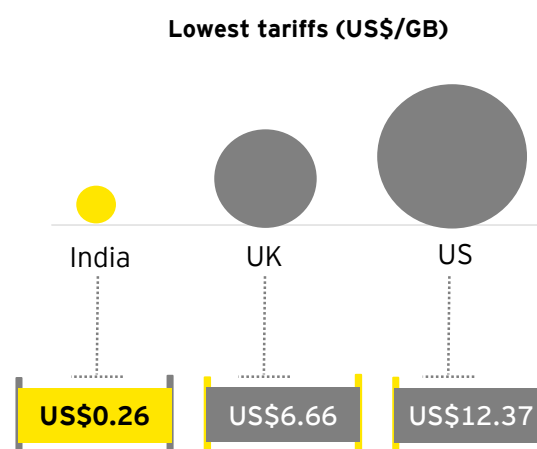


As of 2019, India had the world's highest data usage, averaging 9.8 GB per month per smartphone; expected to reach 18 GB by 2024



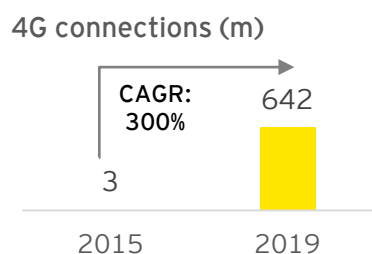
With 80% Indians owning a mobile and 600 million smart phone users, mobile apps have seen a surge in both supply and demand

Source: TRAI, Nokia Mobile Broadband Index 2020, media articles



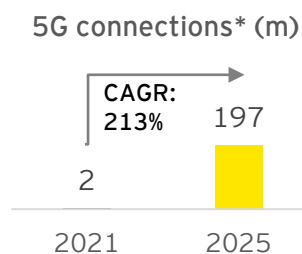
Towercos have played a critical role in the deployment of 4G services. The speed of launch was much faster due to a solid infrastructure support for telcos to rely on. Going forward, emerging technologies such as 5G, augmented reality, virtual reality, and Internet of Things (IoT) are set to redefine the communications landscape in the country, and tower industry will have a much more central role to play in the next decade of growth.

Figure: 4G has led the data consumption in India so far; 5G to emerge as the next frontier for growth



67%

4G device penetration pan-India in 2019



17.5%

5G as proportion of mobile connections by 2025

*projections

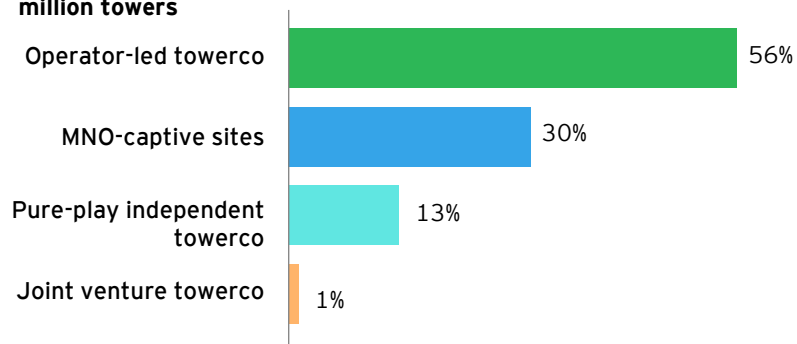
Source: Analysys Mason

India led the way for the world in infrastructure sharing

India was one of the pioneers in passive infrastructure sharing. The tower model's enhancement to operational efficiency and improvement in profitability was highly effective and recognized by infrastructure companies globally. Soon infrastructure companies emerged in advanced countries such as the US, with independent corporations started taking ownership of passive infrastructure elements.

Figure: Global tower ownership by business models and penetration of towercos by region

Global towerco ownership by category (3Q19); 100% = 4.85 million towers



Towerco penetration by region

100% China	83% India	70.8% US & Canada	53.4% Central and Latin America
63.8% Europe	39.5% Sub-Saharan Africa	27.3% South-East Asia*	12.8% Oceania

Towercos own ~70% of the world's towers, with China, US and India leading in terms of towerco penetration

* excluding India

Source: TowerXchange, EY analysis

Key trends shaping the towerco industry

Telcos carving out their own "captive" towercos
On-going towerco consolidation
Flow of pure sale and leaseback (SLB) transactions
Hybrid / Renewable energy and innovative energy storage solutions
Looking at adjacent business models - fibre, small cell, data centre, Wi-Fi, IoT etc.
Towerco management solutions for operational excellence

Pooling in towers and bringing in the passive infrastructure sharing model and providing integrated neutral host platforms for the telecom players has now found success in countries across the globe. Currently, ~70% of the global telecom towers are owned by independent tower companies, or operator-led towercos. The towerco penetration is highest in China (100%), followed by India (83%).⁹

The prevalence and propagation of telecom tower business model is evident from the fact that currently there are over 300 telecom tower companies globally

Source: TowerXchange, 3Q19

Figure: The structure of the global telecom tower industry

Number of towers per company	Number of companies
TowerCos with >20,000 towers	17
TowerCos with 5,000-19,999 towers	29
TowerCos with <5,000 towers	258

Source: TowerXchange

⁹ TowerXchange



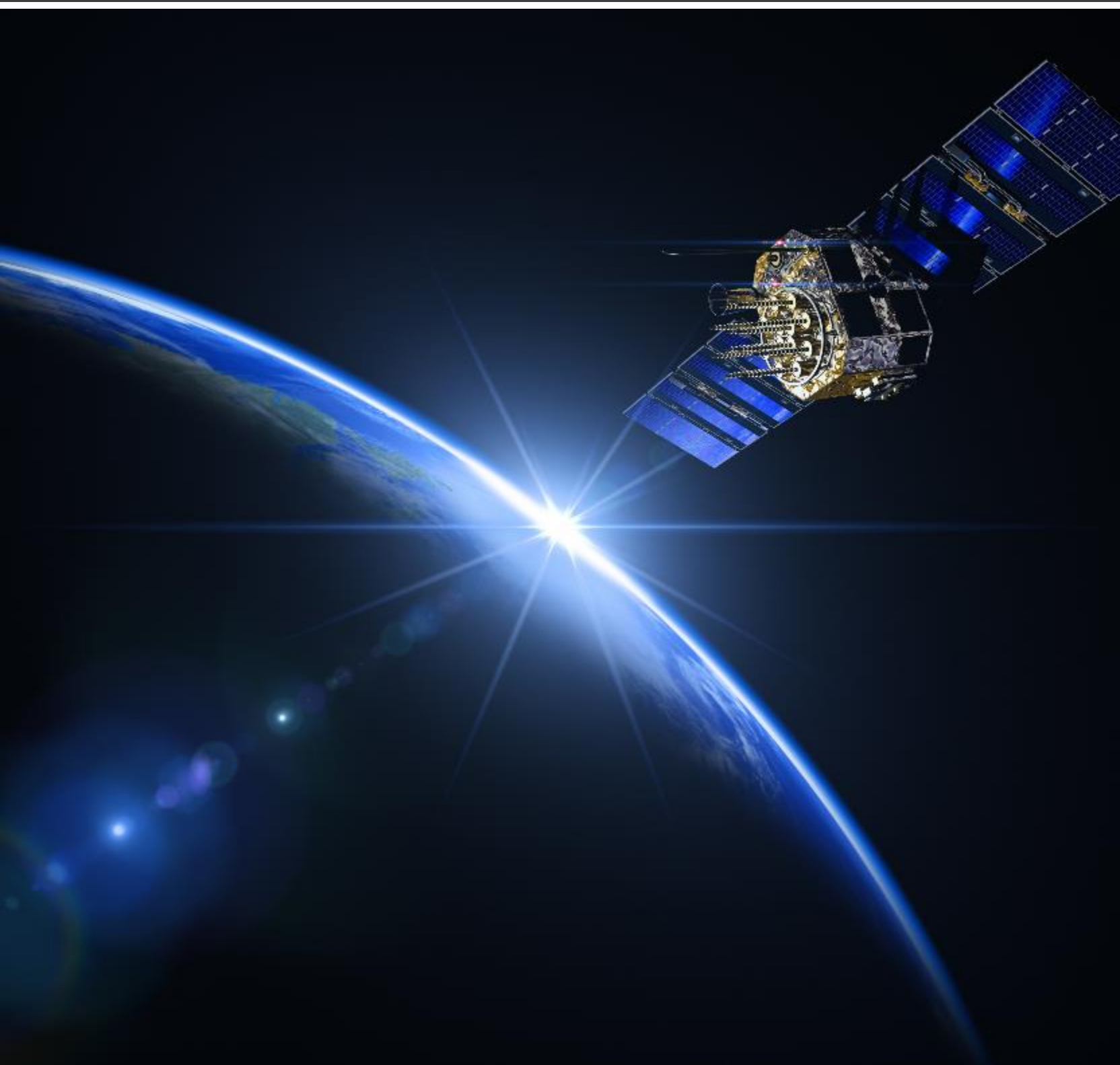
Critical role of telecom infrastructure sector in managing the COVID-19 pandemic

In the last six to eight months, the novel coronavirus has upended the global economy, financial markets, businesses, societies and lives of people at large. The COVID-19 pandemic has brought to the forefront the critical role of telecom infrastructure in keeping economies functioning and connected. The pandemic has transformed overnight how the world uses its digital infrastructure. Social distancing is testing the readiness of the digital infrastructure ecosystem to support an immediate transition to work from home, digital education and, increasingly, digital medicine. Network topographies have been transformed from office-centric to residence-centric. The peak load time slots have shifted, making traffic management more complex.

With little fixed-line capacity to fall back on, the load on local mobile networks is immense in developing countries. Moreover, the digitization accelerated by COVID-19 will in all likelihood, permanently change people's lifestyles, even after normalcy is restored. This would translate to the need for more in-fill capacity in dense, urban areas and further strengthening of the infrastructure to meet the shift in mobile network topology.



From evolution to revolution: Vision 2030

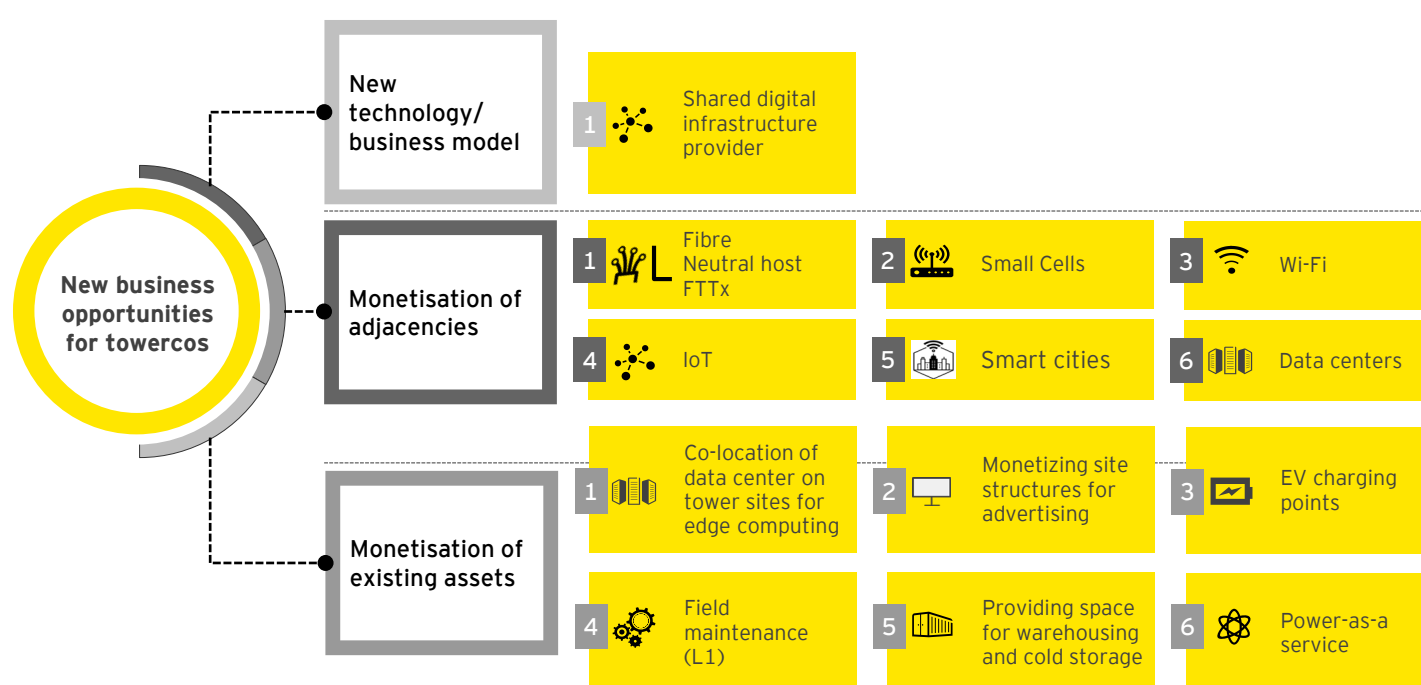


Changing demands in the telecom sector present new opportunities for growth

Until 2018, the tower industry witnessed promising growth with its capex to opex model flourishing, and the number of towers increasing from around 250,000 in 2007¹⁰ to 506,746 in 2018¹¹. The tenancy ratio had jumped from 0.9 in FY08¹² to 2.13 in FY18¹³ (ending March 2018). The sector's overall operating margin was in the range of 43%-44% in the past four-five years (ending March 2018) majorly driven by rental and energy margins expansion.¹⁴

However, the dynamics of the telecom sector have changed. Recent consolidation and restructuring of the telecom market has led to mergers and exits. The Indian telecom market has shrunk from a 10-12 player market to a mature four player construct. The carrier neutral towerco business model, which hinged on tenancy addition, has limited prospects in a mature market with lower number of players. The growth of macro sites is expected to be modest in the coming years, majorly driven by capacity expansion for data and 4G services in the immediate term, and later for 5G launch.

Figure: Vision 2030: new opportunities landscape for towercos



Source: EY analysis

Note: FTTx - Fibre to the x

Increased data consumption and evolution of technology provides new growth opportunities to telecom infrastructure providers in terms of small cell densification and fiberization of telecom assets. Towercos can also explore the role of an end-to-end infrastructure provider by assuming the role of a digital shared infrastructure provider in the telecom value chain (subject to policy and regulatory approvals). This would entail a structural separation of an integrated telco operator into two businesses - one that operates the network (shared infrastructure provider) and one customer-facing entity (telco core business).

As the economy grows, some easy revenue streams can come from capitalizing the real estate rights with the infrastructure providers, which can bring growth opportunities in terms of advertisements, electric vehicles infrastructure, security solutions, traffic control etc.

¹⁰ "Speeding ahead on the telecom and digital economic highway," EY, 2015

¹¹ Department of Telecommunications (DoT)

¹² "Speeding ahead on the telecom and digital economic highway," EY, 2015

¹³ "Towerco consolidation no offset to margin dial-down," CRISIL, October 2018

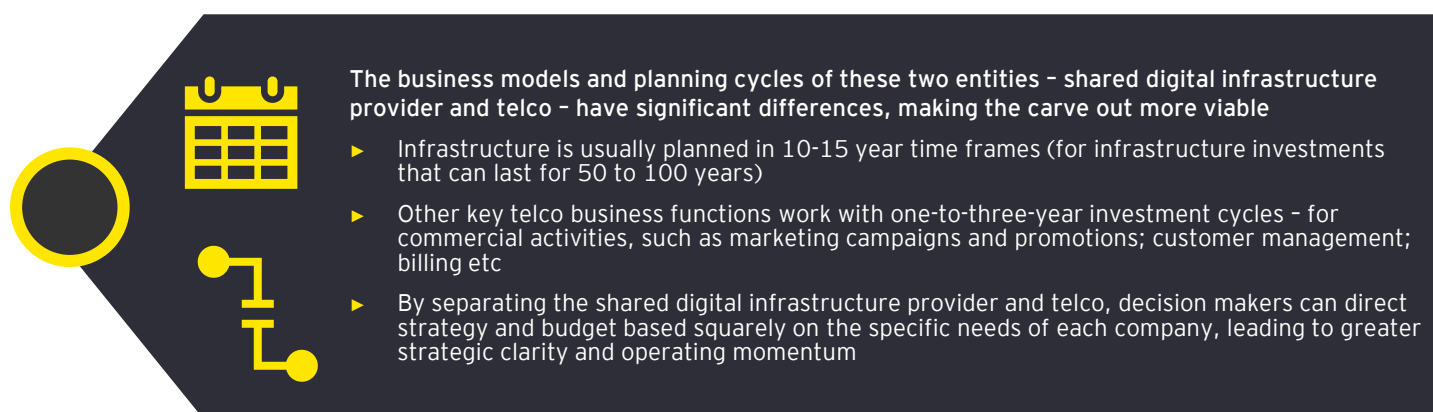
¹⁴ "Towerco consolidation no offset to margin dial-down," CRISIL, October 2018

Shared digital infrastructure provider - a potential future opportunity for towercos

The shared infrastructure business model brings in reduction in operating costs by avoiding duplication of infrastructure by multiple service providers. It enables portfolio rationalization by decommissioning redundant sites and network elements, and helps in consolidating the asset base and optimizing the backhaul infrastructure.

Incumbents across the globe are beginning to embrace or at least considering structural separation of active network elements to a shared digital infrastructure provider as a way to address deepening financial and market pressures as the infrastructure funding requirements increase dramatically with the investment-heavy evolution toward 5G and FTTx. With the telecom sector facing headwinds, structural separation is becoming a more frequently discussed topic for major industry stakeholders.

Figure: Driving synergies with InfraCo model




Source: GSMA, EY analysis

A carrier neutral shared digital infrastructure provider can grow its wholesale business with multiple operators, since aggregating demand from all customers increases household conversion rates for fibre and, hence, can provide return on investment for new buildouts. By operating independently, financing options for the shared digital infrastructure provider improve considerably. Since it primarily invests in infrastructure, the digital infrastructure provider can attract long-term investors who are interested in buying a physical asset.

Moreover, there is broad consensus that 5G will drive up the total cost of network ownership, given the massively increased densification of urban areas and the resulting heightened requirements for fibre deployment. A strong, independent shared digital infrastructure provider is better positioned to support the industry's need for fibre rollout and small cell densification.

A neutral party host can also spearhead the increased network sharing that 5G is likely to prompt. Shared digital infrastructure provider model for 5G rollouts is even more critical for the debt laden Indian telcos, as the high capex requirement for rollouts would further push the cash strapped telcos. Moreover, individual rollouts would result in inefficient utilization of investments, with duplication of network assets.

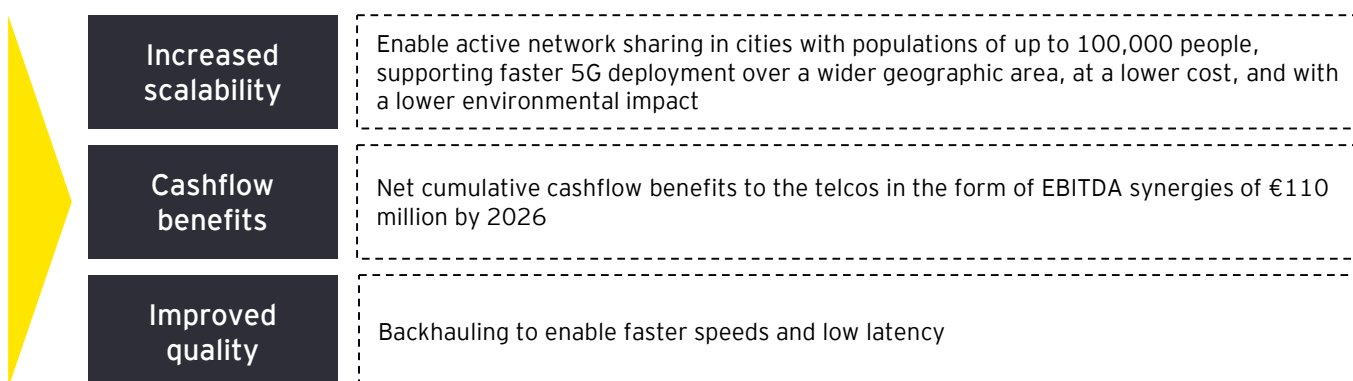
Figure: Italy-based telco partners with UK-based telco for network sharing partnership

 **Case study: Italian telco player enters into network sharing partnership with UK-based player**

Key features

- ▶ The two telcos entered into an active network sharing partnership for 4G and 5G as an extension to their existing tower sharing agreement in Italy. Simultaneously, they plan to implement the network sharing for their existing 2G and 4G networks as well
- ▶ The two telcos also intend to upgrade their respective mobile transmission networks, adding higher capacity optical fibre cables (backhauling)
- ▶ In addition to tower sharing, the partnership will also entail 2,500 small cell/DAS sites to be constructed over the next 10 years

Key benefits and synergies



Source: Company press releases

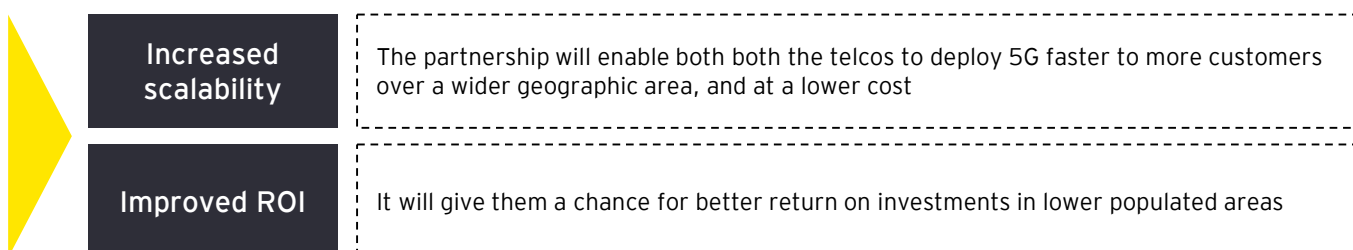
Figure: UK-based telco extends network sharing with the local arm of a Spain-based telco to include 5G

 **Case study: UK-based telco incorporates 5G in its network-sharing agreement with a Spanish telco's UK arm**

Key features

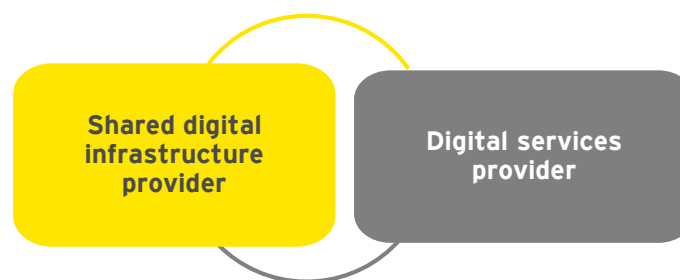
- ▶ The two telcos entered into a partnership to extend the existing network sharing agreement to include 5G at joint radio network sites
- ▶ The telcos are also investigating options to deliver a shared, future proof fibre transmission network. Currently, they intend to upgrade their transmission networks with higher capacity optical fibre cables to provide greater economies of scale and an improved choice of infrastructure partners
- ▶ While conventionally telcos have treated active equipment as a means to differentiate customer experience, the two UK telcos have highlighted the cost synergies and efficiencies that 5G infrastructure sharing brings in
- ▶ Another interesting term of the partnership is that it entails collaboration for the areas where RoI is more difficult to realize. In the larger, more densely populated urban areas, the duo will remain competitive. In 23 large cities, covering 16% of combined cell sites, all assets will be separate

Key benefits and synergies



Source: Company press releases

Figure: Shared digital infrastructure provider (InfraCo) model



Two-layered model

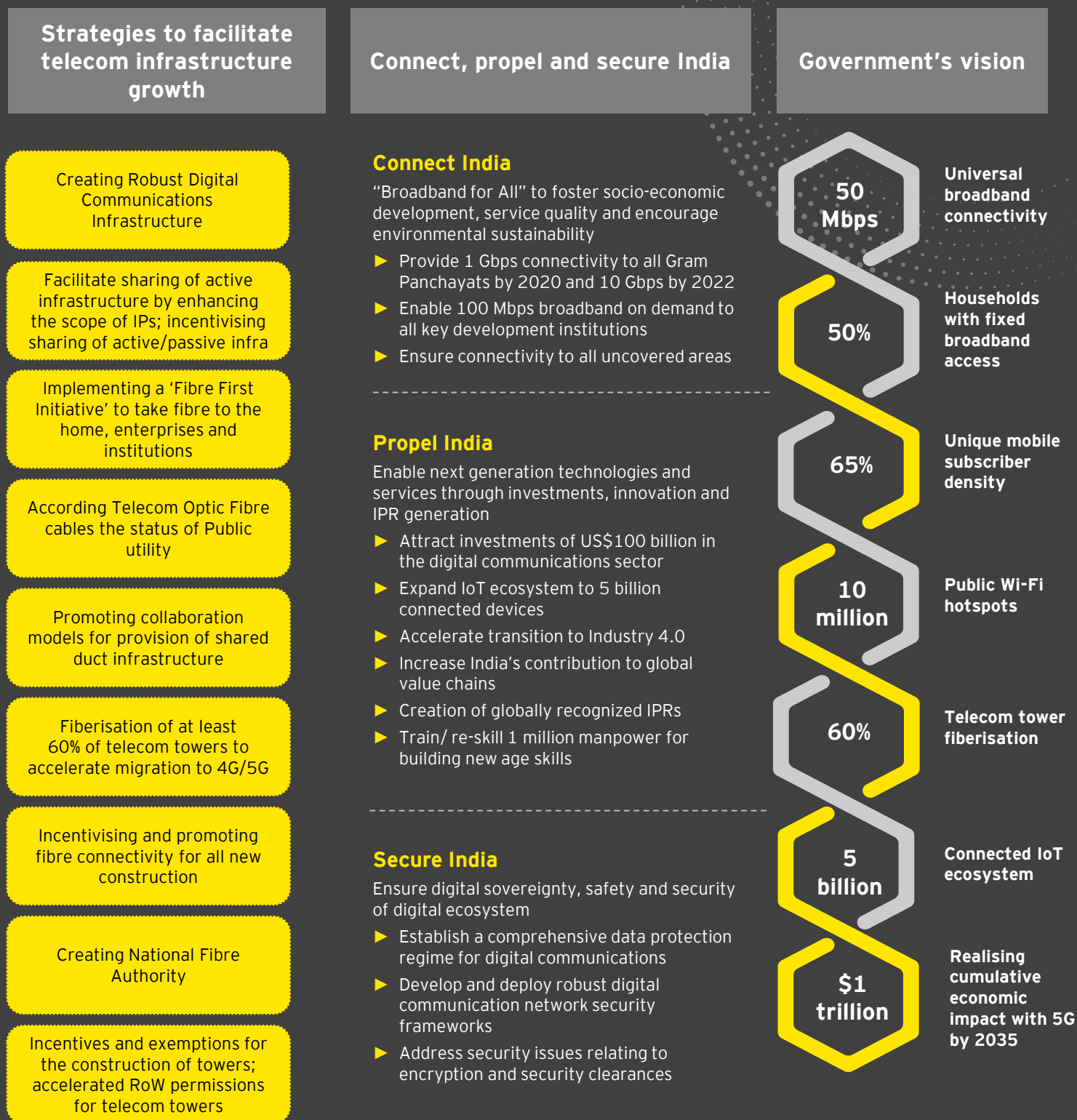
Shared infrastructure provider	Digital services provider
<ul style="list-style-type: none"> ▶ Owns, deploys and maintains passive and active infrastructure essential for digital service providers ▶ Builds the common network infrastructure that can be leveraged by multiple service providers ▶ Charges fees to service provider for leasing network capacity on a mutually agreed model 	<ul style="list-style-type: none"> ▶ Lease network capacity from shared infrastructure providers ▶ Compete in the retail market and provide voice and data services to customers ▶ Responsible for branding, marketing, pricing, retail sales and distribution, customer service, customer billing, innovation/product development

Source: EY analysis

However, the current regulatory environment does not allow towercos to take the shared infrastructure provider business path. The NDCP 2018 envisions to facilitate sharing of active infrastructure by enhancing the scope of Infrastructure Providers (IPs) and promoting and incentivizing deployment of common sharable, passive as well as active, infrastructure. The policy support for shared digital infrastructure provider model will be highly effective in expediting India's vision of digital expansion and accelerate the speed to market for new technologies such as 5G.



Figure: NDCP vision and goals



Source: NDCP 2018

Future opportunity landscape from adjacent services and current asset monetization

With the industry leaning towards data heavy consumption and 5G services on anvil, towercos are aligning their business priorities with the changing sector needs. Globally, new business models and revenue streams have opened up for towercos, and Indian infrastructure market is ripe to explore these diversified business streams. As the telecom infrastructure industry aligns to the changing infrastructure needs of telcos, new business models have started emerging for infracos..

Vision to connect every village with OFC in 1000 days



India's Prime Minister has laid out the vision in August 2020, to connect every village in the country with optical fibre cable (OFC) in 1,000 days. To achieve this vision, the cables would have to be laid at nearly 3.6 times the current speed, up from the existing average of 350 km a day to over 1,251 km a day.

The InfraCos will have a significant role to play in realising this vision, and they possess the skill sets and experience to expedite India's fibre growth story.

Source: media articles

Figure: Assessing the opportunity landscape for towercos

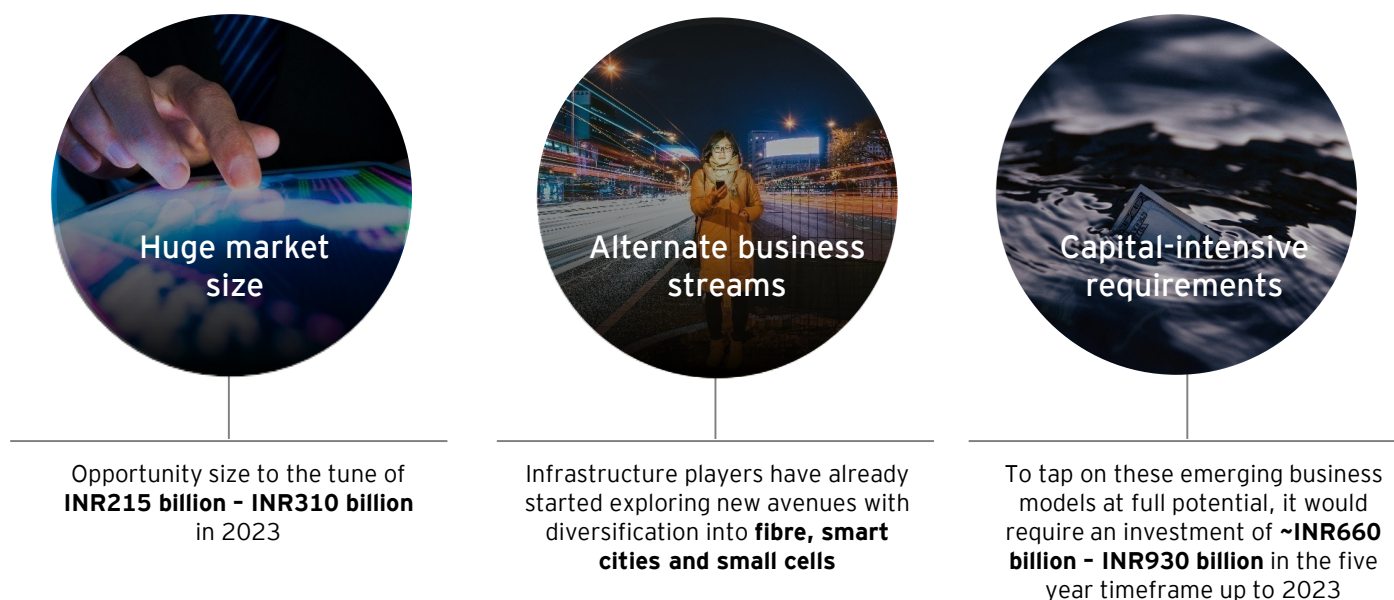
Opportunity		Assessment			Challenges	Heat-map
Adjacencies	<p>Fibre deployment and backhaul through fibre and microwave</p>	Tower fiberization	Fiber to the curb	National long distance	<ul style="list-style-type: none"> ▶ RoW ▶ Pricing of intra-city and NLD fibre ▶ Regulatory approval for microwave 	
	<p>Small cells deployment with 4G/5G</p>	Small cell sites deployment			<ul style="list-style-type: none"> ▶ Site acquisition and RoW 	
	<p>Wi-Fi</p>	Neutral host Wi-Fi provider			<ul style="list-style-type: none"> ▶ Monetization 	
	<p>Internet of things</p>	Build-operate-maintain IoT network	Sensor O&M + installation		<ul style="list-style-type: none"> ▶ Capability enhancement ▶ Workforce management for large scale sensor deployments 	
	<p>Smart cities opportunity</p>	Digital infrastructure deployment	Platform and application provider		<ul style="list-style-type: none"> ▶ Revenue models 	
	<p>Data center deployment</p>	Build and operate data centers (colocation)			<ul style="list-style-type: none"> ▶ Market in nascent stage ▶ Capability enhancement 	

Source: EY analysis

	Opportunity	Assessment	Challenges	Heat-map
Monetize existing assets	Field maintenance (L1)	Level 1 field maintenance	▶ Currently under the purview of OEMs	
	Edge computing (micro data centers)	Colo and managed services	▶ Market in nascent stage	
	Out of home advertising	Static billboards Digital billboards	▶ Complex approvals ▶ Limited opportunity	
	Warehousing, collection point for goods	Space for warehousing and cold storage at tower sites	▶ Limited opportunity	
	EV charging	Use power at sites for providing EV charging	▶ Underdeveloped infrastructure	
	Power management as a service	Power management for other industries	▶ Capability development	

Source: EY analysis

Figure: Opportunity sizing for towercos in new revenue streams



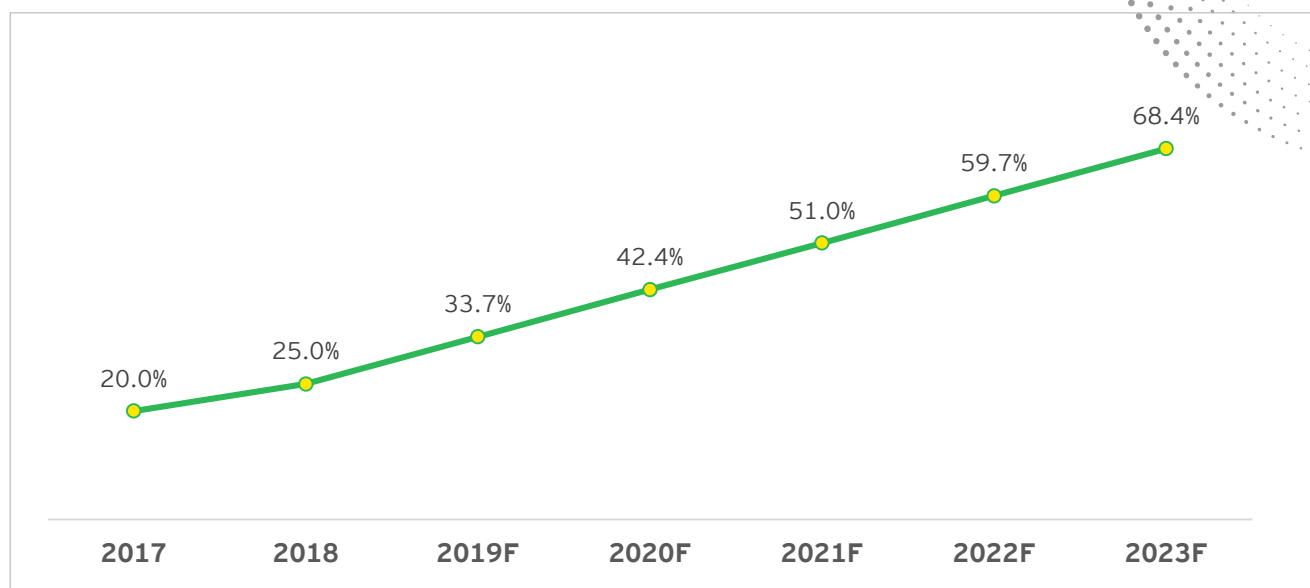
Source: EY analysis

Monetization of adjacencies

Fibre: Fibre is a fast-growing infrastructure asset class which is gaining attention. Fibre demand in India is increasing at a rapid pace. Deployment of a large amount of high frequency 4G and 5G spectrum needs a fibre backhaul. Telcos' ambition of increasing FTTH/B penetration for residences, buildings and enterprise customers would boost the demand for fibre lay outs. Government initiatives such as BharatNet's and Digital India's focus on telecom infrastructure, especially fibre, is also contributing to increased fibre deployment.

Tower fiberization is expected to witness a steady growth in the future. Especially with India's 5G launch anticipated in 2023, fiberization rates are expected to surge from 2021 onwards.

Figure: India tower fiberization forecast



Source: EY analysis; Note: Fibre demand is estimated basis number of towers to be fiberized and incremental Fibre required to fiberize a tower

Towercos are well positioned to address the fibre opportunity, with their existing experience of managing distributed infrastructure assets. Certain use cases that have tower at the central piece of network architecture, are already gaining traction. On the forefront is site fiberization, as it enhances backhaul and increases the valuation of the core tower assets, giving towercos increased control.

Small cells: Coverage and capacity have long been called out as the prerequisites for high speed data networks, especially with the advent of 4G and 5G. Network densification has already begun in metros with 4G network rollouts and will further increase with 5G and IoT use cases.

Towercos can explore provision of fiberized small cells as it would position them as an integrated player. In accordance with time to market consideration, towercos can either deploy own fibre backhaul or partner/acquire independent fibre companies to provide small cell fiberization. It is a viable proposition as provision of site and backhaul together enables cost sharing among multiple operators and these cost savings can be further passed on to the telecom operators.

Globally, towercos are already adding small cells to their inventory of site typologies - mostly functioning as site acquirers, with the small cells owned by telcos. A bigger opportunity lies where towercos acquire and own their small cells and offer fiberized small cell sites to the telcos.

Public Wi-Fi: Owning and maintaining distributed assets gives towercos a synergistic playing field in Wi-Fi. Despite significant growth in mobile data traffic, Wi-Fi penetration in India has remained limited. Towercos have an opportunity to penetrate this market. They can choose a host of business models - providing Wi-Fi equipment and O&M to clients or becoming a neutral host public Wi-Fi provider. The latter will need active infrastructure deployment which is subject to license conditions.

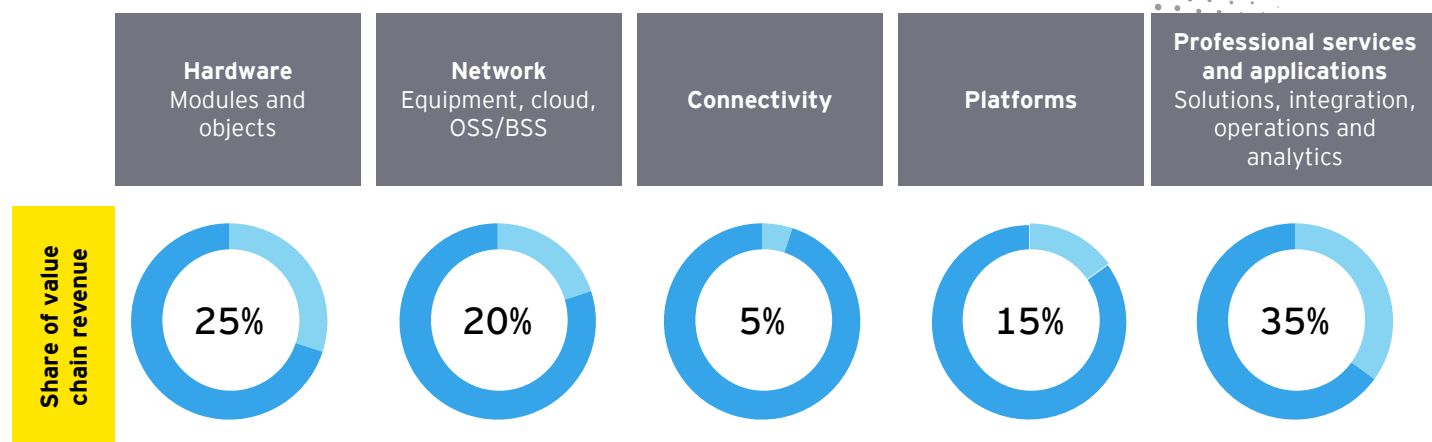
NDCP 2018 facilitating deployment of public Wi-Fi hotspot - target to deploy 10 million Wi-Fi hotspots by 2022

Source: NDCP 2018

Internet of Things (IoT): The IoT ecosystem is expected to grow at a rapid pace with the advent of 5G. IoT connections in India are expected to grow at a CAGR of 32% over 2017-2023 to ~423 million connections.¹⁵ This presents a unique opportunity for towercos to position themselves as the infrastructure providers for the IoT ecosystem. Towercos can strengthen capabilities to widen their area of play in the IoT value-chain. From deployment and maintenance of sensors, to entering the application and hardware value-chain, towercos can explore multiple business directions, based on capability and skill set enhancement.

¹⁵ EY analysis

Figure: IoT value chain

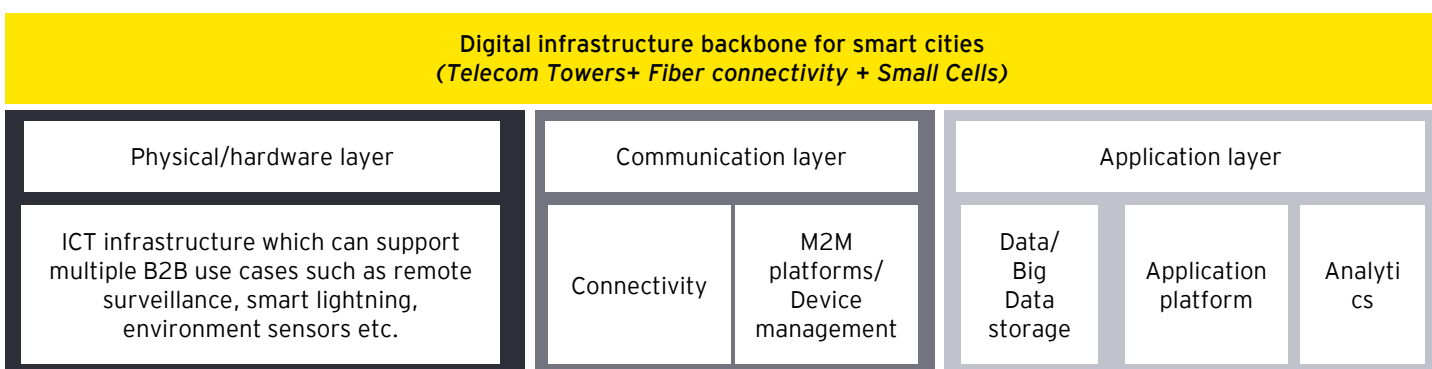


Source: EY analysis

Note: OSS/BSS - Operations support system/Business support system

Smart cities: India’s smart city initiative has opened up a new avenue of growth for infrastructure providers. Digital infrastructure forms the backbone of the smart city initiative, and towercos are well positioned to create and maintain this infrastructure. India Government’s Smart Cities Mission, which was launched in 2015, aims to create 100 smart cities in the country. Towercos in the country have already jumped on the smart city bandwagon and are keen to make most of this opportunity.

Figure: Smart city opportunities for towerco



Source: EY analysis

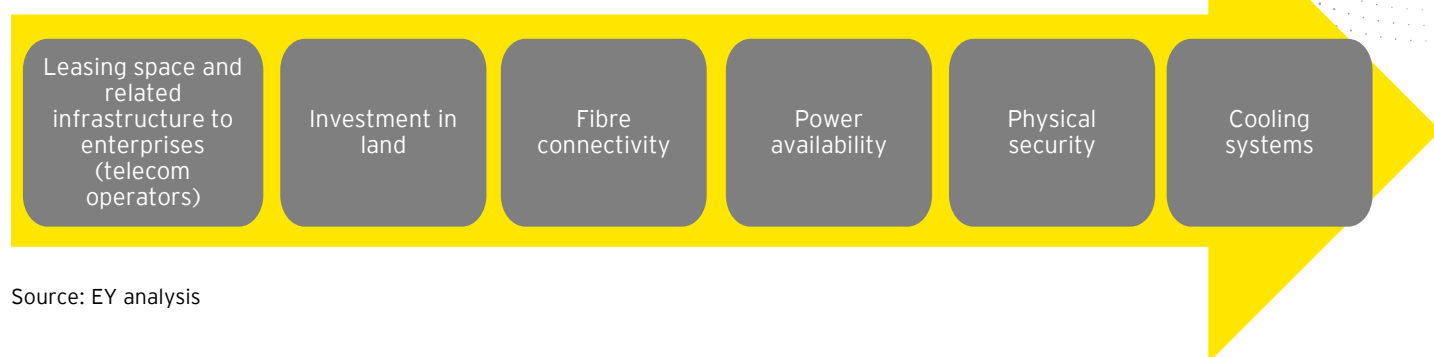
Note: ICT - Information and communications technology, B2B - Business-to-business, M2M - Machine-to-machine

In most cities, purchasing right of way (ROW) is expensive, and one key revenue opportunity in smart cities comes from gaining rights to the street furniture and an easy RoW. Under the public private partnership (PPP) model, towercos can build the communications infrastructure for the city, and in lieu use the RoW and site rights for mounting their own infrastructure for revenue generation. Leading Indian towercos have already entered into smart city projects.

Data centres: In line with the capex to opex conversion model supported by towercos’ traditional business of tower rentals, data centres is a potential area of business which aligns with this model. Upfront high capex investments by towercos in data centres, to lease out space for colocation or to provision of managed hosting services, is a prospective business model. Data centres are witnessing a steep growth trajectory -and the market in India is expected to grow at 8.4% CAGR from 2018-2023.¹⁶

¹⁶ “Data center market in India: Industry Outlook & Forecast (2019-2024),” Arizton Advisory & Intelligence via EMIS

Figure: Synergies between towerco and data center service provider



Source: EY analysis

Monetization of existing assets

Apart from tapping on the above adjacencies, an immediate proposition for towercos is to monetize their existing assets. Towercos can expand their service portfolio beyond tower based real estate and include provisioning other services on their tower sites. With distributed, power backed, and increasingly fiberized sites, towercos can explore revenue streams that exploit this dispersed real estate advantage.

A potential business stream includes setting up of edge computing on tower sites by deploying micro data centers near the network edge. With steady power supply and ready backhaul, tower sites can support edge data centers closer to the user, reducing the need to send backhaul data traffic to a centralized hub.

The location advantage of towercos also renders them fit for serving as storage, warehousing and delivery centres for various businesses. With availability of power and air-conditioning, even perishable goods storage can be explored as a business stream. Tower structures can also be monetized for out-of-home advertising, with placement of billboards on towers/monopoles.

Another service proposition beyond vertical real estate is the provisioning of primary and backup power. This innovation is well established by the 'powerco towercos' of Sub-Saharan Africa and Southern Asia region.¹⁷ As towercos have significant expertise in managing energy assets, they are well-positioned to provide power-as-a-service.

With advent of electric vehicles, towercos can play an important role in this upcoming opportunity and unlock a new revenue stream. The availability of reliable power and possession of distributed sites makes towercos well-suited to provide EV charging infrastructure.

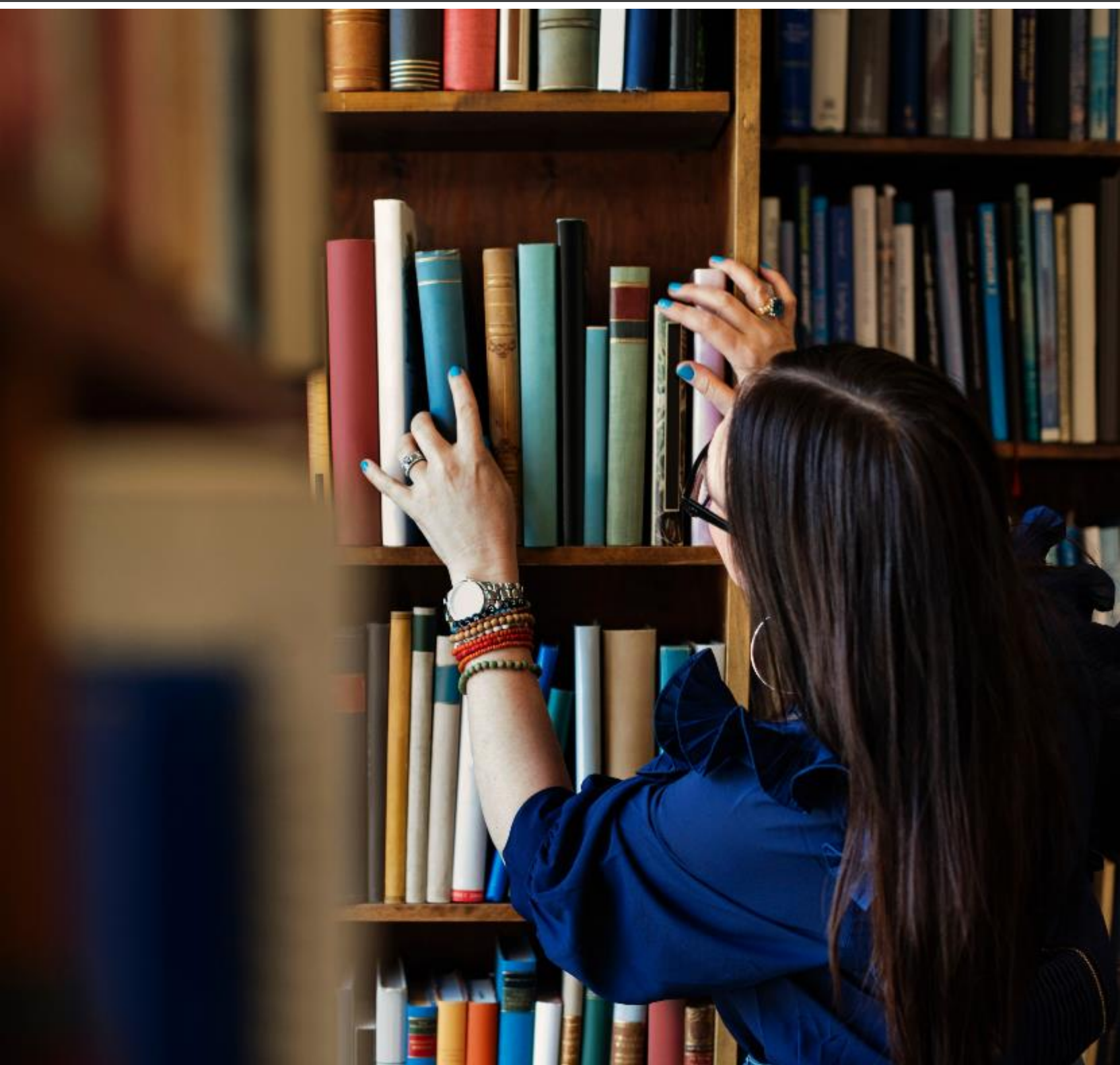
Way forward

Opportunities aside, ease of doing business remains a prime concern for all infrastructure projects in the country. Delays in getting approvals from municipalities, lack of uniform charges and clearances for RoW, and multi-body approvals are key concerns that needs to be addressed for faster infrastructure roll-outs. To expedite the creation of robust telecom infrastructure and to fulfil the agendas of 'Digital India', it is pertinent that ease of doing business is treated as a priority.

¹⁷ TowerXchange

Chapter 3

Acronyms



Abbreviation	Full form
IoT	Internet of Things
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
NDCP	National Digital Communications Policy
Capex	Capital Expenditure
CAGR	Compound Annual Growth Rate
SMEs	Small and Medium Enterprises
OTT	Over-the-top
IP1, IP2	Infrastructure Providers 1,2
DOT	Department of Telecommunications
Opex	Operating expenditure
IPO	Initial Public Offering
MOST	Multi Operator Shared Towers
M&A	Merger and Acquisition
MNO	Mobile Network Operator
BTS	Base Transceiver Station
EV	Electric Vehicle
SLAs	Service Level Agreements
RoW	Right of Way
O&M	Operations and Management
FTTx	Fibre to the x
FTTH/B	Fibre to the home/building
OSS/BSS	Operations Support System/Business Support System
ICT	Information and Communications Technology
B2B	Business-to-business
M2M	Machine-to-machine
PPP	Public Private Partnership



Our offices

Ahmedabad

22nd Floor, B Wing, Privilon,
Ambli BRT Road, Behind Iskcon
Temple, Off SG Highway,
Ahmedabad - 380 015
Tel: + 91 79 6608 3800

Bengaluru

6th, 12th & 13th floor
"UB City", Canberra Block
No.24 Vittal Mallya Road
Bengaluru - 560 001
Tel: + 91 80 6727 5000

Ground Floor, 'A' wing
Divyasree Chambers
11, O'Shaughnessy Road
Langford Gardens
Bengaluru - 560 025
Tel: + 91 80 6727 5000

Chandigarh

Elante offices, Unit No. B-613 &
614
6th Floor, Plot No- 178-178A,
Industrial & Business Park,
Phase-I,
Chandigarh - 160002
Tel: + 91 172 671 7800

Chennai

Tidel Park, 6th & 7th Floor
A Block, No.4, Rajiv Gandhi Salai
Taramani, Chennai - 600 113
Tel: + 91 44 6654 8100

Delhi NCR

Golf View Corporate Tower B
Sector 42, Sector Road
Gurgaon - 122 002
Tel: + 91 124 443 4000

3rd & 6th Floor, Worldmark-1
IGI Airport Hospitality District
Aerocity, New Delhi - 110 037
Tel: + 91 11 4731 8000

4th & 5th Floor, Plot No 2B
Tower 2, Sector 126
NOIDA - 201 304
Gautam Budh Nagar, U.P.
Tel: + 91 120 671 7000

Hyderabad

THE SKYVIEW 10
18th Floor, "Zone A"
Survey No 83/1, Raidurgam
Hyderabad - 500032
Tel: + 91 40 6736 2000

Jamshedpur

1st Floor, Shantiniketan Building
Holding No. 1, SB Shop Area
Bistupur, Jamshedpur - 831 001
Tel: + 91 657 663 1000

Kochi

9th Floor, ABAD Nucleus
NH-49, Maradu PO
Kochi - 682 304
Tel: + 91 484 433 4000

Kolkata

22 Camac Street
3rd Floor, Block 'C'
Kolkata - 700 016
Tel: + 91 33 6615 3400

Mumbai

14th Floor, The Ruby
29 Senapati Bapat Marg
Dadar (W), Mumbai - 400 028
Tel: + 91 22 6192 0000

5th Floor, Block B-2
Nirlon Knowledge Park
Off. Western Express Highway
Goregaon (E)
Mumbai - 400 063
Tel: + 91 22 6192 0000

Pune

C-401, 4th floor
Panchshil Tech Park
Yerwada
(Near Don Bosco School)
Pune - 411 006
Tel: + 91 20 4912 6000



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About TAIPA

Tower and Infrastructure Providers Association was incorporated in 2010 as an Industry representative body registered under the Indian Society Registration Act, 1860.

Leading telecom infrastructure providers like Indus Towers Limited, ATC Telecom Infrastructure Private Limited, Bharti Infratel Limited, Tower Vision India Private Limited, Ascend Telecom Infrastructure Private Limited are the members of the Society. The Association visualizes itself to be the official voice for the Telecom Infrastructure industry.

The association is dedicated to interact, consult, engage and deliberate with the Ministries, Policy Makers, Regulators, Financial institutions and Technical bodies etc. to address various policy and regulatory challenges being faced by infrastructure providers. Sharing of best practices and knowledge dissemination for promotion of telecom infrastructure industry are also the key functions of the association.

The role and objectives of this association is to emphasize the need to bring Telecom Infrastructure Services under key utilities segment and creation of robust telecom infrastructure in the country. The other key objectives are extension of infrastructure status benefits to telecom infrastructure industry, formulation of uniform telecom infrastructure policy across India, to improve competitiveness and address issues affecting tower erection, maintenance and services.