

# Gati Shakti - paving the way for accelerated digital infrastructure rollout in India

Key considerations for creating an enabling environment

September 2022



Building a better  
working world

# Foreword

देवुसिंह चौहान  
DEVUSINH CHAUHAN



सत्यमेव जयते

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आज़ादी का  
अमृत महोत्सव

राज्य मंत्री  
संचार  
भारत सरकार  
Minister of State  
for Communications  
Government of India



## MESSAGE

On the occasion of its Annual Flagship Event, I extend my heartiest congratulations to the management team of Digital and Infrastructure Providers Association (DIPA).

The Government of India under the leadership of the Hon'ble Prime Minister, Shri Narendra Modi Ji has based its policies on three pillars - Ease of living for all the citizens, Ease of doing business for the industry and Atmanirbhar Bharat. Following above philosophy, the Ministry of Communications has formulated his vision which is being realized through the various reforms, policies and actions of both the departments i.e. Department of Telecommunications and Department of Posts. The Government is committed to provide state-of-the-art telecom facilities and postal services to every citizen of the country. Recently, Government has undertaken the very ambitious project to provide telecom facilities to all uncovered villages in the country. Similarly, efforts are being made to open new post offices so that uncovered villages get postal services, banking services and insurance services.

The telecom infrastructure plays a very vital role in extending the telecom services to every corner of the country. In this context, a robust and cost-effective infrastructure has become the need of the hour for the progress of the country. It requires active and continuous collaborations of various stakeholders like infrastructure providing companies, telecom service providers and other users of the industry and the Government. As has been mentioned above, the Government is ever willing to support the telecom infrastructure providers.

Digital connectivity will be vital for achievement of the goals of PM Gati Shakti Yojana. To facilitate spread of 5G mobile services, several initiatives have been taken by Department of Telecommunications. The GatiShakti Sanchar Portal has been launched in May, 2022 to facilitate faster Right of Way (RoW) permission to infrastructure providers. I am happy to state that now on an average, processing of RoW applications takes only 10 days (as per August 2022 data). Several pro-market reforms have been incorporated in the new RoW rules which help in installations of 5G base stations by using street furniture. Similarly, facilitation has been ensured for laying of overhead optical fibre for fiberisation of tower. The government is committed to continue with more pro-people and pro-industry reforms in the future to realise the Hon'ble Prime Minister's vision of New India. I am sure that the digital infrastructure industry will stand up to the challenge and continue to play a pivotal role in ensuring delivery of government services so as to bridge the digital divide.

I convey my warm wishes and good luck to Digital Infrastructure Providers Association (DIPA) for the future.



Room No. 102, Sanchar Bhawan, 20 Ashoka Road, New Delhi - 110 001  
Phone : 011-23372414, 23372565, Fax : 011- 23372277  
301, Dak Bhawan, Sansad Marg, New Delhi - 110 001  
Phone : 011-23096269, 23096270



डा० पी. डी. वाघेला  
Dr. P. D. Vaghela



सर्वमेव जयते

अध्यक्ष  
भारतीय दूरसंचार विनियामक प्राधिकरण  
Chairman  
TELECOM REGULATORY AUTHORITY OF INDIA

**MESSAGE**



At the outset, I extend my warm wishes to Digital Infrastructure Providers Association (DIPA) for their Annual Flagship Event for the year 2022-23.

Digital economy is emerging as one of the most important growth drivers and an indispensable part of modern economy. Digital Infrastructure development is the foundation of digital economy. Digital Infrastructure serves as the basis for "Industry 4.0" innovations, value-adding digital activities and significant productivity improvement. Success in the digital era hinges on efficiently utilizing an efficient infrastructure model owing to the capital-intensive nature of the communications sector.

I hope that DIPA, as an association of infrastructure providers in its new Avatar will continue to facilitate deployment of a robust digital infrastructure to cater to the rising aspirations of users and to the requirements posed by newer technologies such as 5G in the country.

(P.D. Vaghela)

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महानगर दूरसंचार भवन, जवाहर लाल नेहरू मार्ग, (पुराना मिनटो रोड), नई दिल्ली-110002  
Mahanagar Doorsanchar Bhawan, Jawahar Lal Nehru Marg, (Old Minto Road) New Delhi-110002  
Tel. : 23211236/ 23213409/ Fax : 91-11-23236026/ E-mail : cp@trai.gov.in/www.trai.gov.in

# Foreword

के. राजारामन, भा. प्र. से.  
सचिव  
**K. Rajaraman, IAS**  
Secretary



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



## MESSAGE

On the occasion of Annual Flagship Event on 14<sup>th</sup> September, 2022, I extend my heartiest congratulations to the leading industry association body, Digital Infrastructure Providers Association

Infrastructure has always been important to nations' economic growth and success, but the infrastructure needed for today's economy is rapidly changing with advances in Information and Communications Technology (ICT). This new infrastructure - some of it hybrid infrastructure that integrates both physical and digital aspects, some of it pure digital infrastructure—is critical to delivering the next wave of innovation and economic growth to all.

The scope of PM Gati Shakti National Master Plan will encompass the 7 engines for economic transformation, seamless multimodal connectivity and logistics efficiency. It will also include the infrastructure developed by the State Governments, as per the Gati Shakti Master Plan. This will help raise productivity and accelerate economic growth and development. The DoT on its part has launched the Gati Shakti Sanchar Portal and has made significant progress in mapping of telecom infrastructure layer to better utilization of capacities which have potential to reduce wasteful duplication of efforts within the Telecom sector. DoT is working on innovations like "Call before your Dig" to prevent damage to telecom infrastructure.

Digital infrastructure is central to the future of the Indian economy. This national strategy will create the right market and policy conditions to secure world-class connectivity for all, but it needs to be accompanied by changes from within the sector. Industry has a critical role in delivering the world-class connectivity we need, and the focus should be on growing the market and improving consumer experiences. This is a long-term strategy and one which will only be achieved by government and industry working together. A robust digital infrastructure will play a key role in seamless connectivity, which is the essence of true Digitisation.

I convey my best wishes for the success of DIPA Annual Flagship Event with the theme 'Gati Shakti vision for 5G & Beyond'.

  
(K. Rajaraman)

संचार भवन, 20 अशोका रोड, नई दिल्ली-110001 / Sanchar Bhawan, 20, Ashoka Road, New Delhi-110001



## Akhil Gupta

Chairman, DIPA

It is nearly a year now that Tower and Infrastructure Providers Association (TAIPA) rechristened itself to Digital Infrastructure Providers Association (DIPA). In the intervening period, much has happened on the infrastructure front. The launch of PM GatiShakti NMP Platform and the approval of auction of 5G spectrum are two such path breaking landmarks that seek to alter the nation's destiny in its 75th year of independence.

PM GatiShakti is a transformative approach to economic growth and sustainable development. The approach is driven by seven engines, namely, roads, railways, airports, ports, mass transport, waterways, and logistics infrastructure. The PM GatiShakti initiative will facilitate last mile connectivity and kick start a virtuous cycle of private and public investment, which will have a multiplier impact on the economy. It is designed to break departmental silos and bring in more holistic and integrated planning and execution of projects to address the issues of multi-modal and last-mile connectivity.

On the roadmap to build a digitally connected country, this initiative will provide the required impetus which will enhance the seamless flow of information among various industries which are working together on major multi-reach projects. The PM GatiShakti Master Plan will also provide accurate information and guidance, which is important for the completion of projects within a stipulated time frame, make policymaking effective, and eliminate any possibility of government expenditure.

The launch of 5G services, which is initially planned for 14 cities, would require tremendous coordination and a synergy between various central ministries and state governments. With the support of DoT, TRAI and other agencies, the RoW pendency state has been brought down considerably. The high point of this has been the launch of the GatiShakti Sanchar portal on 14 May 2022 by Hon'ble Minister of Railways and Communications. The Digital Infrastructure industry duly represented by DIPA will continue to work together with all stakeholders to ensure the proliferation of telecom services in the nation.

On behalf of all our members, I would like to express our deep gratitude to TRAI, DoT, state governments and various local authorities and our esteemed customers for their whole-hearted support in this mission.

# Foreword



**T R Dua**

**Director General  
DIPA**

India aims to elevate its digital business ecosystem and increase the digital economy by US\$1t by 2025. This vision was fueled in 2015 when the Digital India program was launched. The flagship program is directed to transform India into an empowered digital economy, capturing the potential of technology in the Indian economy. Digital India is an umbrella program that includes multiple efforts around connectivity, skilling, and capacity building, amongst others.

Digital connectivity is at the intersection of the digital business with the physical world, which means that it is a critical factor within the ecosystem of digital business. The data of economic contribution around the globe demonstrates that a 10 percent increase in broadband penetration yielded an additional 1.25 percent in GDP growth in developed economies. In comparison, the same increase in middle-income countries yielded only an additional 0.85 percent in GDP growth and much lesser growth in low-income countries.

Last year has been full of challenges for the digital infrastructure sector, with the pandemic and post-pandemic situations leading to mushrooming of bandwidth demand, where in the concept of Work from Home/Work from Anywhere/Work from Office has emerged. The GatiShakti Master Plan, launched by the Hon'ble Prime Minister, has a focus on planning and financing through innovation, technology and speedier implementation.

The recently released Global Connectivity Report 2022 by ITU again highlights the underlying need of infrastructure sharing, wherein it states, ***"Promoting the sharing of infrastructure can reduce costs. Operators could, for example, share mobile towers and underground ducts. Network deployment investment is reduced by laying fiber-optic cable along railway lines, power transmission grids and pipelines. Estimates suggest that sharing antenna sites can save operators up to 40 per cent on both capital expenditure and 5G deployment"***.

It further states, ***"Ensuring that energy provision is adequate to power ICT infrastructure is essential. This is a challenge in some low- and middle-income countries especially in remote rural locations. Diesel is often used but this is expensive and unkind to the environment. Renewable solutions are not always feasible or price competitive, for instance, because of a lack of sunlight, infrequent wind, or the need for expensive battery storage. Solutions to these challenges include reduced duty, tax incentives on green power equipment, and allowing independent power producers"***.

The transition from TAIPA to DIPA has been a smooth one, but it beckons on us new challenges in terms of the launch of 5G services and achieving the National Broadband Mission targets.

The government and TRAI have played a pivotal role in our coordination with the State Governments for getting the RoW permissions. DIPA is committed to promote the telecom infrastructure in the country by addressing bottlenecks faced by the industry and enabling ease of doing business



## Prashant Singhal

Emerging Markets TMT  
Leader, EY

India stands in the throes of a digital revolution. The successful completion of the 5G spectrum auction paves the way for accelerated commercial 5G service rollout in the country. It is indeed a very exciting time for us. 5G is expected to be a game changer unleashing innovative service offerings. Pan-India 5G rollout would transform India into a broadband super-highway and uplift the socio-economic fabric.

In the next two to four months, consumers would start experiencing 5G services firsthand – high-speed mobile broadband, downloading content in seconds and seamlessly connecting through HD video calls. Access to immersive content will be a key proposition for consumers through virtual and augmented reality headsets/glasses. At the same time, cloud/immersive gaming would gain significant traction. 5G is set to open doors to metaverse and help in the transition to a digitally connected society. For businesses, 5G promises to open-up new use cases across various industries in India. India has the potential to redefine 5G use cases, given the country's unique requirements and sheer scale.

To realize the transformational benefits of 5G, approximately INR2.2t investment is required in the next five years to build the underlying infrastructure – macro towers, fiber network, small cells, and data centers. A fiberized backhaul is essential to support the high-bandwidth and low latency required in 5G. Cumulative investments in fiber are expected to amount to approximately INR590-930b between 2022 to 2027, which will form a major component of 5G capex. Network densification is a critical aspect of 5G and deployment of small cells will be instrumental in achieving this. Small cell investment is expected to be in the tune of INR195-280b between 2022 to 2027.

The Government of India has been the harbinger of policy reforms in the telecommunications sector in the last few years. It has launched bold reforms, bringing in a slew of measures to restore sector viability. This has clearly helped to rebuild investor confidence. The "PM Gati Shakti – National Master Plan" is a visionary step to further enhance ease of doing business in India. Traditional policy and regulatory boundaries are getting blurred in a hyper-connected digital world. Seamless coordination between

different government departments is expected to bring in significant efficiencies in delivering projects – reduce wasteful expenditure, faster go-to-market, simplification of processes. A case in point is the GatiShakti Sanchar Portal. Bringing together all Central Ministries and States/ Union Territories under one roof speaks volume of the coordinated approach to improve efficiencies. The portal has been instrumental in bringing down the average number of days to dispose of RoW applications from 429 in 2019 to only 5 in September 2022. This is a significant achievement possible through prudent planning, removing bottlenecks and practical policy measures. In August 2022, amendments to the Indian Telegraph Right of Way (RoW) Rules were a welcome step to enable quicker and easier rollout of digital infrastructure such as small cells and fiber. Moreover, rationalization of administrative fees for telecom infrastructure will help to reduce operating cost.

Now is the time to really accelerate digital infrastructure deployment in the country. The government can consider incentivizing digital infrastructure rollout to support 5G launch. This will ensure a quick rollout and help to attract much needed investment in the sector. Expanding scope of IP-Is by allowing active infrastructure sharing is likely to lower the cost of deployment and open-up new opportunities. At the same time, we should look at addressing some of the ground-level challenges. Time taken for RoW clearances can further be reduced through better alignment of state and central RWA Rules. Automatic approvals of RoW through the GatiShakti Sanchar Portal should be the norm.

We are witnessing a new industry structure with the emergence of large digital infrastructure service providers. It will lead to improvements in productivity, efficient utilization of value chain assets, reduction in operating costs and help to innovate.

I thank DIPA for being the torchbearer of the tower industry in India. I hope that this report helps us to build the next-gen digital infrastructure in the country for pan-India 5G rollout and to realize the Digital India vision.

### Acknowledgements

**EY report development team:** Girish Seshadri, Kaustav Bandyopadhyay, Sunil Chauhan





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# Executive summary

## 5G to necessitate investments in digital infrastructure

The successful conclusion of spectrum auction in August 2022 has set the stage for accelerated 5G network rollout in the country. The advent of 5G is going to be a game changer for India and is likely to have a profound impact on the socio-economic fabric. 5G is expected to lead to a surge in data traffic, which will necessitate upgrading existing networks and build new Greenfield ones. While the current capacity per tower site is about 1 Gbps for 2G/3G/4G services, going forward, the capacity needed for each site is expected to increase to 10-20 Gbps, once 5G kicks in.

Towercos or Digital Infracos are expected to play a key part in building this infrastructure. They are well positioned to address the fiber opportunity, with considerable experience of managing distributed infrastructure. As we move into the 5G era, network densification will be a key feature to support high-bandwidth applications and surge in data traffic. Towercos' ownership of shared infrastructure and expertise in Right-of-Way (RoW) makes them ideally placed to deploy small cells. There is a need to deploy small cells across all the tower sites. Further, increased adoption of low latency and high bandwidth applications have necessitated the need for edge data centers. Towercos can optimize their asset utilization by offering space for co-location of edge data centers. Through steady power supply and fiberized backhaul, tower sites can support edge data centers closer to the user, reducing the need to send backhaul data traffic to a centralized hub.

Significant investment is required over the next five years in setting-up the underlying digital infrastructure to support 5G launch. This would entail a cumulative investment of INR921b- INR1,411 between 2022-27 in various building blocks of 5G, in addition to macro tower investments.



### Digital infrastructure investment in India

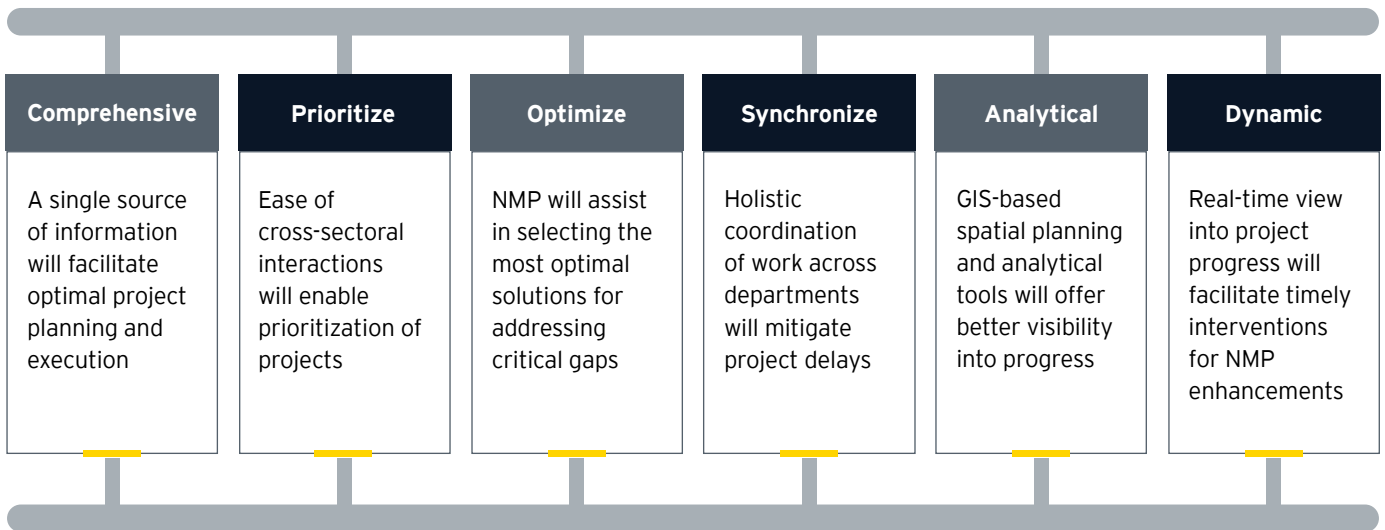
Focus areas	Cumulative investment (2022-27)
Fiber deployment and microwave	INR590-930b
Small cells deployment (outdoor)	INR195-280b
Wi-Fi/ IBS	INR55-75b
Edge data centers	INR50-65b
Data centers	INR31-61b

Source: EY analysis

### Proactive measures by the Government of India (GoI) to enable faster rollout of digital infrastructure and enhance ease of doing business

To accelerate digital infrastructure development in the country, a significant overhaul of existing policies, procedures, and processes will be required. In addition, seamless cooperation and coordination across all levels of the central, state, and local government bodies will be needed. The Prime Minister GatiShakti National Master Plan (PMGS-NMP) is one such initiative that aims to transform infrastructure deployment through country-wide mapping and providing greater visibility. It would also prioritize critical projects, optimize resource allocation, synchronize work across departments, and offer a real-time view of project progress. The PMGS-NMP is expected to have a significant bearing on India's telecom infrastructure development.

## PMGS-NMP is based on six pillars



Source: Internet articles, EY analysis

The launch of 'GatiShakti Sanchar Portal' by the Department of Telecom (DoT) in May 2022 is a step in the right direction in realizing some of the PMGS-NMP vision. Features such as single-window application for RoW permission across all states, faster approvals, and centralized application tracking are likely to expedite the RoW process significantly. Above all, this is expected to significantly boost the ease of doing business and pave the way for digital transformation of all the other industries in India.

### Mitigating regulatory bottlenecks will pave the way for accelerated digital investments

The current regulatory framework does not allow IP-Is to share active infrastructure. It acts as a barrier to adopt the shared infrastructure provider business path, which is instrumental in reducing operating costs by avoiding duplication of infrastructure by multiple service providers. There is a growing need to facilitate the sharing of active infrastructure for faster rollout of the underlying infrastructure as well as open-up new avenues for IP-Is. In addition, lack of any incentives for digital infrastructure rollout may delay rollout owing to high capex requirement.

The GoI has been actively pursuing specific measures to smoothen regulatory roadblocks for digital infrastructure rollout in the country. However, at the ground level several challenges exist. RoW clearances continue to be a major impediment. For instance, local RoW clearance is often delayed owing to non-alignment between Central/State laws. Lack of deemed approvals for RoW increases the time taken for approvals. On the other hand, taxes and levies are inconsistent across States, which leads to increase in cost of deployment. To mitigate this, automatic approvals for RoW should be implemented with rationalized cost through the Single-Window Portal - GatiShakti Sanchar Portal.

Electrification of mobile tower sites is very important to maintain necessary network uptime. Non availability of uninterrupted and quality electricity supply for the telecom towers hinders network operations significantly. Electricity connections should be provided on priority at tower sites and street furniture used for the deployment of digital infrastructure. In addition, industrial tariff rates can be provided instead of commercial rates. This will help to reduce some of the operational costs.



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**5G is set to pivot India's digital infrastructure requirements**

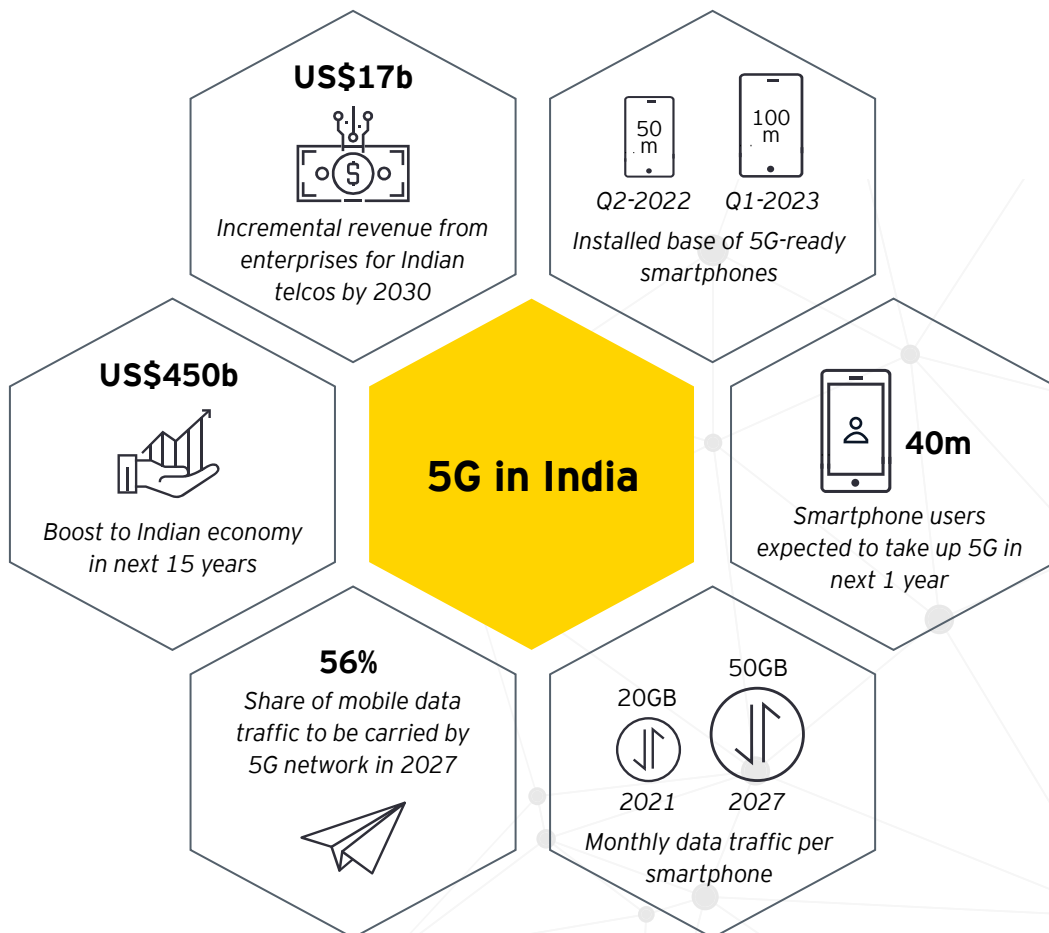
India's telecom sector has been a critical business enabler over the years. Exponential growth in mobile broadband has fueled the digital economy. It is the very foundation that enables the existence of several new age businesses such as e-commerce, fintech, ed-tech and health-tech. Given its enabling effects across sectors, a robust telecom sector can act as a flywheel that drives business impact and innovation, thereby catalyzing India's journey to becoming a US\$1t digital economy in the coming years.

## 1.1 5G and its role in enabling a digital India

India successfully wrapped up its first 5G auctions in early August 2022 and the rollout of 5G services is expected by October 2022. 5G is set to accelerate India's digitization initiatives and unlock the next level of economic growth. Once deployed, 5G is expected to spawn innovation in digital services, manufacturing, healthcare, education, entertainment and many more industries. As a result, the GoI has estimated that 5G can potentially contribute US\$450b to the Indian economy over the next 15 years.

Enthusied by 5G's applicability across sectors, Indian telecom service providers (telcos) are testing a broad range of use cases as part of finalizing their 5G launch plans. These use cases are based on a combination of 5G's three most important characteristics – enhanced mobile broadband (eMBB), ultra-reliable low latency communication (uRLLC), and massive machine-type communications (mMTC).

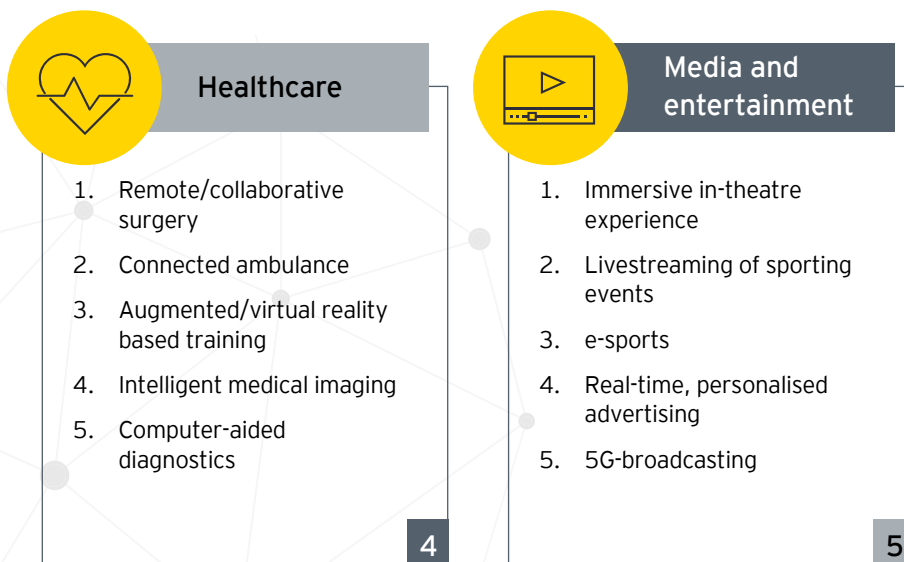
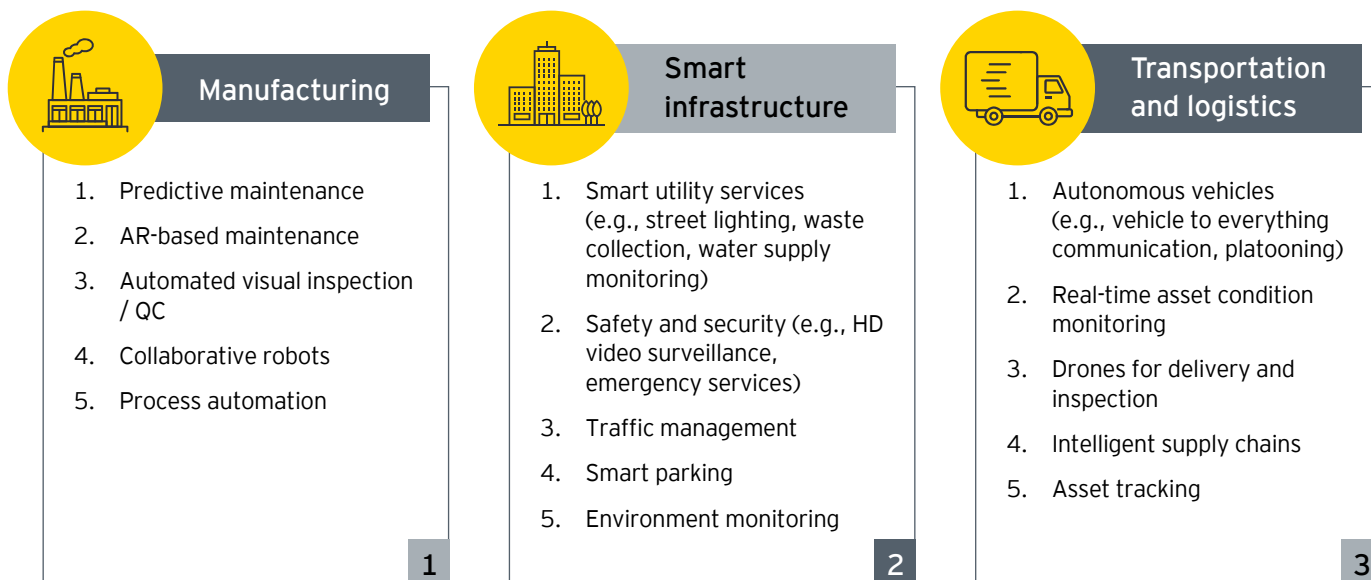
### Potential outlook for 5G in India



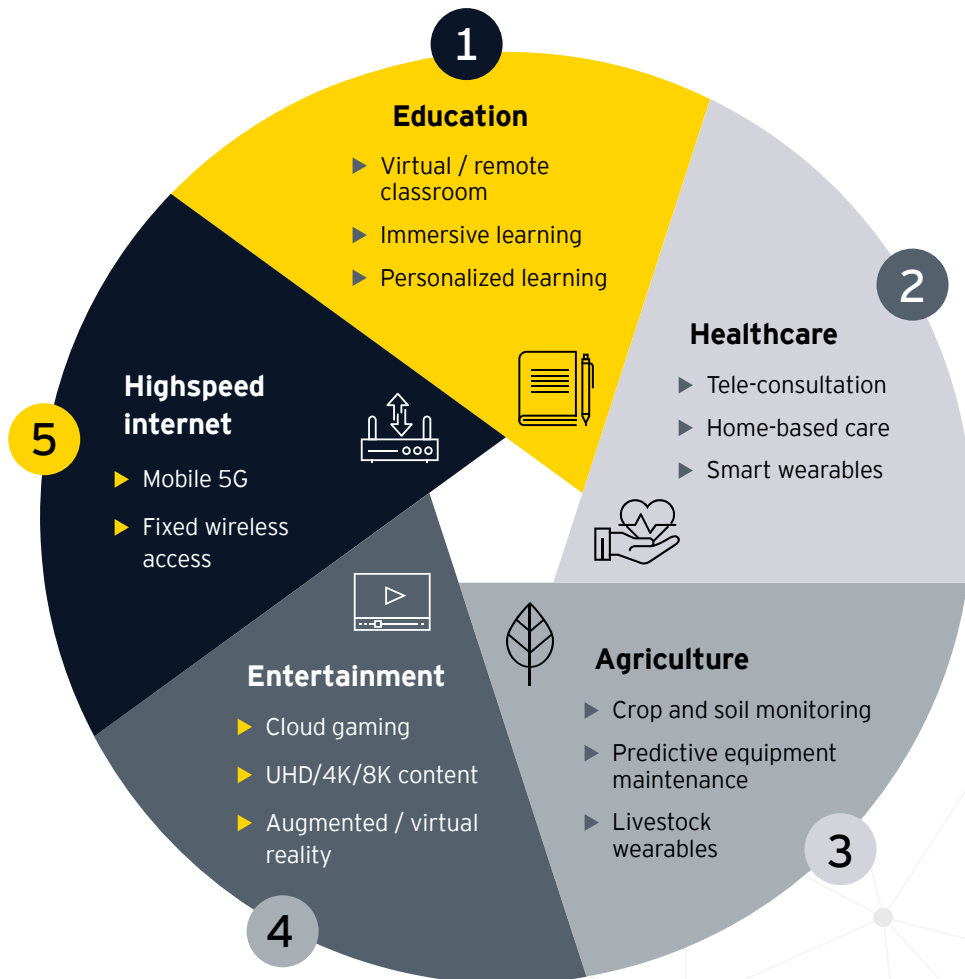
Source: Ericsson Mobility Report - India Edition, Counterpoint, CyberMedia Research

## 5G can potentially enable several use cases across sectors and customer segments

### 5G enterprise use cases



## 5G consumer use cases



Source: EY analysis

5G's ability to cater to such a broad range of use cases is primarily owing to use of new spectrum bands - 700 MHz, 3300 MHz, and 26 GHz. Each of these bands have their own combination of speed and range characteristics. Additionally, the use of technologies such as software defined networking (SDN) and network function virtualization (NFV) allow 5G to leverage network slicing. This facilitates the customization of network connectivity, ensuring the delivery of optimized connectivity to any industry and, as per use case.

## 1.2 Investments in digital infrastructure - need of the hour

5G rollout in India will require significant overhaul of the existing telecom infrastructure. India's telecom revolution has been facilitated by the country's digital infrastructure providers (IP-Is), especially the towercos. Over the years, Indian towercos have gained extensive experience in managing distributed passive network assets such as the tower structures, site locations and air-conditioning. They also have valuable experience in managing long term master service agreements (MSAs) and the know-how of RoW clearance processes. As the importance of active network assets grows, towercos will need to focus their efforts on the following emerging opportunities.

### 1.2.1 Significant capex is required in India for pan-India 5G rollout

In India, the pace of 5G rollout is expected to be faster leading to an elevated capex cycle. Launch of 5G presents a greenfield opportunity for towercos in the form of setting-up 5G macro cells, upgrades to existing towers as equipment load (from massive MIMO antennas) increases, and densification of networks. Passive infrastructure capex for macro tower set-up is estimated to be approximately INR775b between 2022-27<sup>1</sup>.

In addition, other investments will primarily be incurred in 5G's critical building blocks - OFC networks, small cells, in building solutions (IBS) and edge computing. Optical fibre cable (OFC) will enable latency reduction (from 50ms to 1ms) and higher speed (from 100 Mbps to 10 Gbps). Small

cells, besides improving coverage, will also help increase 5G's throughput (1000x that of 4G) and allow it to support a much higher number of connected devices (1000x that of 4G). IBS will complement millimetre wave (mmWave) 5G radios and small cells, ensuring adequate network coverage within indoor environments. Edge data centres / multiaccess edge computing (MEC) coupled with 5G will help in enabling ultra-low latency use cases that would have not been possible with 4G networks alone.

#### Towercos can unlock new growth opportunities by monetizing existing assets and exploring business adjacencies

Focus areas	Revenue opportunity (2022-27)	Cumulative investment (2022-27)
Fiber deployment and microwave	INR200-320b	INR590-930b
Small cells deployment (outdoor)	INR60-95b	INR195-280b
Wi-Fi/ IBS	INR18-24b	INR55-75b
Edge data centers	INR16-21b	INR50-65b
Data centers	INR10-20b	INR31-61b

Source: EY analysis

1 EY analysis



## 1.2.2 Augmenting the OFC network

Conventional microwave wireless-based backhaul cannot support 5G's multi-Gigabit speed requirements. This necessitates OFC deployment to enable 5G networks. Additionally, a fiberized backhaul also helps support the deployment of edge data centers and small cells, two other critical enablers of 5G. However, with only ~35.1% of towers currently connected by fiber, India trails many other developing nations<sup>2</sup>. In spite of India being the second largest telecommunications market, the fiber kilometer (fkm) per capita in India is lower than other nations.

### Benefits of OFC

1

#### Backhaul of choice

Fiber optimises 5G quality of experience by enabling multi-Gigabit capacity that microwave bands cannot provide.

2

#### Fronthaul from small cells

Small cell fiberization ensures higher speeds, lowers attenuation, and offers immunity from electromagnetic interference.

3

#### Enabler of edge computing

Low latency and reliable data transmission is made possible between Edge data centers, network core and the public cloud.

4

#### Network security

Fiberisation makes the telecom network highly secure with its sensors driven de-aggregated architecture.

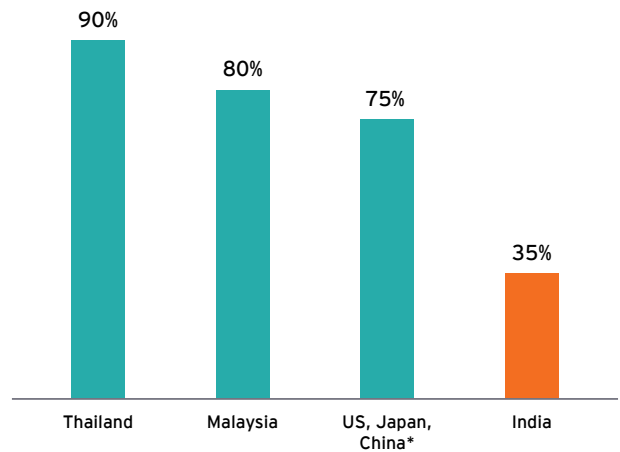
Source: National Broadband Mission

<sup>2</sup> DIPA analysis

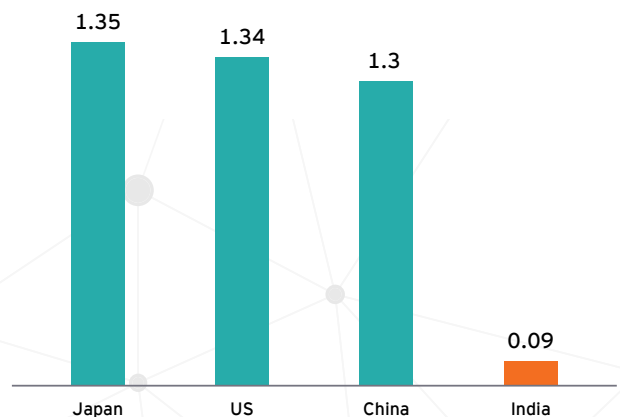
<sup>3</sup> DIPA

### India trails global peers in terms of tower fiberization and fiber km per capita

% of towers fiberised



Fibre kms per capita



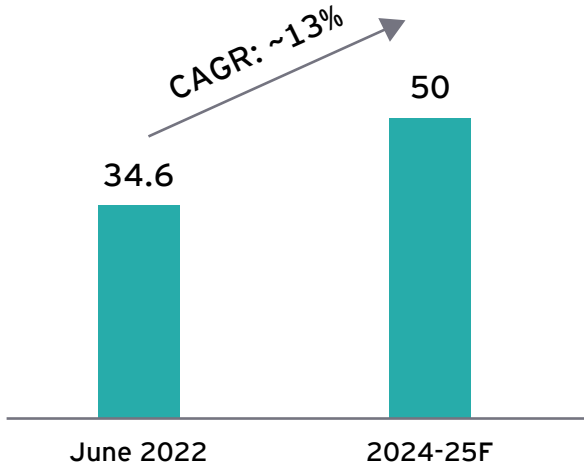
Source: DIPA analysis, Internet articles

The GoI has taken cognizance of this shortcoming and is aggressively pursuing the nationwide deployment of OFC. The country currently has approximately ~34.6 lakh kilometers of OFC. The GoI is now aiming to ensure OFC connectivity to all villages by 2023. Achieving this will require cables to be laid at the rate of 1,251 kms/day, nearly 3.6x times the current speed of 350 kms/day<sup>3</sup>. Increasing traction within key government programs such as Prime Minister Wi-Fi Access Network Interface (PM-WANI), BharatNet and Smart Cities is also expected to catalyze fiber deployment, ultimately necessitating 100% tower fiberization.

**OFC deployment and tower fiberization is likely to pick up pace in India**

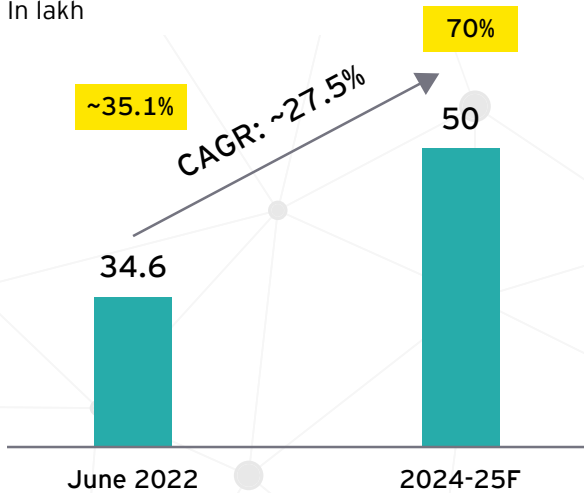
**India's OFC network**

In lakh kms



**India's tower strength and fiberization level**

In lakh



Source: National Broadband Mission

One of the key challenges of OFC deployment is the timely availability of reasonably priced passive infrastructure. A common duct is one such passive infrastructure. This is a shared underground conduit that can hold fibers, cables and pipes from multiple service providers and utilities in separate micro ducts. It can expedite the process for OFC deployment

by eliminating the time-consuming processes of seeking RoW permissions and carrying road excavations. Once constructed, a company deploying OFC just needs to buy/lease the required number of micro ducts as per requirements, blow the OFC, connect the electronics, and provide the services. Additionally, it also simplifies OFC maintenance and optimizes capex by allowing for cost sharing among various IP-Is and utilities. Although the deployment of such common ducts is underway in India, it needs to be scaled up massively.

Given that OFC is now considered a public utility by NDSP 2018, the time is right for all utilities to go through common ducts. This will enable high protection against the much-feared fiber cuts and aid in maintenance of optical fiber. Once a common utility duct has been constructed, it is no longer necessary to excavate the street every time something must be replaced, and the ability to visually inspect water lines and the like greatly simplifies the task of maintenance. Furthermore, if an earthquake or other major disaster occurs, damage can be quickly pinpointed and repaired. Where common utility ducts are in place, a city is much better prepared to deal with emergencies. In addition, a common GIS platform and a Fiber Management system will ensure a seamless and reliable maintenance and management of utilities.

**Best practices in common duct rollout**

**The US**

- ▶ Boston city's "joint build" policy requires all telecoms to install their OFC in shared underground conduits on a shared-cost basis. A "lead company" is tasked with coordinating the efforts between all telecoms involved in the installation process, planning, and implementing the installation.
- ▶ State of Utah's "dig once" policy requires the installation of oversized conduit for certain road construction projects. The state's Department of Transport owns the conduit and leases it to telecom companies that want to use it. Utah's Telecommunications Advisory Council reviews and approves valuations and trades between the state's Department of Transport and telecom companies for access to the conduit and maintains a map of fiber locations.

## India

- ▶ In Rajarhat New Town, Kolkata, a JV - New Town Telecom Infrastructure Development Company Ltd. (NTTIDCO) has been formed between West Bengal Housing and Infrastructure Development Corporation (HIDCO) and WEBFIL, a private sector telecom infrastructure company. NTTIDCO is tasked with the responsibility of creating common ducts in a planned utility corridor across the city.
- ▶ Telangana's 'Mission Bhagiratha' project entails the laying down of OFC ducts alongside the extensive water pipeline network being laid under Mission Bhagiratha. This is expected to save huge funds that would have been required to install a separate OFC network.
- ▶ Some of the new road construction projects in Chhattisgarh include common ducts installation at the time of road construction. These will be rented out for OFC deployment

Source: TRAI's consultation paper on "Roadmap to promote broadband connectivity and enhanced broadband speed", Internet articles

Another important challenge is that significant capex inefficiencies may arise due to OFC network duplication. This could possibly be overcome through OFC sharing. Globally, telcos are already exploring the idea of sharing OFC networks for 5G deployment. Such a model is not only expected to help telcos in achieving opex and capex savings but also in helping them realize higher cash flows. Regulators and governments too have begun warming up to this idea.



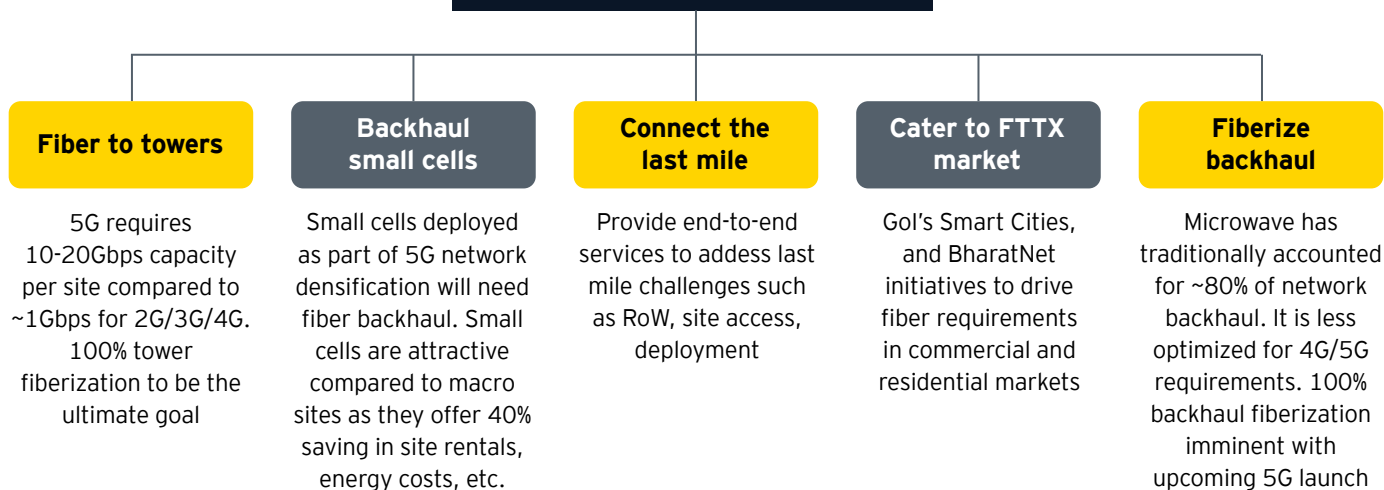
## Global examples of OFC sharing among telcos

No.	Country	OFC sharing details
1	Spain	<ul style="list-style-type: none"> <li>▶ As part of enabling faster 5G rollout, two of Spain's leading telcos expanded their passive network sharing agreement in April 2019 to include OFC backhaul.</li> <li>▶ The agreement is expected to deliver cumulative opex and capex savings of least EUR600m over the next ten years. It will also enable them to extend 5G coverage to two-thirds of the Spanish population.</li> <li>▶ Only smaller cities with populations of up to 175,000 people will be covered under this agreement. Both the telcos will continue to operate their separate, independent infrastructure in Spain's biggest cities.</li> </ul>
2	Italy	<ul style="list-style-type: none"> <li>▶ Two of Italy's leading telcos entered a JV in July 2019 for sharing OFC backhaul to facilitate faster 5G rollout. Both the telcos will be responsible for adding higher capacity OFC to their towers as part of the agreement.</li> <li>▶ The agreement is expected to deliver net cumulative cashflow benefits of at least EUR800m over the next 10 years.</li> <li>▶ The network sharing agreement will be applicable in cities with population up to 100,000 people. Both the telcos will continue to operate independent infrastructure in Spain's biggest cities.</li> </ul>
3	Canada	<ul style="list-style-type: none"> <li>▶ Two of Canada's leading telcos have had a long-standing agreement for sharing fiber backhaul for delivering 4G services. This has allowed them to extend coverage of 4G LTE Advanced services to over 95% of Canadian population.</li> <li>▶ The fiber backhaul is now being leveraged for enabling faster 5G rollouts, whose coverage already extends to 70% of the Canadian population</li> </ul>
4	Germany	<ul style="list-style-type: none"> <li>▶ In January 2021, Germany's three leading telcos have agreed to come together for sharing their OFC backhaul infrastructure to cover the gaps in Germany's 5G network.</li> <li>▶ This agreement was reached after Germany's Federal Cartel Office asked the operators to work together to cover "grey spots" in their networks.</li> </ul>

Source: Internet articles

## OFC opportunity for towercos in India

### Focus areas for towercos



Source: EY analysis

### 1.2.3 Network densification through small cells and IBS

The 3300 MHz and 26 GHz bands have relatively poor propagation characteristics. This can impede 5G coverage in hyperdense environments such as urban areas and factories. Coverage from macro sites alone will prove to be inadequate in such cases and hence, network densification will be critical. Small cell deployments will help increase capacity, improve coverage and energy efficiency while reducing risk of radiation.

Street furniture can be utilized to mount small cells for providing telecom services as well. Some common examples of street furniture include utility poles, billboards, lamp posts, traffic signals, and public structures like gazebos, bus stops etc. Availability of existing street furniture in form of millions of streetlights, thousands of bus stops, hundreds of metro pillars can be a boon for economical and fast deployment of small cells. Considering the costs involved, complexity, and time frames for densification of the proposed 5G network infrastructure, there is a need to put in place a mechanism for

using the existing street resources for large-scale deployment of small cells. Street furniture are under various public and private authorities that have administrative jurisdictions in Municipal bodies, Smart City administrations, Government departments, railways, airports, ports and metro train systems, stadia etc. Granting access to street furniture by these controlling authorities at reasonable cost could remove a significant hurdle in 5G small cell deployment in the country.

## Benefits of small cells

### Enhanced coverage

High frequency 5G waves can better penetrate hard surfaces in hyper-dense environments, thereby enhancing network coverage

1

### Higher network capacity

Built-in eMBB and mMTC capabilities supports higher number of simultaneous users and minimizes network congestion

2

### Lower latency

3GPP mobile technology ensures seamless hand-off between small cells with no loss of connectivity

3

### Versatile and Customisable

Can be deployed in licensed / shared/unlicensed/locally licensed spectrum and managed as per network requirements

4

### Power efficient

Less power consumed for functions due to low power operation capability

5

### Easy to handle

Easy to install and handle due to their smaller size

6

Source: EY analysis

Almost 85% of the data traffic and 70% voice traffic is currently generated indoors and is driving the demand for IBS<sup>4</sup>. The upcoming launch of 5G services, greater traction for IoT services and the Govt's Smart Cities Mission will further encourage the adoption of IBS.

### Opportunity for towercos

TowerCos can leverage their macro site expertise - securing clearances, deployment, management, and maintenance to cater to the small cell and IBS market. Subject to regulations they can become an integrated player by owning the active/passive infrastructure. This allows them to act as neutral hosts and cater to multiple telcos. Alternatively, they can act as landlords of passive infrastructure and seek rent of right for its use.

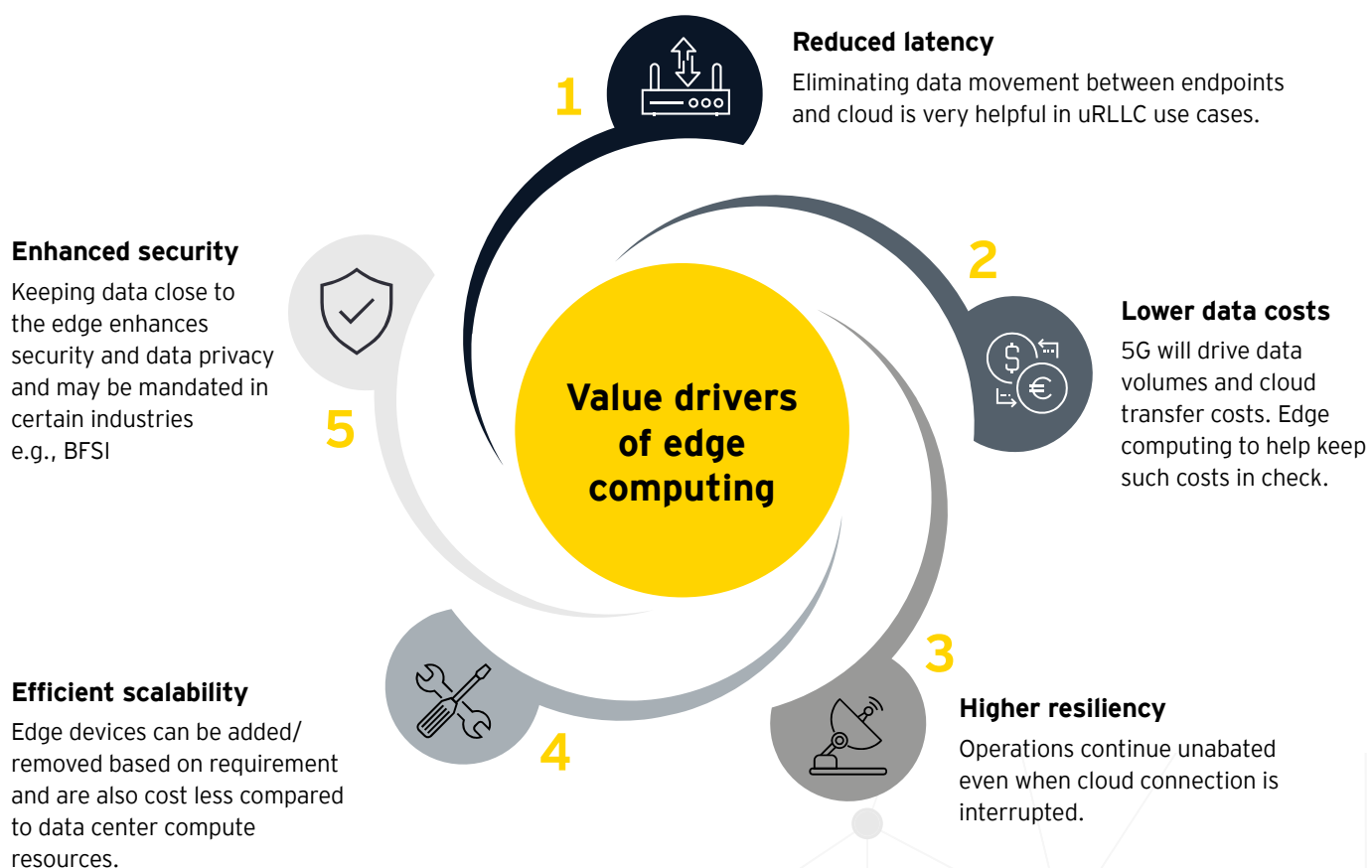
Source: EY analysis

### 1.2.4 Enabling intelligence on the edge

5G's uRLLC and mMTC characteristics make it compelling for AI-based use cases such as robotics and autonomous vehicles. Traditionally, such use cases have relied on a central cloud, which is not only costly but may not always offer optimal network latency. Given their proximity to customers, tower sites are ideal for the co-location of edge computing infrastructure. Such edge data centers, coupled with 5G, steady power supply and fiberized backhaul, can overcome the limitations of sending data back and forth to a central cloud.

4 DIPA analysis

## Benefits of edge computing



Source: EY analysis

### Opportunity for towercos

A business case for edge data center deployment depends on factors, such as geographic location, surrounding industries, and network design. Deployments in dense, urban, industrial clusters can potentially support latency-sensitive applications and power high speed computing. TowerCos can provide server space to content providers and cloud providers and enable real-time applications with richer and immersive experience for end users. Such edge infrastructure can also enable localized cloud RAN, thereby allowing telcos to make their networks more flexible and versatile.

Source: EY analysis

### 1.3 Business model transition - adopting the netco model to reduce cost and enable faster time-to-market

Indian towercos had pioneered the concept of pooling in passive telecom infrastructure and offering neutral host services to Indian telecommunication service providers (telcos). This not only enabled the telcos to optimize their capex and opex but also facilitated faster time-to-market and affordable services. The rollout of 5G services in India will possibly require a further evolution of this digital infrastructure sharing business model.

Globally, radio access network (RAN) sharing is emerging as one of the most important enablers of 5G deployments. Driven by a need to improve their financial health and operational efficiency, some of the leading global telcos have begun spinning off their active network assets, such as small cells and fiber. This is leading to them transitioning into the servco business model<sup>5</sup>. At the same time, some leading North American and European towercos have begun consolidating active network assets and moving up the value chain, in turn transforming into netcos<sup>6</sup>. This business model transition is facilitated by the use of application programming interfaces (APIs). These allow a single netco to offer active network infrastructure access to several telcos, thereby enabling the former to position themselves as neutral infrastructure providers.

As India prepares for 5G rollout, Indian towercos will need to take cues from global towercos' evolving business practices in the 5G era. Indian towercos already have well-established relationships with telcos and they now need to effectively leverage these. Expanding their scope of offerings to shared active assets will enable them to develop a unique value proposition for Indian telcos and thrive in the 5G era.

<sup>5</sup> EY analysis

<sup>6</sup> EY analysis





## Value proposition of the netco business model

### Revenue diversification

TowerCos can upsell to existing tenants, attract tenancies from operators planning to expand their coverage, becoming network partners to aspiring new entrants.



### Economies of scope

Equipment can be shared across multiple telcos since they tend to follow similar spectrum strategies in the same geographies.



### Key impact areas of the NetCo business model

### Flexible and scalable pricing

A pricing mechanism based on technology (4G vs. 5G) and frequency (1800MHz vs. 700MHz) is better aligned with changing network configurations.



### Lower cost of capital

Longer contracts (~10-15 years), higher switching costs lead to predictable cash flows and enable access to cheaper capital.



Source: EY analysis



2

## **Facilitating India's digital infrastructure development journey**

Making 5G a reality will require India to enhance its digital infrastructure on a war footing. Seamless cooperation and coordination across all levels of the central, state, and local government bodies will be needed. The Government of India (GoI) has initiated several measures to improve ease of doing business. Their successful implementation will pave the way for laying a strong foundation for a Digital India.

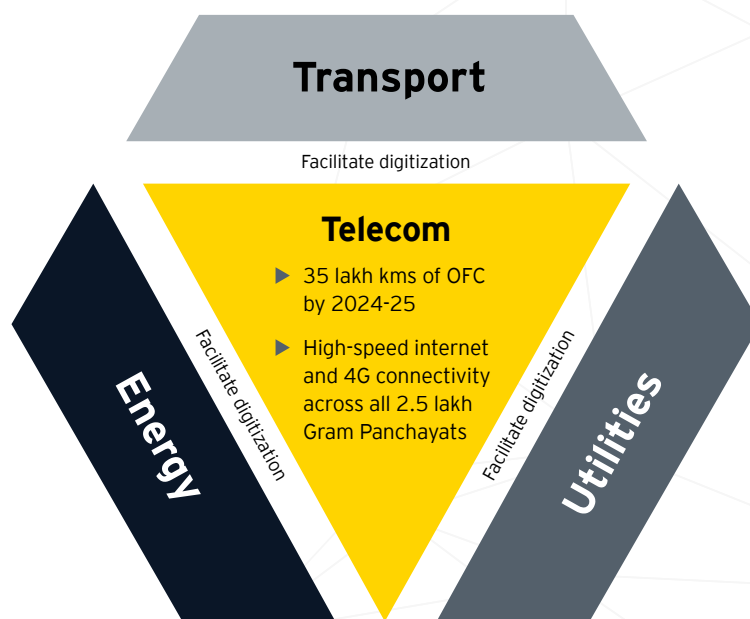
## 2.1 PM GatiShakti National Master Plan - embodying India's infrastructure development vision

The PMGS-NMP was launched in October 2021, with an outlay of INR100t. This digital platform brings together 16 ministries for integrated planning and coordinated implementation of infrastructure connectivity projects. This approach will be driven by seven engines, namely, roads, railways, airports, ports, mass transport, waterways, and logistics infrastructure. These engines will be supported by the complementary roles of energy transmission, IT communication, bulk water and sewerage, and social infrastructure. The projects pertaining to these seven engines, such as the National Broadband Mission, Bharatmala, Sagarmala and Ude desh ka aam nagrik (UDAN), will be aligned with the PMGS-NMP. The platform will incorporate technology, such as spatial planning tools, with the Indian Space Research Organisation (ISRO) imagery developed by Bhaskaracharya National Institute for Space Applications and Geoinformatics (BiSAG-N). This will enable

the country-wide mapping of infrastructure such as mobile towers and optical fiber cable (OFC) to the PMGS-NMP platform and offer visibility into the deployment of such assets.

The PMGS-NMP is highly relevant to India's telecom sector, and it offers a major boost for the development of a robust digital communications infrastructure. Once developed, this will serve as a digital backbone for powering the digital transformation of all the other industries in India. It will enable the smartification of the country's physical infrastructure – highways, railroads, airports, and seaports and unleash the country's economic potential. By ensuring easy access to real-time information, it can also be expected to ensure the smooth functioning of the PMGS-NMP itself.

### Telecom sector initiatives under PMGS-NMP to favorably impact all other sectors

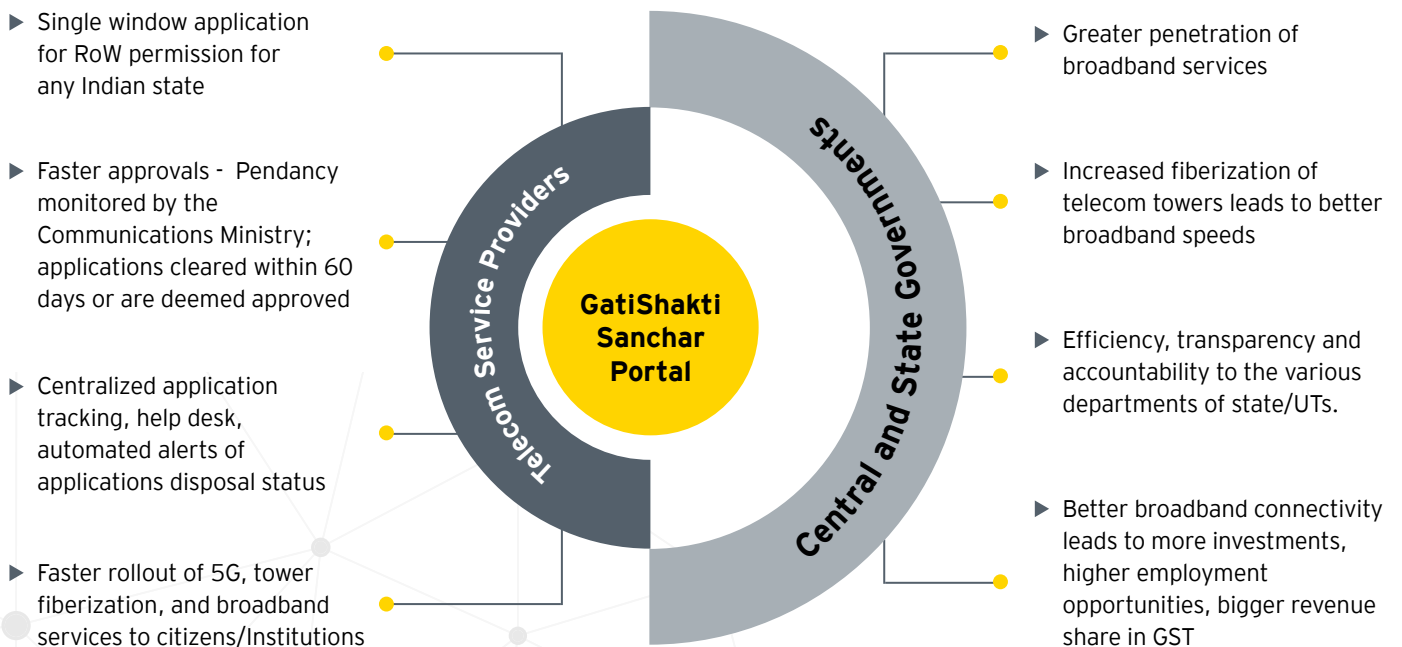


Source: Department for Promotion of Industry and Internal Trade (DPITT), Press Information Bureau, EY analysis

## 2.2 GatiShakti Sanchar Portal - an initiative to streamline countrywide RoW applications and permissions

Realizing the dream of a superior digital infrastructure will require bringing transparency, accountability, and responsiveness while processing applications. Delays due to inconsistency and uncertainty in policies and processes in implementing the RoW Rules-2016 need to be addressed promptly. Keeping this in mind, and in line with the PMGS-NMP, the DoT launched the GatiShakti Sanchar Portal in May 2022. This portal offers a collaborative institutional mechanism between all stakeholders, including central and state/UT government(s), central land-owning authorities, local bodies, and telecom sector entities. It acts as a giant step up to the ease of doing business by bringing transparency, accountability, and responsiveness while processing RoW applications.

### Gati Shakti Sanchar Portal is expected to mutually benefit all stakeholders



Source: GatiShakti Sanchar Portal, EY Analysis

### Linkages between GatiShakti Sanchar Portal and all other entities accomplished

#### Linkages with other government departments

All ministries fully linked with GatiShakti Sanchar Portal (e.g., Ministry of Railways; Ministry of Road, Transport & Highways; Ministry of Defence, Ministry of Environment and Forests among others)

#### Linkages with state portals

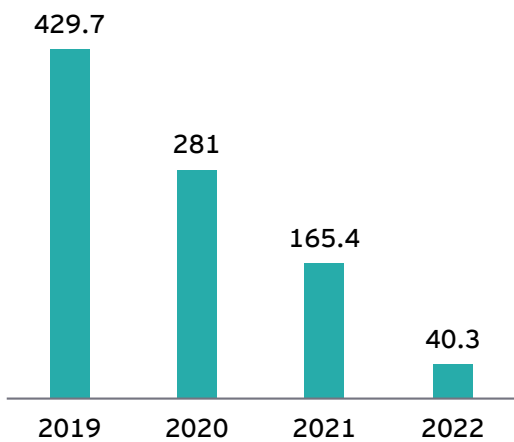
All 36 States/UTs fully linked with GatiShakti Sanchar portal

Source: GatiShakti Sanchar Portal, Department of Telecom, media reports

**OFC deployment and tower fiberization is likely to pick up pace in India**

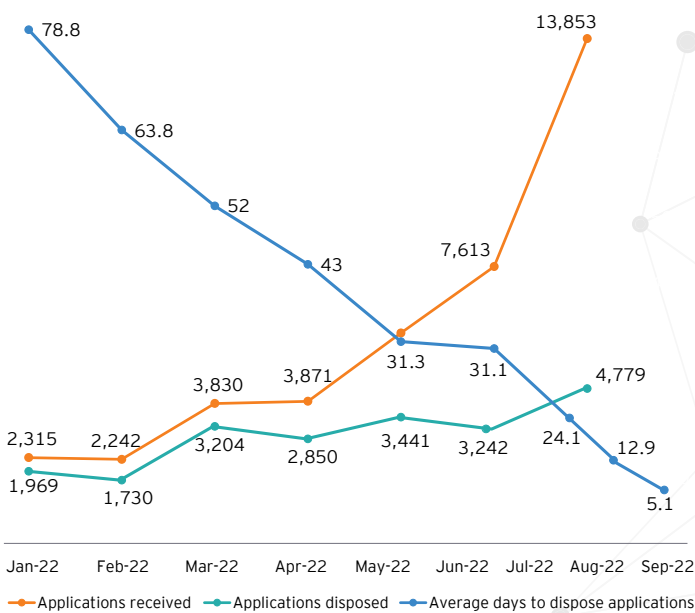
**Significant decline witnessed in average number of days to dispose RoW applications; disposal keeping pace with the increase in applications received**

Yearly - average number of days to dispose RoW applications



Source: GatiShakti Sanchar Portal

Monthly - average number of days to dispose RoW applications in 2022



\*Note: For Applications received and Application disposed, data available till Jul'22

Source: GatiShakti Sanchar Portal

**2.3 Several initiatives underway in India for facilitating the ease of deploying digital infrastructure**

The PMGS-NMP and GatiShakti Sanchar Portal will complement several other initiatives that are already underway for easing the path of digital infrastructure development. Most of these initiatives are centered on enhancing transparency and easing the regulatory and administrative burden on infrastructure development. Some of them are guidelines or exploratory ideas at present and are not yet notified as rules. However, considering the momentum gained in promoting the ease of doing business, their formalization may likely happen soon.



## Key initiatives for deploying digital infrastructure

No.	Initiative	Overview of key aspects
1	Amendment in the Indian Telegraph RoW Rules-2016 (August 2022)	<ul style="list-style-type: none"> <li>▶ Some key aspects covered in the latest notified amendment are: <ul style="list-style-type: none"> <li>▶ No approval required from authorities for laying OFC or installing mobile towers or poles over private properties. Only a written intimation needs to be submitted to the appropriate authority prior to the deployment of OFC/towers.</li> <li>▶ The GatiShakti Sanchar portal will be the single window for getting all the RoW clearances.</li> <li>▶ Charges for using street furniture for deployment of small cells (INR300 per annum in urban areas and INR150 per annum in rural areas per street furniture) and OFC (INR100 per annum per street furniture) have been fixed.</li> </ul> </li> </ul>
2	Exploring the use of street furniture for 5G deployment	<ul style="list-style-type: none"> <li>▶ In March 2022, TRAI released a consultation paper inviting public comments on the use of street furniture for 5G deployment.</li> <li>▶ It seems to agree to the fact that such deployment will obviate the need of deploying new mobile towers leading to capex reduction and faster rollout of 5G.</li> <li>▶ However, TRAI wants issues pertaining to sharing of street furniture, power supply, among other aspects to be addressed first.</li> </ul> <ul style="list-style-type: none"> <li>▶ Kerala State Electricity Board released a report on the use of electric poles for 4G/5G small cell and Wi-Fi access points.</li> <li>▶ Detailed specifications and design-related information on such electricity poles were shared.</li> <li>▶ RoW issues, resistance from DISCOMS in allowing the use of electric poles, power consumption issues, among others, were some of the key issues highlighted.</li> <li>▶ It suggested further research on suitable geographies for deployment, international best practices, and infrastructure sharing arrangements going forward.</li> </ul> <ul style="list-style-type: none"> <li>▶ In March 2022, the Telecommunication Engineering Centre released a report on rolling out of 5G small cells on street furniture.</li> <li>▶ Some key suggestions, among others, are: <ul style="list-style-type: none"> <li>▶ Simplified and uniform RoW rules - Uniform rules and simplified, but one-time clearances, through a single-window clearance portal, will minimize deployment costs.</li> <li>▶ Monthly rental - There should be close to zero monthly rental for the use of any central/state/local government infrastructure.</li> </ul> </li> </ul>
3	Online applications for ensuring ease of doing business	<ul style="list-style-type: none"> <li>▶ Earlier, telcos were required to submit application hard copies for Standing Advisory Committee for Frequency Allocation (SACFA) site clearance.</li> <li>▶ Telcos often deploy more than 20,000 sites a month and submitting the corresponding paperwork was time consuming.</li> </ul>

No.	Initiative	Overview of key aspects
4	Minimizing digging of roads for OFC deployment	<ul style="list-style-type: none"> <li>▶ A national common duct policy for laying fiber across the state/municipal roads and national highways will minimize instances of road digging and optimize the use of utility ducts.</li> <li>▶ NDCP-2018 (National Digital Communications Policy 2018) emphasizes the establishment of common service ducts and utility corridors in all new cities and highway road projects.</li> <li>▶ Accordingly, a draft standard for common duct and post infrastructure has been prescribed in accordance with directions of the DoT. It is aligned with TRAI's (Telecom Regulatory Authority of India) recommendations on "Roadmap to promote Broadband Connectivity and enhanced broadband speed".</li> </ul>
5	Fee guidelines for deploying OFC and IBS	<ul style="list-style-type: none"> <li>▶ As per Ministry of Housing and Urban Affairs (MoHUA) guidelines, the fee for allowing the laying of OFC should not be a source of revenue for municipal authorities. It should be kept to minimum for facilitating digital connectivity at par with water and electricity connectivity.</li> <li>▶ Charges for deploying common infrastructure, such as IBS, can be levied in a fair, reasonable, transparent, and non-discriminatory manner by service providers.</li> </ul>
6	Liberalizing satellite space	<ul style="list-style-type: none"> <li>▶ The move to transform the space sector from being government driven to opening the sector to commercial businesses, both Indian and international, in the country's space journey is a revolutionary move by the GoI. Space industry helps in country's rapid economic development, but it also has a political dimension as more and more countries are attempting to have a better hold over the space infrastructure, internet and the flow of information. The space industry is on the strategic roadmap of taking its rightful place among the established value chain internationally. There have been some very encouraging policy changes that are taking place in the sector from time to time.</li> <li>▶ Satellite communication continues to be the best suited technology to provide data connectivity in remote and rural locations due to its ability for rapid deployment, reliability, consistency, flexibility and scalability of services across all regions and terrains and also complements the mobile network connectivity.</li> </ul>

Source: DIPA, TRAI, Press Information Bureau (PIB), EY analysis

## 2.4 Select global best practices for facilitating digital infrastructure deployments

Globally, countries are establishing best practices for formulating regulations and administrative processes in context of digital infrastructure development. The aim is to ensure that all public authorities are aligned with the goal of digital infrastructure development and ensure friction-free achievement of the same. The below tables capture some of these best practices and regulatory guidelines.



## Best practices for facilitating digital infrastructure rollout

No.	Country/Region	Best practice theme	Overview
1	Malaysia	Common 5G infrastructure	<ul style="list-style-type: none"> <li>▶ The state-owned Digital Nasional Berhad (DNB) will own the spectrum and deploy the physical infrastructure required for 5G. The country's five telcos will in turn sign a wholesale access agreement with DNB.</li> <li>▶ This model will significantly save costs by avoiding infrastructure duplication. Based on government projections, DNB will be able to build the national 5G network for US\$3.9b vs. US\$8.3b, if the telcos had done this by themselves.</li> </ul>
2	Canada	Call/click before digging	<ul style="list-style-type: none"> <li>▶ All Canadian provinces offer a Click Before You Dig portal. This acts as a single-window approach for requesting the locations of buried utilities prior to ground disturbance activities. Telephone-based options are also present to put in a request. A minimum of three full working days is required to process the request.</li> <li>▶ Australia, Singapore, the US, and the UK are some of the other countries offering a similar facility.</li> <li>▶ India too is piloting the "Click before you dig" smartphone app. This allows diggers to determine the location of underground utilities. They can also alert the asset owners prior to carrying out any digging.</li> </ul>
3	Europe	Free RoW access	<ul style="list-style-type: none"> <li>▶ Austria offers free RoW access without an authorization on public property. In case of private property, free ROW is permitted under conditions of inter alia existing line expansion or existing line unable to jointly use.</li> <li>▶ German operators of public telecom networks can use thoroughfares free of charge. Timely updates are required on the infrastructure database.</li> <li>▶ Netherland's municipalities are required to offer operators free access to their infrastructure and promote sharing and coordinate upcoming civil works to minimize civil disruption.</li> </ul>
4	South Africa	Use of GIS for asset tracking and OFC deployment tracking	<ul style="list-style-type: none"> <li>▶ Use of a geographic information system (GIS) platform is enabling the mapping and monitoring of the status of fiber rollouts in South Africa. The location data platform acts as a single portal for all spatial assets. It also assists management in maximizing efficiencies and optimizing the cost of fiber deployment and maintenance.</li> <li>▶ The South African Government is actively supporting the private players in the use of GIS platforms, thereby aiding in its faster adoption.</li> <li>▶ Similar use of GIS platforms is also underway in Japan, South Korea, Europe, the US, China, and Bangladesh.</li> </ul>

Source: Internet articles



## Regulatory guidelines for small cell deployment

No.	Country/Region	Overview
1	Japan	<ul style="list-style-type: none"> <li>▶ Telcos can deploy 5G base stations on 208,000 traffic lights across the country.</li> <li>▶ The government has proposed that these traffic lights be shared between operators and local government authorities.</li> <li>▶ There are plans to equip traffic lights with communication functions for traffic data collection and processing and emergency communication.</li> </ul>
2	Australia	<ul style="list-style-type: none"> <li>▶ Several policies have been put in The Australian Communications and Media Authority and the Department of Communications to facilitate small cell deployment.</li> <li>▶ A key proposal is reducing planning requirements for small-cell deployments in the public space, and the removal of barriers between license types to facilitate the re-allocation of incumbent spectrum holders.</li> </ul>
3	Singapore	<ul style="list-style-type: none"> <li>▶ The Infocomm Media Development Authority (IMDA) has directed that building developers and owners need to provide free of charge "mobile installation spaces" – typically rooftop spaces reserved for telecommunication equipment.</li> </ul>

Source: DIPA's Response to TRAI Consultation Paper on "Use of Street Furniture for Small Cell and Aerial Fiber Deployment", EY analysis





3

**Mitigating challenges to  
accelerate digital  
infrastructure rollout**

The existing state of India's digital infrastructure presents several challenges in realizing India's digital dream. Nurturing the country's digital economy will require a grassroots-level strengthening of the digital infrastructure. In the last decade, a concentrated focus on developing critical physical infrastructure projects played a significant role in powering India's growth. Similarly, succeeding in the next hyper-connected digital era will require a concentrated effort in ironing out several administrative and regulatory challenges that continue to confront the country's IP-Is.

### 3.1 Multiple headwinds plague digital infrastructure development

A conducive regulatory environment is needed to maximize digital infrastructure rollout in the country. Addressing some of the regulatory bottlenecks faced by towercos/IP-Is, will go a long way in building the digital backbone of the nation. In the last five years the GoI has taken several measures to mitigate some of the challenges. However, more needs to be done and implementation at the ground level continues to be a major impediment.

Currently, 35 States have aligned their tower policies with the RoW rules issued by the DoT. However, non-implementation of the RoW rules has created several hurdles as far as fiber deployment across tower sites is concerned. Expenses for RoW remains the biggest cost component for tower operators. For instance, delays in getting the necessary permissions in places where the policies are not aligned with the RoW rules further escalate the overall cost of the project. On top of that, administration fees levied on processing tower site approvals is not aligned with the central policy of 2016, leading to higher cost. Delays in obtaining No-Objection Certificates (NOCs) pertaining to mobile tower sites adds to the time pressure.

Further, the laying of OFC is associated with high costs and complex installation acts as a major restraining factor. RoW charges are very prohibitive in many municipal corporations. For laying OFC, permission has to be sought from the various Government department(s).

Telcos and IP-Is have to maintain a network uptime of 99.95%. To ensure seamless services, diesel generator sets, and Lithium-ion batteries are deployed as power back up, on which large costs are incurred. Even, there are instances where lot of time has been taken to get electricity at tower sites. In addition, cost of electricity connection is much higher. This leads to delays in rolling out the necessary infrastructure and leads to increase in cost.



## Key challenges in the Indian telecom infrastructure space

### 1 Impediments in obtaining RoW clearances

#### Non-uniform implementation of RoW Rules

- ▶ Despite 35 states issuing their RoW policies, local implementation is a hurdle due to non-alignment between central/state laws and local by-laws. Resistance from DISCOMS (distribution companies) and resident welfare associations (RWAs) further adds to the delays.

#### Permission delays add to time pressure

- ▶ Delays in getting the necessary permissions in places where the policies are not aligned with the RoW rules further escalate the overall cost of the project
- ▶ RoW related challenges act as a significant impediment in tower fiberization

#### Lack of deemed approvals for RoW

- ▶ No-Objection Certificates (NOCs) pertaining to tower sites are often not acted upon by the requisite authority during the application stage.
- ▶ This is despite guidelines mandating deemed approval within the turnaround time of 60 days.

#### Inconsistent taxes and levies

- ▶ Levies and taxes linked to RoW vary widely across the country. This is in direct contravention to the DoT's RoW Policy of 2016.
- ▶ Property taxes have been found to be as high as 40%-115% in certain States. Interest on penalty and the threat of sealing of tower sites to recover property tax are additional impediments.

### 2 Challenges with electrification of towers

#### Delays in getting electricity connection

- ▶ Long-standing delays are observed in granting of live EB connections to tower sites owing to administrative and operational delays on the part of Distribution Companies (DISCOMs)
- ▶ At times, cost of providing EB connections is high and differs across States

#### Lack of industrial tariff for electricity

- ▶ In majority of cases, electricity at tower sites is provided at commercial rates as opposed to industrial tariffs

#### Impediments in reducing carbon footprint

- ▶ Lack of availability of power 24/7 leads to dependence on non-renewable sources of energy

### 3 Non-uniform Property Tax on mobile tower sites

#### Varying rates across States

- ▶ Property Taxes on mobile tower sites are being levied using methodologies that are not consistent across all States - rates and formula for calculating the same varies
- ▶ Within State also variations in rates, multiplying factor and calculation approach
- ▶ Many states have no specified Property Tax on towers; however, municipalities charge the same based on their interpretation
- ▶ Certain states tend to charge penalty on previous outstanding dues of Property Tax vide Penalty on Property Tax

#### Tax on property owners

- ▶ Levying of property taxes for tower sites levied on property owners tend to discourage them from allowing installation of tower sites on their properties

### 4 Inefficiencies in single-window clearance portal

#### Lack of proper training may lead to delays in clearances

- ▶ Training and sensitization of authorities involved in granting clearances and permissions needs to be strengthened; as operational challenges owing to lack of training tend to hamper the intent of having single-window clearance portal, which leads to delays in rollouts

### 5 Limitations in the National Building Code

#### No mandates for passive infrastructure provisioning

- ▶ Builders are not yet mandated to make adequate provision for ducts and optical fiber. This adds to deployment costs and timelines.
- ▶ Addressing this shortcoming will enable speedy access to indoor telecom connectivity

Source: DIPA analysis, EY analysis

## 3.2 Key considerations

The recent initiatives by the GoI have provided a significant impetus to laying down a strong digital foundation for the upcoming 5G era. However, ease of doing business needs to gain momentum to fulfill the agenda of Digital India. Catalyzing the deployment of a robust telecommunications infrastructure will require active support on the following pressing issues:

No.	Issue	Support needed
1	Aligning and implementation of State and local bodies RoW policies in line with the Central Indian Telegraph RoW Rules, 2016	<ul style="list-style-type: none"> <li>▶ The Indian Telegraph RoW Rules were notified in 2016 and subsequently amended in 2017, 2021 and 2022. However, few States are yet to formulate their RoW policies in line with the Center. This misalignment needs to be corrected. The DoT can address this issue by introducing a legal backing to the RoW Rules by December 2022.</li> <li>▶ States need to align their State RoW Policy with the recently released RoW (Amended) Rules, 2022 to further pave way for the deployment of digital infrastructure for 5G rollout</li> <li>▶ Automatic approvals for RoW, with rationalized cost, through the GatiShakti Sanchar Portal can be prioritized</li> <li>▶ Timely approvals to be provided with a provision for deemed approval</li> </ul>
2	Mitigate impediments in OFC deployment and infrastructure sharing	<ul style="list-style-type: none"> <li>▶ A national "Dig-Once" policy can be formulated for OFC deployment across States and municipal roads and national highways.</li> <li>▶ Provisioning of common ducts and smart poles will enable time-bound and cost-efficient OFC deployment. It will also help significantly overcome the challenges faced in the laying of underground cable. Hence, relevant standards for such common ducts and smart poles need to be introduced.</li> <li>▶ GIS mapping of the existing ducts and fiber will ensure infrastructure management and proper permissions.</li> </ul>
3	Enhancement of the scope of services offered by IP-Is to facilitate sharing of active assets	<ul style="list-style-type: none"> <li>▶ IP-Is can already share passive infrastructure solutions. They can also be permitted to offer shared, active infrastructure solutions to telcos on a plug and play model. This will facilitate cost sharing and reduce telcos' capex burden.</li> <li>▶ Fiberization will be incentivized as IP-Is would be able to offer an end-to-end solution to telcos</li> <li>▶ TRAI too is in favor of expanding the scope IP-Is and has recommended the same to the DoT.</li> <li>▶ Economic and energy efficiency can be achieved in case the scope of passive sharing is extended to active infrastructure sharing as well. It is likely to lead to substantial savings in energy/ reduced carbon footprint</li> </ul>
4	Securitization of telecom infrastructure	<ul style="list-style-type: none"> <li>▶ There is a need to include telecom infrastructure under the Critical Services category to ensure support from State governments and local bodies.</li> <li>▶ This will help to prevent tampering of equipment, diesel theft from generators and cutting of OFC</li> </ul>

No.	Issue	Support needed
5	Role of DISCOMS and local authorities in small cell deployment	<ul style="list-style-type: none"> <li>▶ Access to public spaces/ structures for small cell deployment varies across States. This needs to be made uniform with a simple and efficient processes to award permits. Sharing of the small cell sites, as recommended by TRAI, can also be permitted.</li> <li>▶ Dedicated space can be provided on public infrastructure/street furniture falling under Central jurisdiction. Uniform guidelines can be formed to ensure such access on a mutually agreed commercial basis – either free of cost or at bare minimum charge.</li> <li>▶ DISCOMS and local authorities should comply with RoW rules and guidelines to ensure friction free deployment of OFC and other telecom infrastructure.</li> <li>▶ Electricity connections to towers and small cell sites need to be prioritized and expedited.</li> <li>▶ RWAs should allow unrestricted access to building premises for small cell deployment, with no location-specific restrictions/requirements.</li> </ul>
6	Availability of power on 24x7 basis at industrial tariff	<ul style="list-style-type: none"> <li>▶ EB Connections at tower sites and street furniture used for the deployment of digital infrastructure need to be provided on priority and the same needs to be levied at industrial tariff instead of commercial as is being done in various states</li> <li>▶ The high cost is incurred for electrification of the sites from the main grid, especially in border area States and North-Eastern states. States can consider giving subsidy and share this cost for laying of the electric lines.</li> </ul>
7	Need for mandates towards ICT Infrastructure	<ul style="list-style-type: none"> <li>▶ Necessary amendments required in National Building Code-2016 for provisions for laying of ICT Infrastructure such as cables, ducts, etc.</li> <li>▶ States to be mandated in implementing NBC-2016 by amending their building byelaws</li> <li>▶ Mandated provisioning of ICT Infrastructure prior to obtaining Completion certificate for any Commercial &amp; Residential building</li> <li>▶ Buildings and areas should be rated using a standard system/methodology based on their digital connectivity to evaluate the efficiency of the network and infrastructure deployed. Further, mandate towards Fibre Sharing is needed which would lead to reduction in capex and avoid duplication of infrastructure.</li> </ul>
8	Subsidizing fiber deployment through viability gap funding	<ul style="list-style-type: none"> <li>▶ Last mile OFC deployment requires significant capex. This can be subsidized using a viability gap funding model.</li> <li>▶ The Universal Service Obligation (USO) fund can be considered for deploying OFC backhaul in urban areas. Bandwidth sharing can be mandated, and IP-Is should be permitted to bid.</li> </ul>
9	Accelerated depreciation and long-term loans	<ul style="list-style-type: none"> <li>▶ Despite the inclusion of Telecom as an Infrastructure subsector in the harmonized master list, the benefits of accelerated depreciation and concessional loans with longer tenure have not been extended to telecom companies.</li> <li>▶ The DoT may facilitate, being an administrative ministry for these benefits so that the industry qualifies for claiming depreciation on the capital cost of the PV system with associated tax benefits. This would support in faster deployment of RET in the telecom sector.</li> </ul>

Source: DIPA analysis









# EY offices

## Ahmedabad

2nd floor, Shivalik Ishaan  
Near C.N. Vidhyalaya  
Ambawadi  
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 4027 5000  
+ 91 80 6727 5000  
+ 91 80 2224 0696

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

## Chandigarh

1st Floor, SCO: 166-167  
Sector 9-C, Madhya Marg  
Chandigarh - 160 009  
Tel: + 91 172 331 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

Oval Office, 18, iLabs Centre  
Hitech City, Madhapur  
Hyderabad - 500 081  
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: + 91 484 304 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 DIPA

Digital Infrastructure Providers Association (Erstwhile Tower and Infrastructure Providers Association) was constituted in 2010 as an industry representative body registered under the Indian Society Registration Act, 1860.

Digital Infrastructure Providers Association (DIPA) represents the India's digital infrastructure industry that develop, build, own and operate the nation's wireless infrastructure. From infrastructure providers and equipment manufacturers to EV charging infrastructure and fiber deployers, we bring together a dynamic group of companies that enable consumers to lead a 21st Century connected life.

The association is dedicated to interact, discuss and deliberate with Indian Government Ministries, Policy Makers, Regulators, Financial institutions, and technical bodies etc. for the knowledge collection & dissemination for promotion of healthy growth in telecom services.

Since its inception in the year 2010, DIPA has become one of the key drivers for innovation and digital revolution in the Indian telecom ecosystem. We are well recognized locally and globally as the model association wherein the most complex issues of the industry are resolved through consensus-building, driving the business interests of our members forward. Taking up the common interests of the members and enabling their ease of doing business is one of the key objectives of DIPA.

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