

Industry Research Report

on

Telecom Tower and Optic Fibre Industry

23 February 2024

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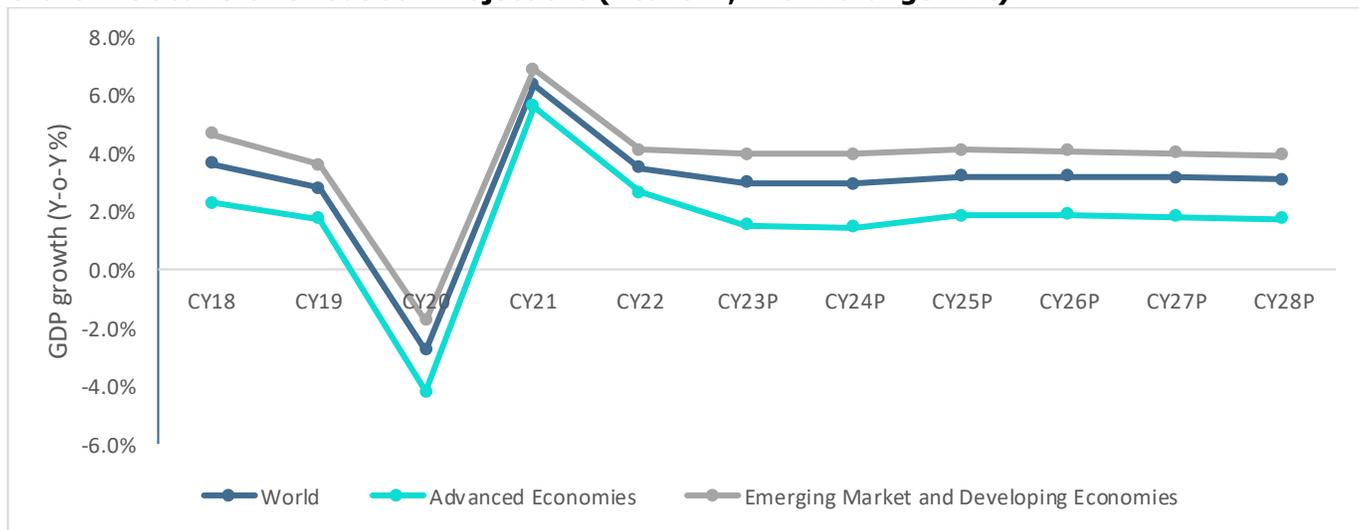
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1 Economic Outlook

1.1 Global Economy

As per the International Monetary Fund (IMF)’s World Economic Outlook growth projections released in January 2024, the global economic growth for CY23¹ stood at 3.1% on a year-on-year (y-o-y) basis, down from 3.5% in CY22 due to disruptions resulting from the Russia-Ukraine conflict and higher-than-expected inflation worldwide. On the other hand, the global economic growth for CY24 is projected to remain stable at 3.1%, attributed to growth resilience in major economies due to high government and private spending, rapidly subsiding inflation rates, and advanced economies easing their fiscal policies. Cost of borrowing remained high as central banks fight inflation. For the next 4 years, the IMF projects world economic growth in the range of 3.1%-3.2% on a y-o-y basis.

Chart 1: Global Growth Outlook Projections (Real GDP, Y-o-Y change in %)



Notes: P-Projection;

Source: IMF – World Economic Outlook, October 2023

Table 1: GDP growth trend comparison - India v/s Other Economies (Real GDP, Y-o-Y change in %)

	Real GDP (Y-o-Y change in %)									
	CY19	CY20	CY21	CY22	CY23P	CY24P	CY25P	CY26P	CY27P	CY28P
India	3.9	-5.8	9.1	7.2	6.3	6.3	6.3	6.3	6.3	6.3
China	6.0	2.2	8.5	3.0	5.0	4.2	4.1	4.1	3.7	3.4
Indonesia	5.0	-2.1	3.7	5.3	5.0	5.0	5.0	5.0	5.0	5.0
Saudi Arabia	0.8	-4.3	3.9	8.7	0.8	4.0	4.2	3.3	3.3	3.1
Brazil	1.2	-3.3	5.0	2.9	3.1	1.5	1.9	1.9	2.0	2.0
Euro Area	1.6	-6.1	5.6	3.3	0.7	1.2	1.8	1.7	1.5	1.3
United States	2.3	-2.8	5.9	2.1	2.1	1.5	1.8	2.1	2.1	2.1

P- Projections; Source: IMF- World Economic Outlook Database (October 2023)

Advanced Economies Group

¹ CY – Calendar Year

The major advanced economies registered GDP growth of 2.6% in CY22, down from 5.6% in CY21, which is further projected to decline to 1.5% in CY23. This forecast of low growth reflects increased central bank interest rates to fight inflation and the impact of the Russia-Ukraine war. About 90% of advanced economies are projected to witness decline GDP growth in CY23 compared to CY22. In addition, this is further expected to decline to 1.4% in CY24.

One of the major countries from this group is the **United States**. The United States registered GDP growth of 2.1% in CY22 compared to 5.9% in CY21. Whereas, growth for CY23 and CY24 is projected at 2.1% and 1.5%, respectively. Among advanced economies group, private consumption has been stronger in the United States than in the euro area. The business investments have also been robust in the second quarter, in addition, the general government fiscal stance of United States is expected to be expansionary in CY23. However, the unemployment rate is expected to rise coupled with declining wages and savings. With this, the GDP growth is expected to soften in near term.

Further, the **Euro Area** registered GDP growth of 3.3% in CY22 compared to 5.6% in CY21. For CY23 and CY24, the growth is projected at 0.7% and 1.2%, respectively. There is divergence in GDP growth across the euro area. Wherein, Germany is expected to witness slight contraction in growth due to weak interest rate sensitive sector and slow trading demand. On the other hand, the GDP growth for France has been revised upwards on account of growing industrial production and external demand.

Emerging Market and Developing Economies Group

For the emerging market and developing economies group, GDP growth stood at 4.1% in CY22, compared to 6.9% in CY21. This growth is further projected at 4.0% in CY23 and CY24. About 90% of the emerging economies are projected to make positive growth. While the remaining economies, including the low-income countries, are expected to progress slower.

Further, in **China**, growth is expected to pick up to 5.0% with the full reopening in CY23 and subsequently moderate in CY24 to 4.2%. The property market crisis and lower investment are key factors leading to this moderation. Whereas, **India** is projected to remain strong at 6.3% for both CY23 and CY24 backed by resilient domestic demands despite external headwinds.

The **Indonesian** economy is expected to register growth of 5% both in CY23 and CY24 with a strong recovery in domestic demands, a healthy export performance, policy measures, and normalization in commodity prices. In CY22, **Saudi Arabia** was the fastest-growing economy in this peer set with 8.7% growth. The growth is accredited to robust oil production, non-oil private investments encompassing wholesale and retail trade, construction and transport, and surging private consumption. Saudi Arabia is expected to grow at 0.8% and 4.0% in CY23 and CY24, respectively. On the other hand, **Brazil** is expected to project growth of 3.1% in CY23 driven by buoyant agriculture and resilient services in the first half of CY23.

Despite the turmoil in the last 2-3 years, India bears good tidings to become a USD 5 trillion economy by CY27. According to the IMF dataset on Gross Domestic Product (GDP) at current prices, the nominal GDP has been estimated to be at USD 3.4 trillion for CY22 and is projected to reach USD 5.2 trillion by CY27. India's expected GDP growth rate for coming years is almost double compared to the world economy.

Besides, India stands out as the fastest-growing economy among the major economies. The country is expected to grow at more than 6% in the period of CY24-CY28, outshining China's growth rate. By CY27, the Indian economy is estimated to emerge as the third-largest economy globally, hopping over Japan and Germany. Currently, it is the third-largest economy globally in terms of Purchasing Power Parity (PPP) with a ~7% share in the global economy, with China [~18%] on the top followed by the United States [~15%]. Purchasing Power Parity is an economic performance indicator denoting the relative price of an average basket of goods and services that a household needs for livelihood in each country.

Despite Covid-19's impact, high inflationary environment and interest rates globally, and the geopolitical tensions in Europe, India has been a major contributor to world economic growth. India is increasingly becoming an open economy as well through growing foreign trade. Despite the global inflation and uncertainties, Indian economy continues to show resilience. This resilience is mainly supported stable financial sector backed by well-capitalized banks and export of services in trade balance. With this, the growth of Indian economy is expected to fare better than other economies majorly on account of strong investment activity bolstered by the government's capex push and buoyant private consumption, particularly among higher income earners.

1.2 Indian Economic Outlook

1.2.1 GDP Growth and Outlook

Resilience to External Shocks remains Critical for Near-Term Outlook

India's real GDP grew by 9.1% in FY22 and stood at ~Rs. 149 trillion despite the pandemic and geopolitical Russia-Ukraine spillovers. In Q1FY23, India recorded 13.1% y-o-y growth in real GDP, largely attributed to improved performance by the agriculture and services sectors. Following this double-digit growth, Q2FY23 witnessed 6.2% y-o-y growth, while Q3FY23 registered 4.5% y-o-y growth. The slowdown during Q2FY23 and Q3FY23 compared to Q1FY23 can be attributed to the normalization of the base and a contraction in the manufacturing sector's output.

Subsequently, Q4FY23 registered broad-based improvement across sectors compared to Q3FY23 with a growth of 6.1% y-o-y. The investments, as announced in the Union Budget 2022-23 on boosting public infrastructure through enhanced capital expenditure, have augmented growth and encouraged private investment through large multiplier effects in FY23. Supported by fixed investment and higher net exports, real GDP for full-year FY23 was valued at Rs. ~160. trillion registering an increase of 7.2% y-o-y.

Furthermore, in Q1FY24, the economic growth accelerated to 7.8%. The manufacturing sector maintained an encouraging pace of growth, given the favorable demand conditions and lower input prices. The growth was supplemented by a supportive base alongside robust services and construction activities. This momentum was maintained in the Q2FY24 with GDP growth at 7.6%, mainly supported by acceleration in investments. However, private consumption growth was muted due to weak rural demand and some moderation in urban demand amid elevated inflationary pressures in Q2FY24. On the supply side, a significant improvement in manufacturing and construction activities supported growth. Overall, the economy expanded by 7.7% in H1FY24 compared to 5.3% in H2FY23. As per recent Ministry of Statistics and Programme Implementation (MoSPI)'s advanced estimate release, the real GDP growth for FY24 is pegged at 7.3% and will attain a level of ~ Rs. 171.79 trillion.

GDP Growth Outlook

- Driven by resilience in urban demand and the front loading of the government's capital expenditure, the H1FY24 witnessed a strong growth. While festive cheer will support urban demand in Q3, the outlook for rural demand revival remains clouded amid monsoon deficiency and likely hit to the agricultural production.
- The recent announcements of various relief measures such as LPG price reduction and extension of Pradhan Mantri Garib Kalyan Anna Yojna (PMGKAY) are expected to provide some cushion and so far, investment demand has remained robust. However, there could be some moderation in H2FY24 as both the government and private sector may restrain their capital spending ahead of the general elections. Despite some expected moderation in the H2FY24, India's overall GDP growth for FY24 is expected to remain on a firm footing. In terms of fiscal deficit for the year, the Finance Ministry has estimated it to be at 5.1% of GDP.

- Strong credit growth, resilient financial markets, and the government’s continual push for capital spending and infrastructure are likely to create a compatible environment for investments. In the Interim Budget 2024-25, significant emphasis is placed on infrastructure development with an increased capital expenditure outlay of Rs. 11,11,111 crores, amounting to 3.4% of the GDP.
- External demand is likely to remain subdued with a slowdown in global activities, thereby indicating adverse implications for exports. Additionally, heightened inflationary pressures and resultant policy tightening may pose a risk to the growth potential.

Prior to the Interim Budget, in December 2023, the RBI in its bi-monthly monetary policy meeting estimated a real GDP growth of 7% y-o-y for FY24 comparatively lower from MoSPI’s estimate.

Table 2: RBI’s GDP Growth Outlook (Y-o-Y %)

FY24P (Complete Year)	Q3FY24P	Q4FY24P	Q1FY25P	Q2FY25P	Q3FY25P
7.0%	6.5%	6.0%	6.7%	6.5%	6.4%

Note: P-Projected; Source: Reserve Bank of India

1.2.2 Gross Value Added (GVA)

Gross Value Added (GVA) is the measure of the value of goods and services produced in an economy. GVA gives a picture of the supply side whereas GDP represents consumption.

Industry and Services sector leading the recovery charge

- The gap between GDP and GVA growth turned positive in FY22 (after a gap of two years) due to robust tax collections. Of the three major sector heads, the service sector has been the fastest-growing sector in the last 5 years.
- The **agriculture sector** was holding growth momentum till FY18. In FY19, the acreage for the rabi crop was marginally lower than the previous year which affected the agricultural performance. Whereas FY20 witnessed growth on account of improved production. During the pandemic-impacted period of FY21, the agriculture sector was largely insulated as timely and proactive exemptions from COVID-induced lockdowns to the sector facilitated uninterrupted harvesting of rabi crops and sowing of kharif crops. However, supply chain disruptions impacted the flow of agricultural goods leading to high food inflation and adverse initial impact on some major agricultural exports. However, performance remained steady in FY22.

In FY23, the agriculture sector performed well despite weather-related disruptions, such as uneven monsoon and unseasonal rainfall, impacting yields of some major crops and clocked a growth of 4% y-o-y, garnering Rs. 22.3 trillion.

In Q1FY24, this sector expanded at a slower pace of 3.5% y-o-y growth compared to y-o-y growth a quarter ago. This further stumbled to 1.2% in Q2FY24. Overall, H1FY24 registered a 2.4% growth with weakest monsoon experience caused by El Nino conditions.

In the Interim Budget 2024-25, the government plans to boost private and public investment in post-harvest activities and expand the application of Nano-DAP across agro-climatic zones. Strategies for self-reliance in oilseeds and dairy development are to be formulated, alongside ramping up the Pradhan Mantri Matsya Sampada Yojana and establishing Integrated Aquaparks. Allocation for PM-Formalization of Micro Food Processing Enterprises scheme has increased from Rs. 639 in FY24 to Rs. 880 crores in FY25.

Going forward, rising bank credit to the sector and increased exports will be the drivers for the agriculture sector. However, a deficient rainfall may have impact on the reservoir level, weighing on prospects of Kharif sowing. Considering these factors, the agriculture sector is estimated to attain Rs. 22.7 trillion and mark 1.8% y-o-y growth for complete FY24.

- The **industrial sector** witnessed a CAGR of 4.7% for the period FY16 to FY19. From March 2020 onwards, the nationwide lockdown due to the pandemic significantly impacted industrial activities. In FY20 and FY21, this sector felt turbulence due to the pandemic and recorded a decline of 1.4% and 0.9%, respectively, on a y-o-y basis. With the opening up of the economy and resumption of industrial activities, it registered 11.6% y-o-y growth in FY22, albeit on a lower base.

The industrial output in FY23 grew by 4.4% with estimated value Rs. 45.2 trillion owing to a rebound in manufacturing activities and healthy growth in the construction sector.

The industrial sector grew by 5.5% in Q1FY24, while Q2FY24 growth was up by 13.2% owing to positive business optimism and strong growth in new orders supported manufacturing output. The industrial growth was mainly supported by sustained momentum in the manufacturing and construction sectors. Within manufacturing, industries such as pharma, motor vehicles, metals, petroleum and pharma witnessed higher production growth during the quarter. The construction sector (13% growth in Q2FY24) benefited from poor rainfall during August and September and higher implementation of infrastructure projects. This was reflected in robust cement and steel production and power demand in Q2FY24. Overall, H1FY24 picked up by 9.3% with manufacturing and construction activities witnessing significant acceleration.

India's industrial sector is experiencing strong growth, driven by significant expansion in manufacturing, mining, and construction. This growth is supported by positive business sentiment, declining commodity prices, beneficial government policies like production-linked incentive schemes, and efforts to boost infrastructure development. These factors collectively contribute to the sustained buoyancy in industrial growth due to which the industrial growth is estimated at 7.9% on y-o-y basis registering the value of Rs. 48.9 trillion in FY24.

- The **Services sector** recorded a CAGR of 7.1% for the period FY16 to FY20, which was led by trade, hotels, transport, communication, and services related to broadcasting, finance, real estate, and professional services. This sector was the hardest hit by the pandemic and registered an 8.2% y-o-y decline in FY21. The easing of restrictions aided a fast rebound in this sector, with 8.8% y-o-y growth witnessed in FY22.

Overall, in FY23, benefitting from the pent-up demand, the service sector was valued at Rs. 20.6 trillion and registered growth of 9.5% y-o-y.

In Q1FY24, the services sector growth jumped to 10.3%. Within services, there was a broad-based improvement in growth across different sub-sectors. However, the sharpest jump was seen in financial, real estate, and professional services. Trade, hotels, and transport sub-sectors expanded at a healthy pace gaining from strength in discretionary demand. The service sector growth in Q2FY24 moderated to 5.8% partly due to the normalization of base effect and some possible dilution in discretionary demand. Considering these factors, service sector marked 8% growth in H1FY24.

With this performance, steady growth in various service sector indicators like air passenger traffic, port cargo traffic, GST collections, and retail credit are expected to support the services sector. With this, the growth of service sector is estimated at Rs. 86.2 trillion registering 7.7% growth in FY24 overall.

Table 3: Sectoral Growth (Y-o-Y % Growth) - at Constant Prices

At Constant Prices	FY19	FY20	FY21	FY22 (FRE)	FY23 (PE)	FY24 (FAE)
Agriculture, Forestry & Fishing	2.1	6.2	4.1	3.5	4.0	1.8
Industry	5.3	-1.4	-0.9	11.6	4.4	7.9
Mining & Quarrying	-0.9	-3.0	-8.6	7.1	4.6	8.1
Manufacturing	5.4	-3.0	2.9	11.1	1.3	6.5
Electricity, Gas, Water Supply & Other Utility Services	7.9	2.3	-4.3	9.9	9.0	8.3

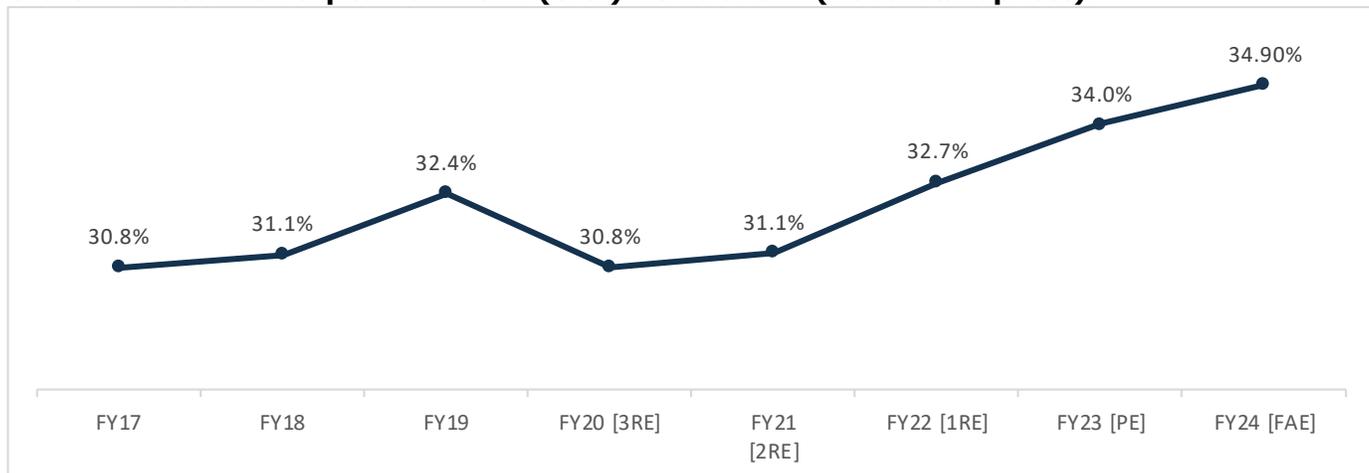
Construction	6.5	1.6	-5.7	14.8	10.0	10.7
Services	7.2	6.4	-8.2	8.8	9.5	7.7
Trade, Hotels, Transport, Communication & Broadcasting	7.2	6.0	-19.7	13.8	14.0	6.3
Financial, Real Estate & Professional Services	7.0	6.8	2.1	4.7	7.2	8.9
Public Administration, Defence and Other Services	7.5	6.6	-7.6	9.7	7.2	7.7
GVA at Basic Price	5.8	3.9	-4.2	8.8	7.0	6.9

Note: FRE – First Revised Estimates, PE – Provisional Estimate, FAE – First Advance Estimate; Source: MOSPI

1.2.3 Investment Trend in Infrastructure

Gross Fixed Capital Formation (GFCF), which is a measure of the net increase in physical assets, witnessed an improvement in FY22. As a proportion of GDP, it is estimated to be at 32.7%, which is the second-highest level in 7 years (since FY15). In FY23, the ratio of investment (GFCF) to GDP climbed up to its highest in the last decade at 34%. Continuing in its growth trend, this ratio is expected to reach 34.9% in FY24.

Chart 2: Gross Fixed Capital Formation (GFCF) as % of GDP (At constant prices):



Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate, FAE-First Advance Estimate; Source: MOSPI

Overall, the support of public investment in infrastructure is likely to gain traction due to initiatives such as Atmanirbhar Bharat, Make in India, and Production-linked Incentive (PLI) scheme announced across various sectors.

1.2.4 Industrial Growth

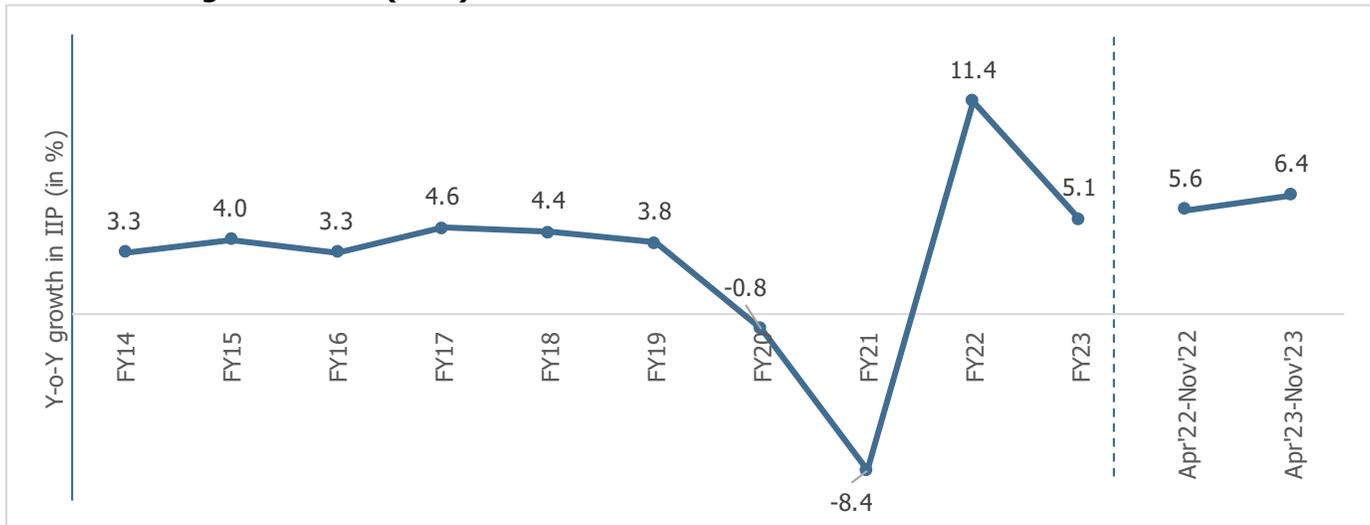
Improved Core and Capital Goods Sectors helped IIP Growth Momentum

The Index of Industrial Production (IIP) is an index to track manufacturing activity in an economy. On a cumulative basis, IIP grew by 11.4% y-o-y in FY22 post declining by 0.8% y-o-y and 8.4% y-o-y, respectively, in FY20 and FY21. This high growth was mainly backed by a low base of FY21. FY22 IIP was higher by 2.0% when compared with the pre-pandemic level of FY20, indicating that while economic recovery was underway, it was still at very nascent stages.

During FY23, the industrial output recorded a growth of 5.1% y-o-y supported by a favorable base and a rebound in economic activities. The period April 2023 – November 2023, industrial output grew by 6.4% compared to the 5.6% growth in the corresponding period last year. For the month of November 2023, the IIP growth slowed down to 2.4% compared to the last year primarily on account of a normalization of base.

So far in the current fiscal, while the infrastructure-related sectors have been doing well, slowing global growth and downside risks to rural demand have posed a challenge for industrial activity. Though the continued moderation in inflationary pressure offers some comfort, pain points in the form of elevated prices of select food items continue to persist.

Chart 3: Y-o-Y growth in IIP (in %)



Source: MOSPI

1.2.5 Consumer Price Index

India’s consumer price index (CPI), which tracks retail price inflation, stood at an average of 5.5% in FY22 which was within RBI’s targeted tolerance band of 6%. However, consumer inflation started to upswing from October 2021 onwards and reached a tolerance level of 6% in January 2022. Following this, CPI reached 6.9% in March 2022.

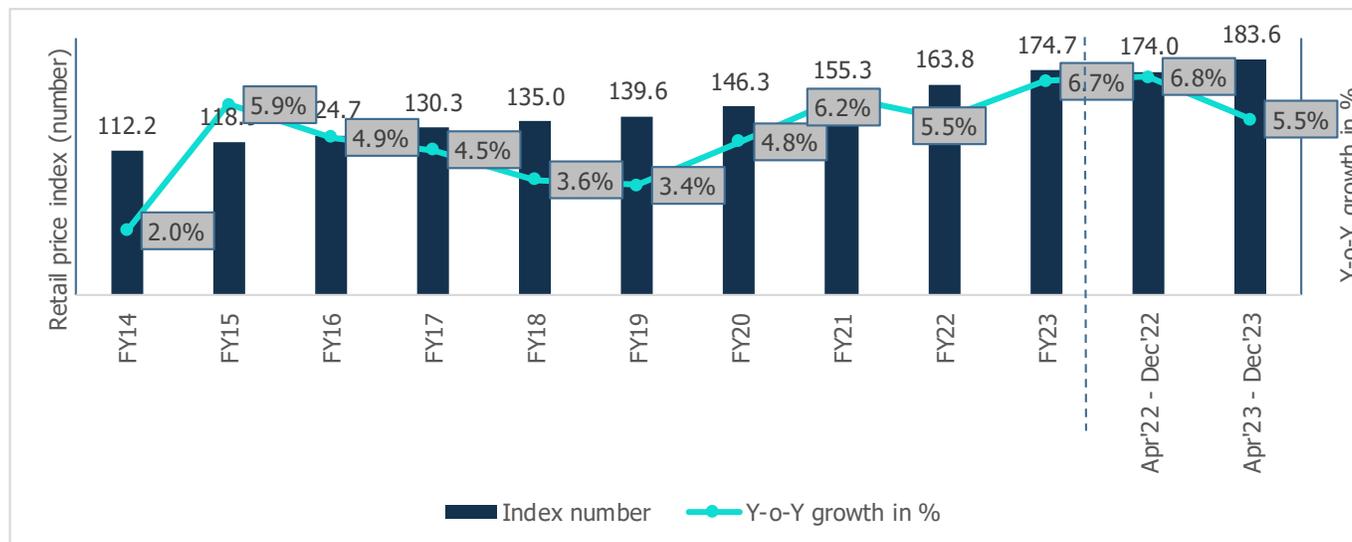
CPI remained elevated at an average of 6.7% in FY23, above the RBI’s tolerance level. However, there was some respite toward the end of the fiscal wherein the retail inflation stood at 5.7% in March 2023, tracing back to the RBI’s tolerance band. Apart from a favorable base effect, the relief in retail inflation came from a moderation in food inflation.

In the current fiscal FY24, the CPI moderated for two consecutive months to 4.7% in April 2023 and 4.3% in May 2023. This trend snapped in June 2023 with CPI rising to 4.9%. In July 2023, the CPI had reached the RBI’s target range for the first time since February 2023 at 7.4% largely due to increased food inflation. This marked the highest reading observed since the peak in April 2022 at 7.8%. The notable surge in vegetable prices and elevated inflation in other food categories such as cereals, pulses, spices, and milk have driven this increase. Further, the contribution of food and beverage to the overall inflation had risen significantly to 65%, surpassing their weight in the CPI basket. In August 2023, the food inflation witnessed some moderation owing to government’s active intervention. This was further moderated for second consecutive month in September 2023 to 5%, led by a sharp correction in vegetables prices and lower LPG prices. Helped by deflation in the fuel and light category, the retail inflation in October 2023 softened at 4.9%. This trend reversed in November 2023 due to spike in certain vegetable prices as well as sticky inflation in non-perishable food items such as cereals, pulses and spices and the CPI rose to 5.6%. In the month of December 2023, elevated food prices and an unfavourable base drove headline inflation to a four-month peak of 5.7%.

While the consistent decrease in core inflation due to falling commodity prices and diminishing demand-side pressures is encouraging, the ongoing high food inflation, potentially exacerbated by a projected drop in Kharif production and

uncertainties around Rabi sowing, remains worrisome. Despite these concerns, the favourable base effect throughout Q4FY24 and the expected easing of food price pressures with the arrival of fresh crops from January to March could help mitigate inflation risks.

Chart 4: Retail Price Inflation in terms of index and Y-o-Y Growth in % (Base: 2011-12=100)

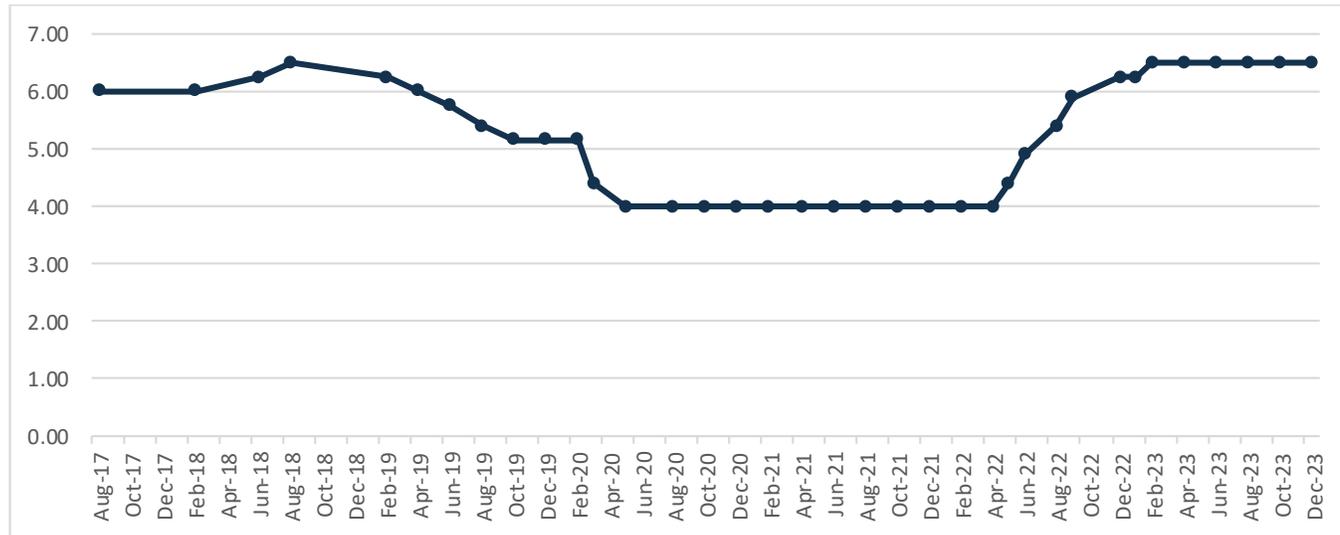


Source: MOSPI

The CPI is primarily factored in by RBI while preparing their bi-monthly monetary policy. At the bi-monthly meeting held in December 2023, RBI projected inflation at 5.4% for FY24 with inflation during Q3FY24 at 5.6%, Q4FY24 at 5.2% Q1FY25 at 5.2% , Q2FY24 at 6.5% and Q3FY24 at 6.4%.

The RBI has increased the repo rates with the rise in inflation in the past year from 4% in April 2022 to 6.5% in January 2023. Considering the current inflation situation, RBI has kept the repo rate unchanged at 6.5% in the last five meetings of the Monetary Policy Committee.

Chart 5: RBI historical Repo Rate



Source: RBI

In a meeting held in December 2023, RBI also maintained the liquidity adjustment facility (LAF) corridor by adjusting the standing deposit facility (SDF) rate of 6.25% as the floor and the marginal standing facility (MSF) at the upper end of the band at 6.75%.

Further, the central bank continued to remain focused on the withdrawal of its accommodative stance. With domestic economic activities gaining traction, RBI has shifted gears to prioritize controlling inflation. While RBI has paused on the policy rate front, it has also strongly reiterated its commitment to bringing down inflation close to its medium-term target of 4%. Given the uncertain global environment and lingering risks to inflation, the Central Bank has kept the window open for further monetary policy tightening in the future, if required.

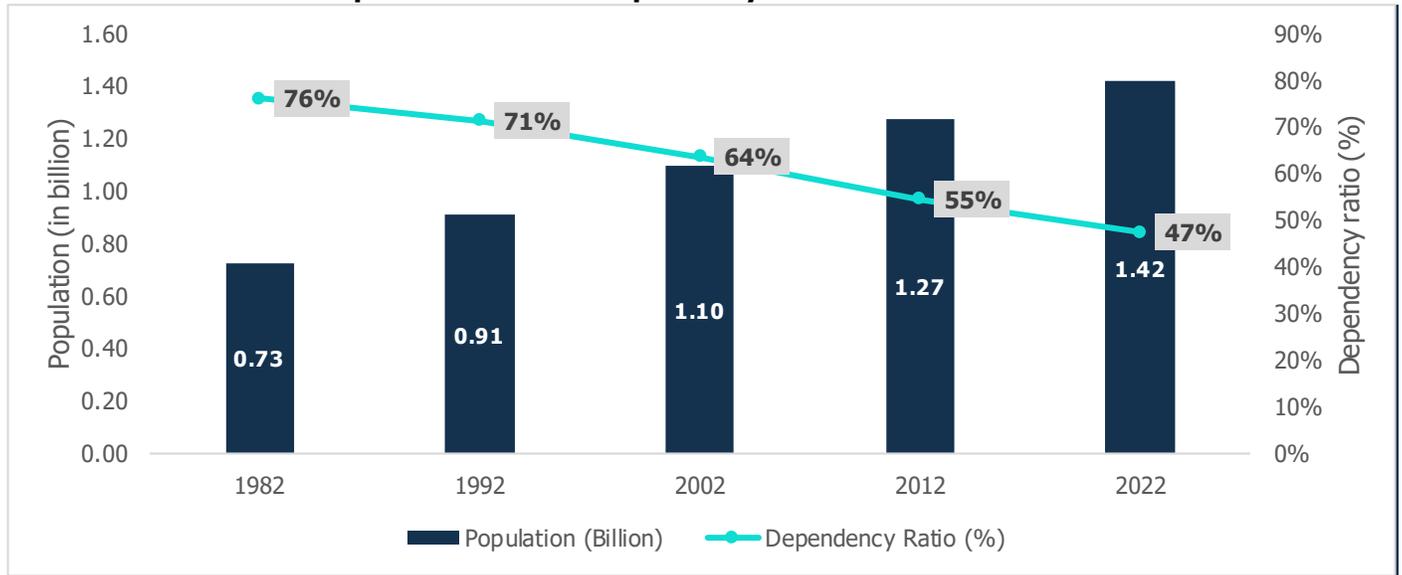
1.2.6 Overview on Key Demographic Parameters

- **Population growth and Urbanization**

The trajectory of economic growth of India and private consumption is driven by socio-economic factors such as demographics and urbanization. According to the world bank, India’s population in 2022 surpassed 1.42 billion slightly higher than China’s population 1.41 billion and became the most populous country in the world.

Age Dependency Ratio is the ratio of dependents to the working age population, i.e., 15 to 64 years, wherein dependents are population younger than 15 and older than 64. This ratio has been on a declining trend. It was as high as 76% in 1982, which has reduced to 47% in 2022. Declining dependency means the country has an improving share of working-age population generating income, which is a good sign for the economy.

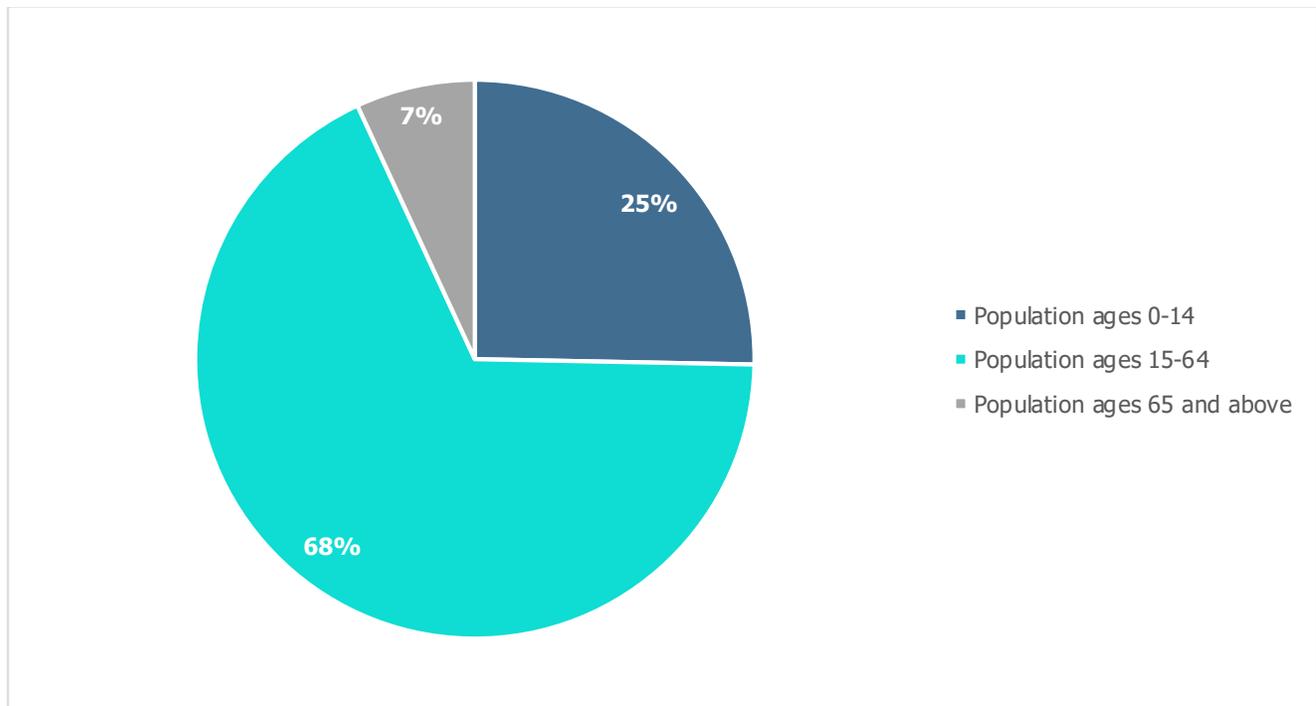
Chart 6: Trend of India Population vis-à-vis dependency ratio



Source: World Bank Database

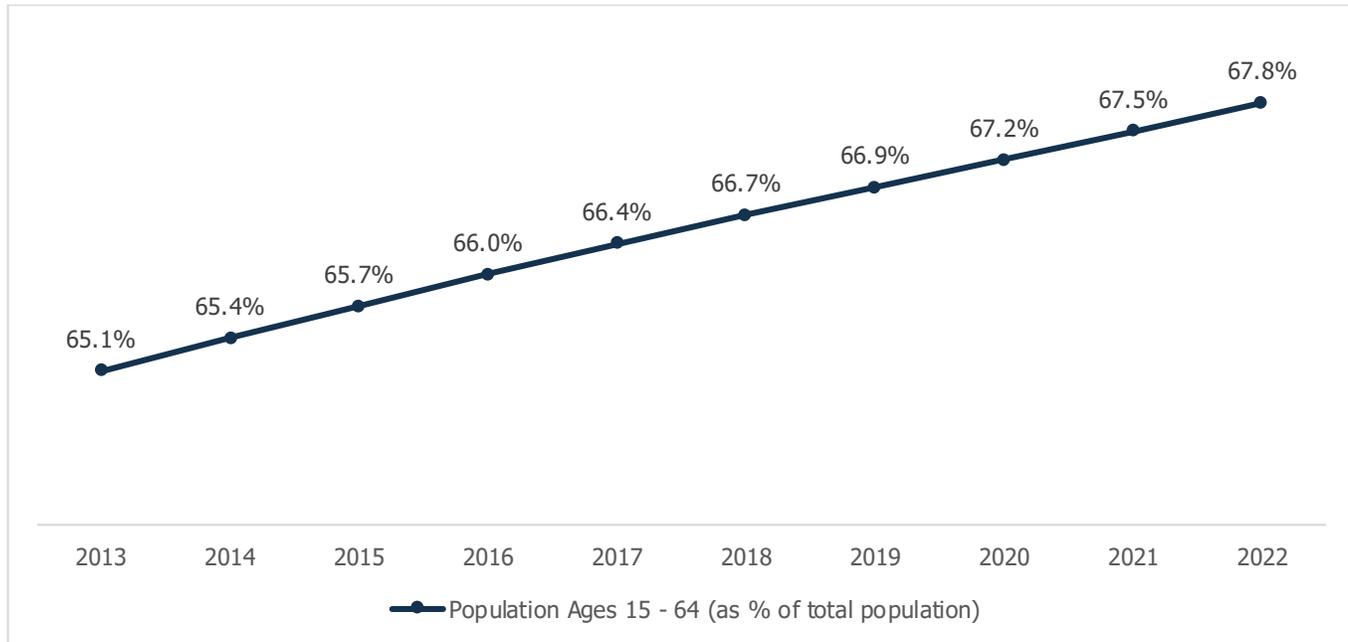
With an average age of 29, India has one of the youngest populations globally. With vast resources of young citizens entering the workforce every year, it is expected to create a 'demographic dividend'. India is home to a fifth of the world's youth demographic and this population advantage will play a critical role in economic growth.

Chart 7: Age-Wise Break Up of Indian population



Source: World Bank Database

Chart 8: Yearly Trend - Young Population as % of Total Population

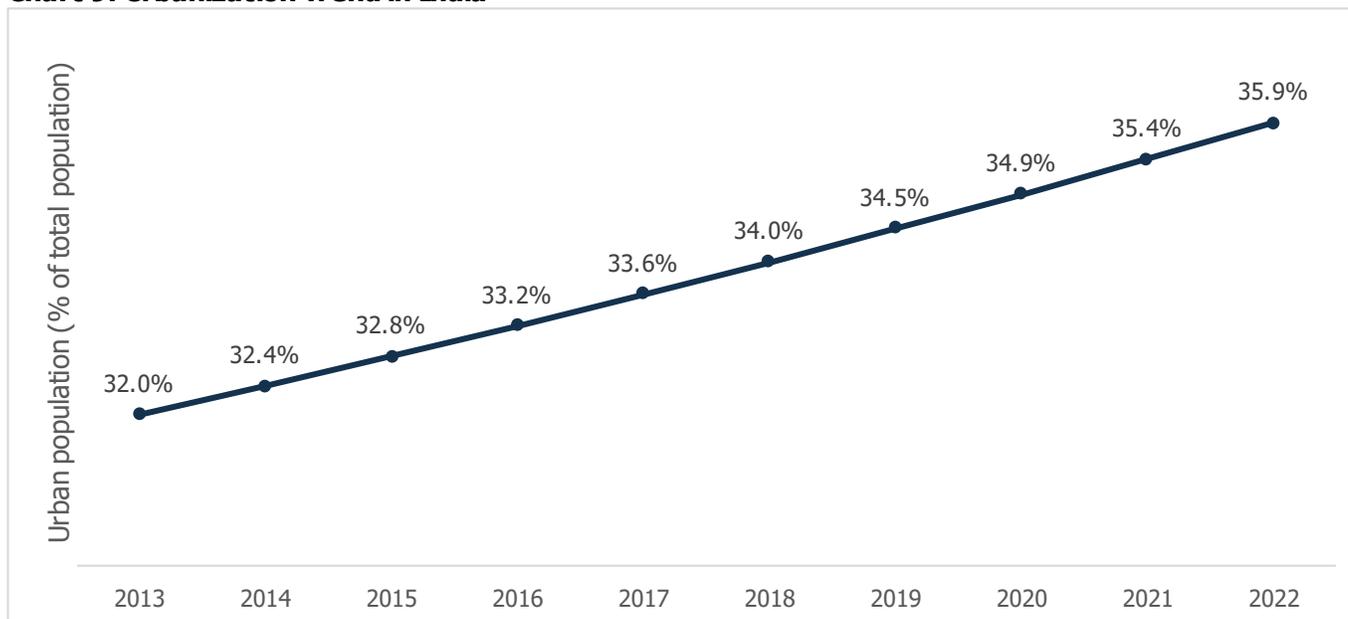


Source: World Bank database

- Urbanization**

The urban population is significantly growing in India. The urban population in India is estimated to have increased from 403 million (31.6% of total population) in 2012 to 508 million (35.9% of total population) in the year 2022. People living in Tier-2 and Tier-3 cities have greater purchasing power.

Chart 9: Urbanization Trend in India



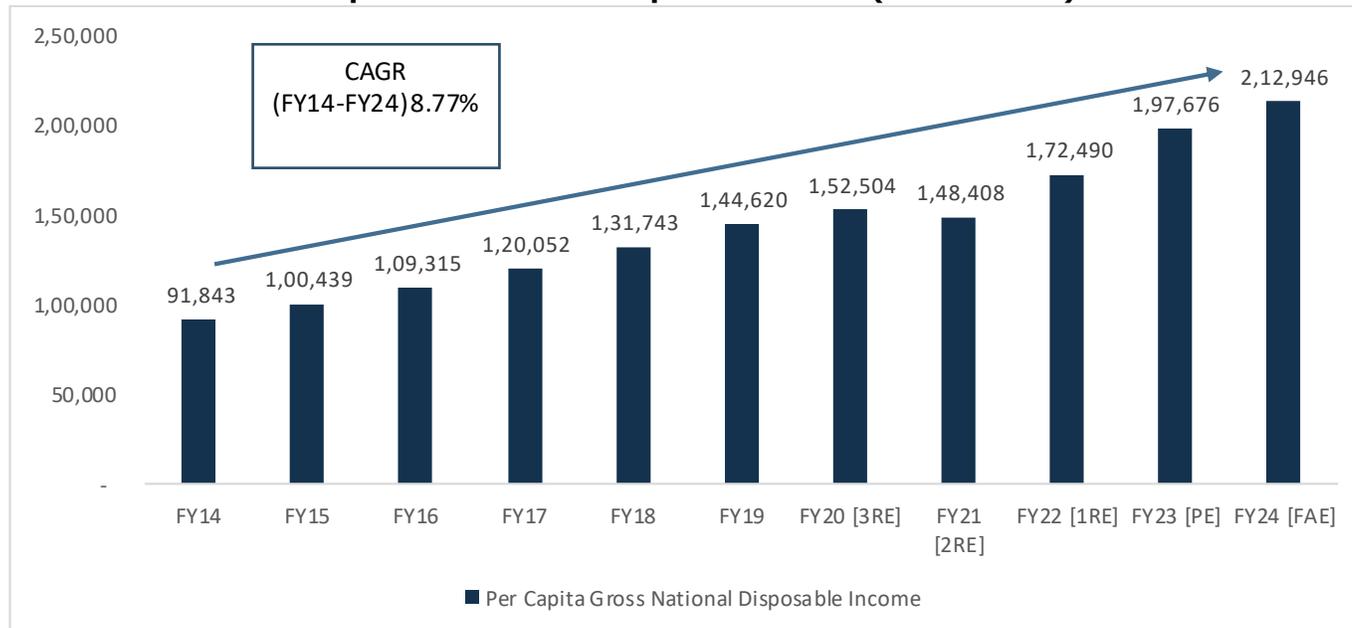
Source: World Bank Database

Increasing Per Capita Disposable Income

Gross National Disposable Income (GNDI) is a measure of the income available to the nation for final consumption and gross savings. Between the period FY14 to FY24, per capita GNDI at current prices registered a CAGR of 8.77%. More disposable income drives more consumption, thereby driving economic growth.

The chart below depicts the trend of per capita GNDI in the past decade:

Chart 10: Trend of Per Capita Gross National Disposable Income (Current Price)

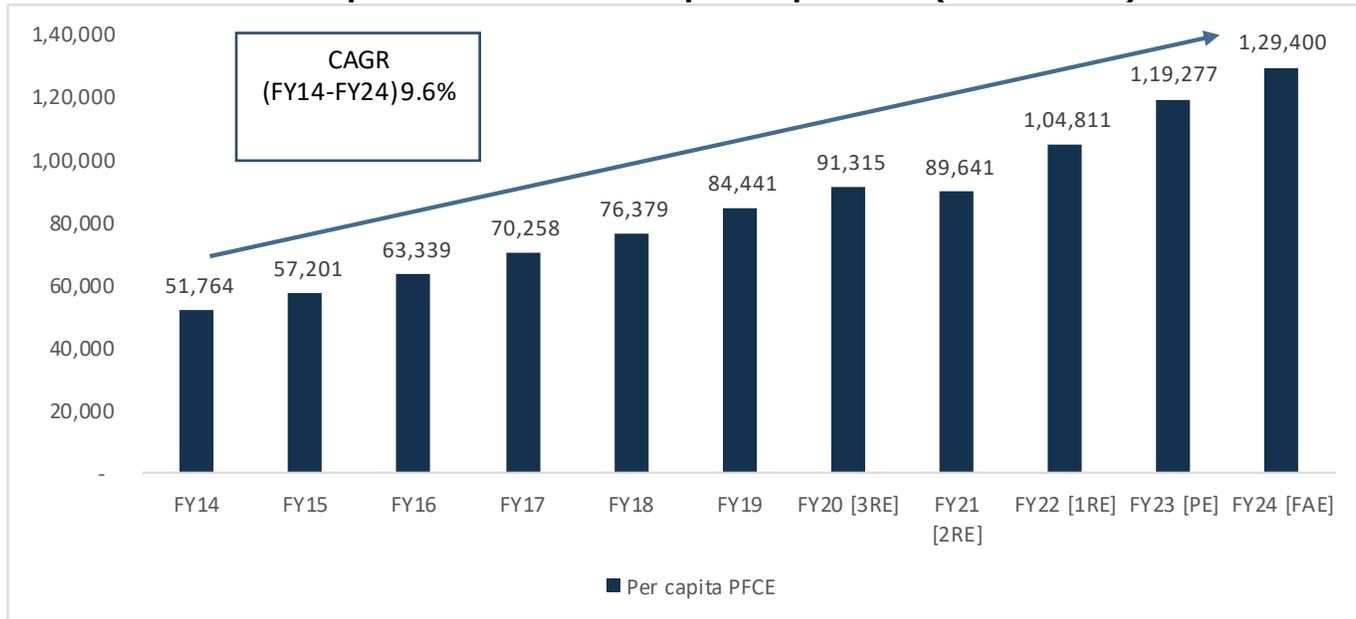


Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate; Source: MOSPI

Increase in Consumer Spending

With increase in disposable income, there has been a gradual change in consumer spending behaviour as well. Private Final Consumption Expenditure (PFCE) which is measure of consumer spending has also showcased significant growth in the past decade at a CAGR of 9.6%. Following chart depicts the trend of per capita PFCE at current prices:

Chart 11: Trend of Per Capita Private Final Consumption Expenditure (Current Price)



Source: MOSPI

1.2.7 Concluding Remarks

The major headwinds to global economic growth are escalating geopolitical tensions, volatile global commodity prices, and a shortage of key inputs. Despite the global economic growth uncertainties, the Indian economy is relatively better placed in terms of GDP growth compared to other emerging economies. According to IMF’s forecast, it is expected to 6.3% in CY24 compared to the world GDP growth projection of 3%. The bright spots for the economy are continued healthy domestic demand, support from the government towards capital expenditure, moderating inflation, and improving business confidence.

Likewise, several high-frequency growth indicators including the purchasing managers index, auto sales, bank credit, and GST collections have shown improvement in FY23. Moreover, normalizing the employment situation after the opening up of the economy is expected to improve and provide support to consumption expenditure.

Further, as per the Indian Meteorological Department (IMD), the rainfall witnessed a deficit until September 2023. A drop-in yield due to irregular monsoons and a lower acreage can lead to a demand-supply mismatch, further increasing the inflationary pressures on the food basket. Moreover, the consumption demand is expected to pick up in Q3FY24 due to the festive season. Going forward, the rising domestic demand will be driven by the rural economy’s performance and continual growth in urban consumption. However, high domestic inflation and global headwinds pose a downside risk to domestic demand.

At the same time, public investment is expected to exhibit healthy growth as the government has allocated a strong capital expenditure of about Rs. 10 lakh crores for FY24. The private sector’s intent to invest is also showing improvement as per the data announced on new project investments. However, volatile commodity prices and economic uncertainties emanating from global turbulence may slow down the improvement in private CapEx and investment cycle.

2 Indian Telecom Sector

2.1 Overview of the Indian Telecom Sector

The telecommunications sector plays an important role in the Indian economy as it contributes to the economic growth and GDP, and generates revenue for the government. There has been growth in the last few years in the telecom sector on the back of strong consumer demand and supportive policies by the government. For instance, the services of the telecom sector are available to consumers at an affordable rate due to fair competition and a proactive regulatory framework by the government.

India currently has the world’s second largest subscriber base of 1.18 billion second to China. India jumped 7 ranks from 67 in 2021 to 60 in 2023 in the Network Readiness Index, an index published by Portulans Institute, an independent non-profit research and educational institute based in Washington DC which maps the network readiness landscape of 131 economies based on their performance in four areas - Technology, People, Governance, and Impact.

Furthermore, there has been augmented growth in the last few years because of affordable tariffs, higher penetration, roll-out of Mobile Number Portability (MNP), expansion of 4G and 5G coverage, evolving consumption patterns of subscribers, Government’s initiatives towards supporting India’s domestic telecom infrastructure, and favourable regulatory environment.

India is divided into four circles categories where telecom services are provided that are-

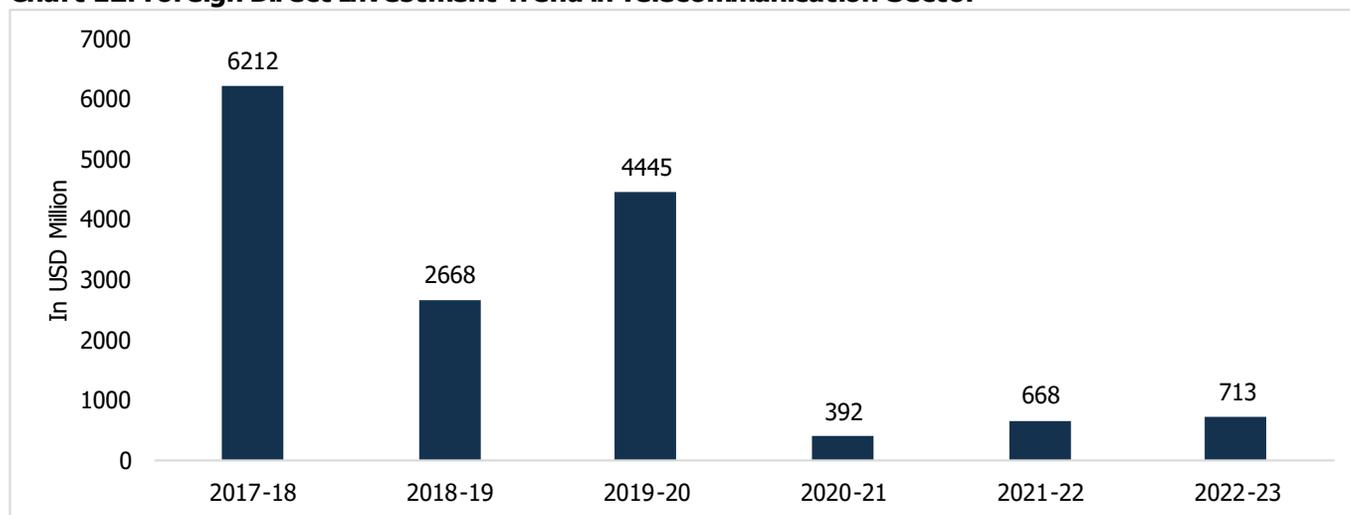
Metro	Circle A	Circle B	Circle C
<ul style="list-style-type: none"> •Delhi •Mumbai •Kolkata 	<ul style="list-style-type: none"> •Andhra Pradesh •Gujarat •Karnataka •Maharashtra •Tamil Nadu (including Chennai) •Telangana 	<ul style="list-style-type: none"> •Haryana •Kerela •Madhya Pradesh •Punjab •Rajasthan •West Bengal •Uttar Pradesh (East & West) •Uttrakhand 	<ul style="list-style-type: none"> •Assam •Bihar •Himachal Pradesh •Jammu & Kashmir •North East •Odisha

2.2 FDI Inflow

India has a liberalized FDI policy for the telecom sector, allowing foreign investors to hold up to 100% equity in telecom companies under the automatic route in most segments. This policy has encouraged foreign investment and participation in the Indian telecom industry. The Indian telecom sector has witnessed significant consolidation and mergers in recent years, leading to increased FDI inflows. Mergers and acquisitions involving major telecom operators have attracted substantial investments from foreign entities seeking to gain market share and scale in India. Foreign companies are partnering with Indian telecom operators to upgrade network infrastructure and roll out advanced telecommunications services.

The FDI-equity flow in the telecommunication sector during 2022-23 was around USD 713 million compared to USD 668 million during 2021-22.

Chart 12: Foreign Direct Investment Trend in Telecommunication Sector



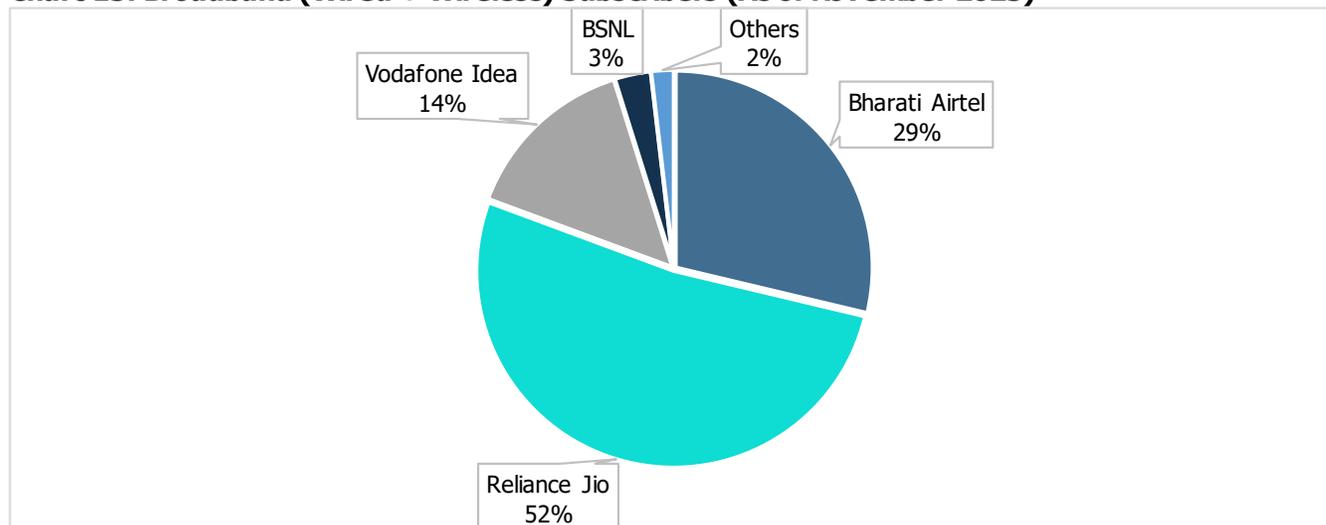
Source: Department for Promotion of Industry and Internal Trade

2.3 Broadband Subscriber

The telecom industry is oligopolistic with three large private sector players dominating the market Reliance Jio Infocomm Ltd, followed by Bharti Airtel and Vodafone-Idea with a collective market share of around 95% in broadband, 59% in wireline, and 91% in wireless telephone subscribers. The broadband subscribers base increased from 825.38 million in November 2022 to 896.61 million in November 2023, i.e., an increase of 9% y-o-y basis. The increase in subscriber base is due to the increased affordability of 4G and 5G services over the past year and the surging demand for wireline broadband services used in smart televisions and work-from-home trends.

The broadband market is dominated by Reliance Jio with 52% of the total market size followed by Bharati Airtel and Vodafone Idea. As of November 2023, the total broadband subscribers for Reliance Jio stands at 465.97 million, Bharati Airtel has 262.35 million, Vodafone Idea has 126.63 million, and BSNL has 24.65 million subscriber base.

Chart 13: Broadband (Wired + Wireless) Subscribers (As of November 2023)



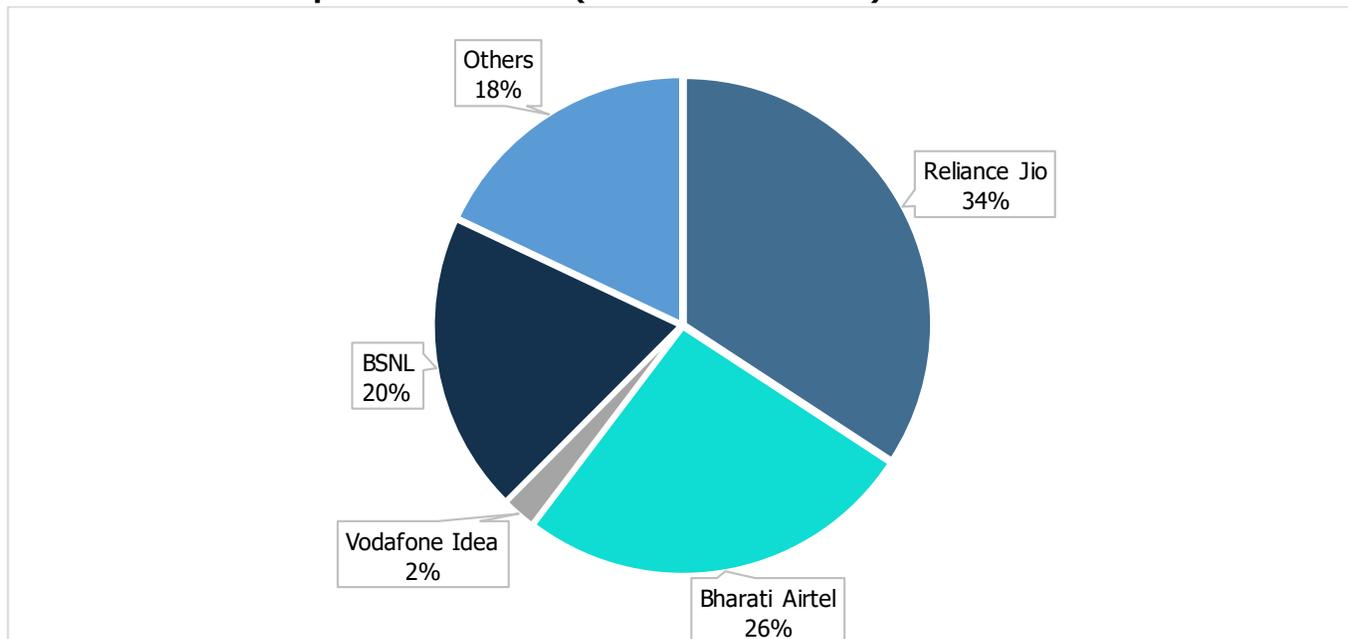
Source: TRAI, CareEdge Research

2.4 Wireline Telephone Subscriber

Wireline subscribers increased from 27.13 million in November 2022 to 31.57 million in November 2023, i.e., an increase of 16% y-o-y. The overall wireline teledensity in India has increased to 2.26% in November 2023 from 1.96% in November 2022. The urban wireline tele density is at 5.84% and rural tele density is at 0.3% as of November 2023. The increasing numbers are attributed to telcos reaching more areas of the country and more demand for stable connections.

The wireline subscriber market is dominated by Reliance Jio with a market share of 34% followed by Bharati Airtel and BSNL. The number of subscribers increased by 4% for Reliance Jio while the number of subscribers decreased by 6% for BSNL.

Chart 14: Wireline Telephone Subscribers (as of November 2023)



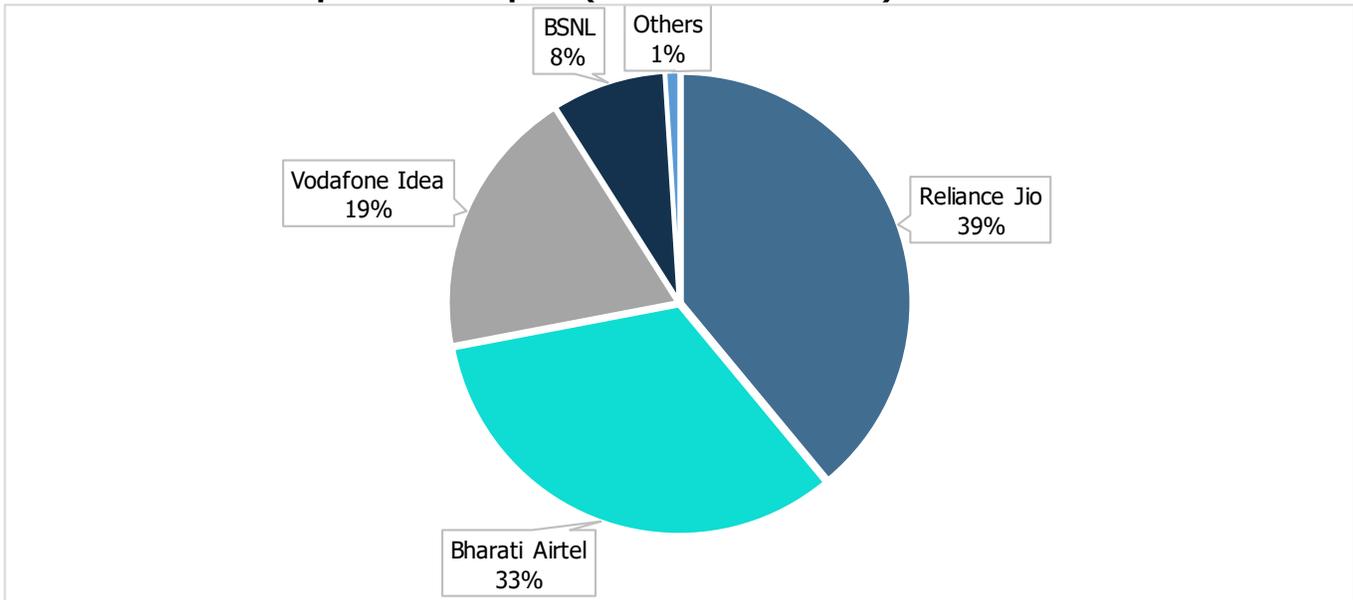
Source: TRAI, CareEdge Research

2.5 Wireless Telephone Subscription

The total wireless subscribers stood at 1,154.17 million in November 2023 as compared to 1,143.04 million in November 2022, i.e., an increase of 11 million subscribers. The urban subscriber base stood at 630.72 million in urban areas and 523.45 million in rural areas at the end of November 2023. The teledensity in the wireless segment stands at 83% in total and 128% in urban followed by 58% in rural areas in November 2023. The increase is mainly accredited to the growth of the 5G subscriber base, affordable service plans, and increasing availability & affordability of 5G smartphones.

As of November 2023, the private access service providers hold 92% of the total market with Reliance Jio consisting of the major market share of 40% followed by Bharati Airtel and Vodafone Idea. The PSU service access providers consist only 8% of the total market with BSNL holding 8% of the total market.

Chart 15: Wireless Telephone Subscription (As of November 2023)



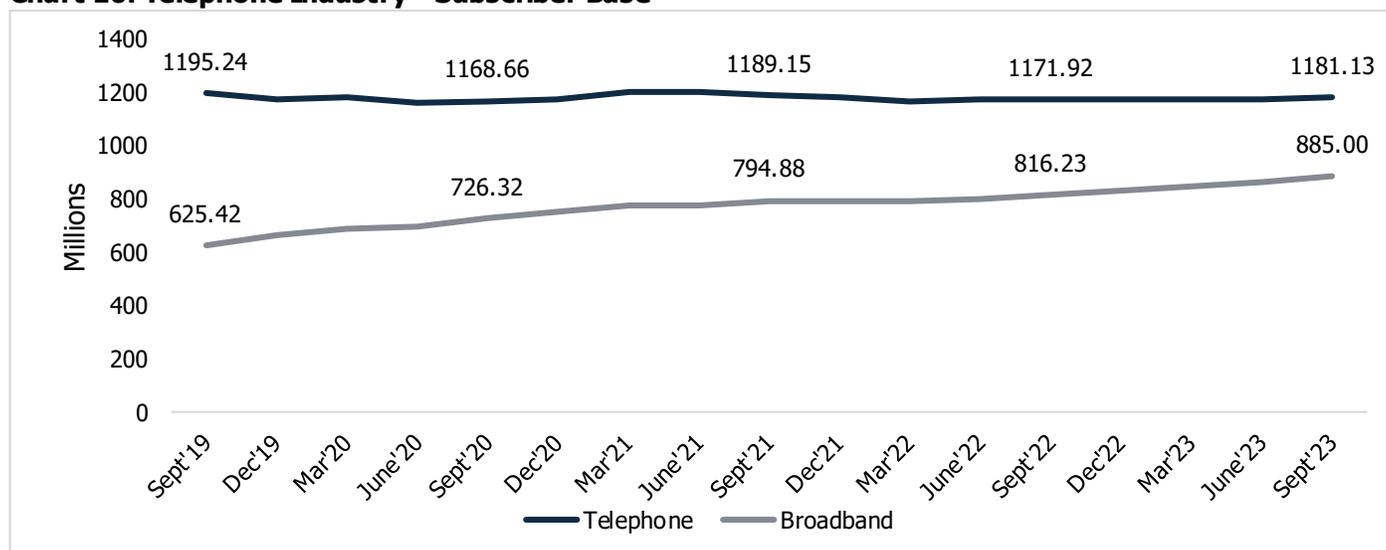
Source: TRAI, CareEdge Research

3 Performance Indicators in the Telecom Sector

3.1 Telephone and broadband Subscriber Base

The broadband subscriber base grew by 9.1% from 625.42 million in September 2019 to 855 million in September 2023, whereas the telephone subscriber base declined marginally to 1,181.13 million in September 2023 from 1,195.24 million in September 2019. The decline is primarily because of the minimum recharge requirement² which led to the passive users surrendering connections. The number of telephone users was also affected by the consolidation of market and pricing interventions.

Chart 16: Telephone Industry - Subscriber Base

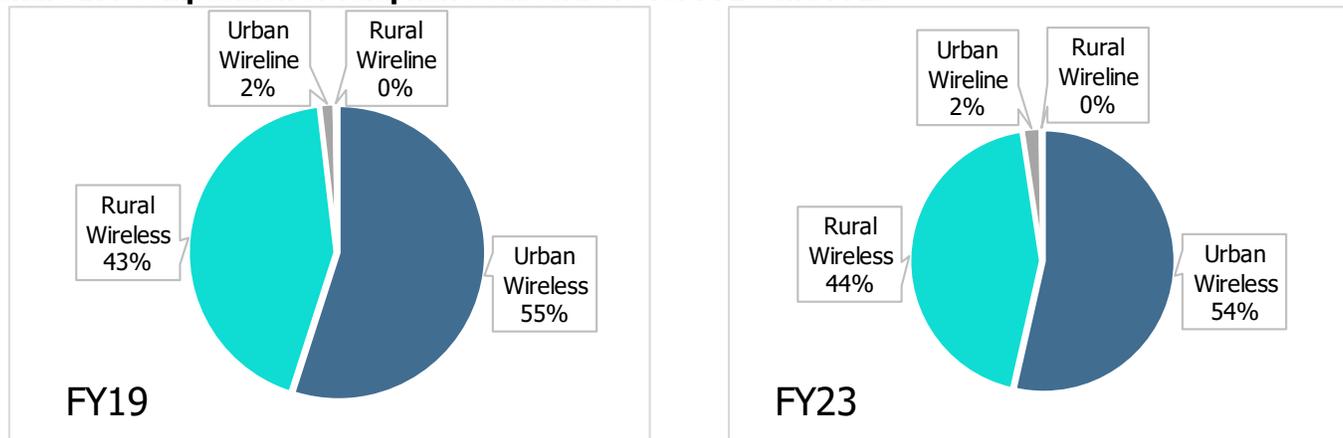


Source: TRAI, CareEdge Research

Out of the total telephone subscriptions, the share of rural telephone subscriptions increased from 43% in FY19 to 44% in FY23. However, the share of urban telephone subscriptions in total telephone subscriptions decreased from 55% in FY19 to 54% in FY23.

² Minimum recharge requirement every month to keep the phone number active.

Chart 17: Composition of Telephone Subscribers for FY19 and FY23



Source: TRAI, CareEdge Research

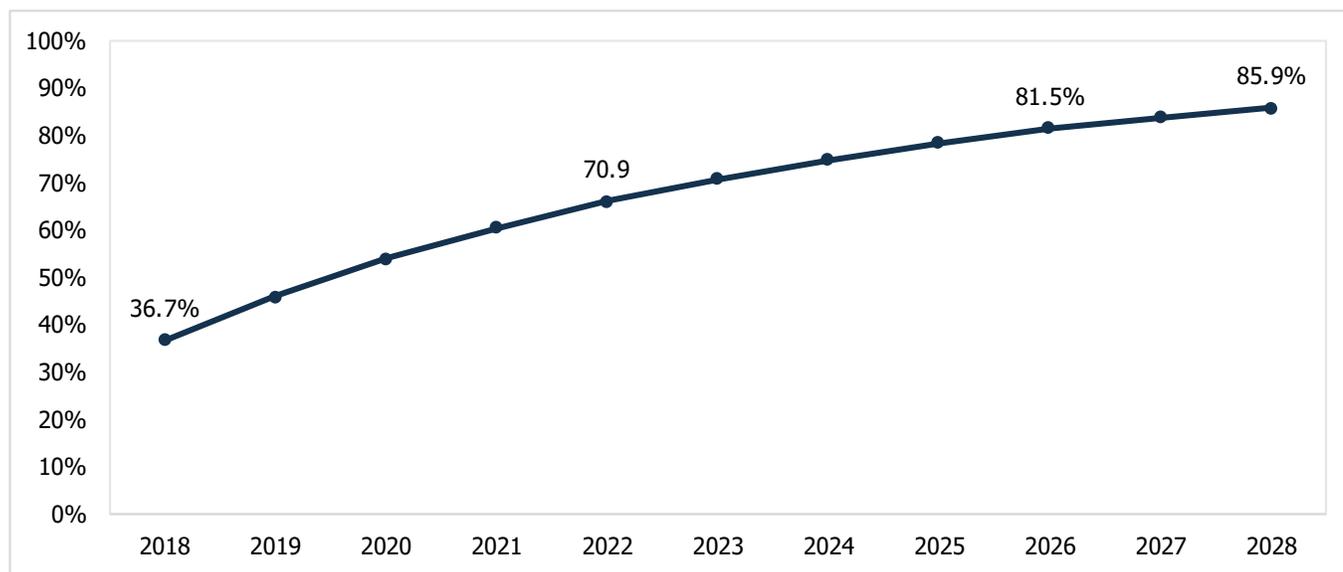
3.2 Internet Penetration

The Indian economy is rapidly inching toward a digital economy, supplemented by internet penetration. For instance, the internet penetration has risen from 36.7% in 2018 to 70.9% in 2023 and is expected to rise to 85.9% by 2028. India has witnessed significant growth in the number of internet users over the years. With a large population and rising smartphone penetration, millions of new users are coming online every month, contributing to the expansion of internet penetration. Whereas affordable smartphones and low-cost data plans have made internet access more accessible to a broader segment of the population, including those in rural areas.

Further, government-led initiatives such as Digital India have played a crucial role in promoting internet adoption and digital literacy across the country. For instance, initiatives such as BharatNet, which aims to connect rural areas with high-speed broadband, are helping to extend internet access to remote parts of the country. Similarly, projects focused on expanding broadband connectivity, setting up public Wi-Fi hotspots, and providing digital skills training have contributed to increased internet penetration. Besides, efforts to improve internet connectivity in rural areas have been ongoing, aiming to bridge the digital divide between urban and rural regions.

Accordingly, the growth of e-commerce platforms, digital payment services, online entertainment, and social media have contributed to increased internet usage in India. Consumers are increasingly turning to the internet for shopping, banking, entertainment, and social networking, driving up overall internet penetration.

Chart 18: Internet Penetration (In %)



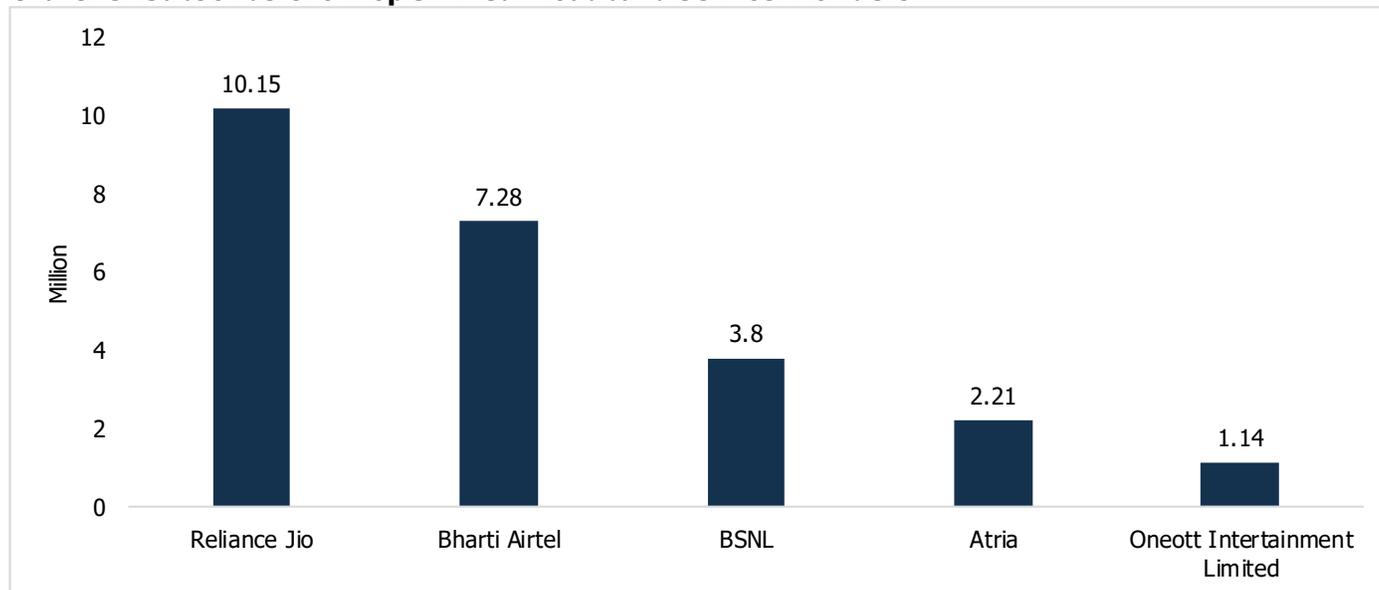
Source: Maia Research, CareEdge Research

3.3 Subscribers Base for Top 5 Broadband Service Providers

The telecom sector is majorly driven by private access service providers who constitute about 98% of the total subscriber base. As of November 2023, Reliance Jio was the largest wired broadband service provider with 10.15 million subscribers followed by Bharti Airtel with 7.28 million subscribers and BSNL with 3.8 million subscribers.

The increased subscribers were attributed to additions in Reliance Jio and Bharati Airtel subscriber base. The adoption of JioBharat phones and Jio AirFiber has led to increased numbers for Reliance Jio while enhancing rural coverage has led to growth in the Airtel subscriber base.

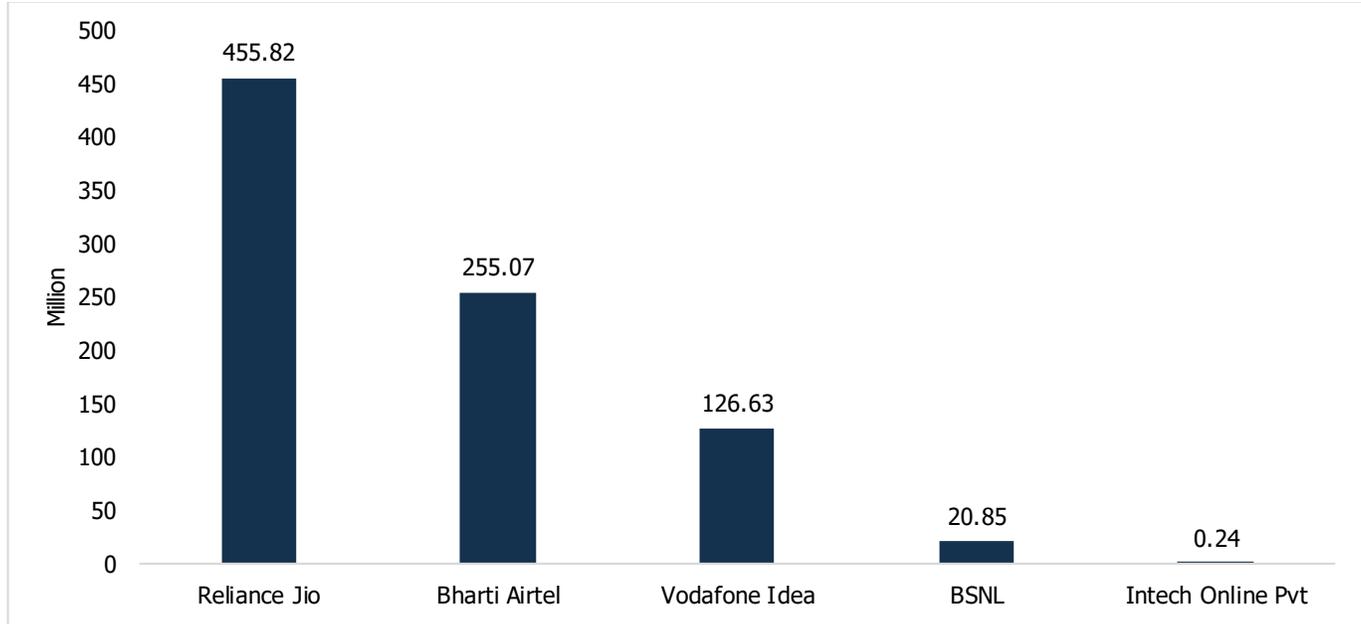
Chart 19: Subscribers for Top 5 Wired Broadband Service Providers



Source: TRAI, CareEdge Research

As of November 2023, Reliance Jio was the largest wireless broadband service provider with 455.82 million subscribers followed by Bharti Airtel with 255.07 million subscribers and Vodafone Idea with 126.63 million subscribers.

Chart 20: Subscribers for Top 5 Wireless Broadband Service Provider



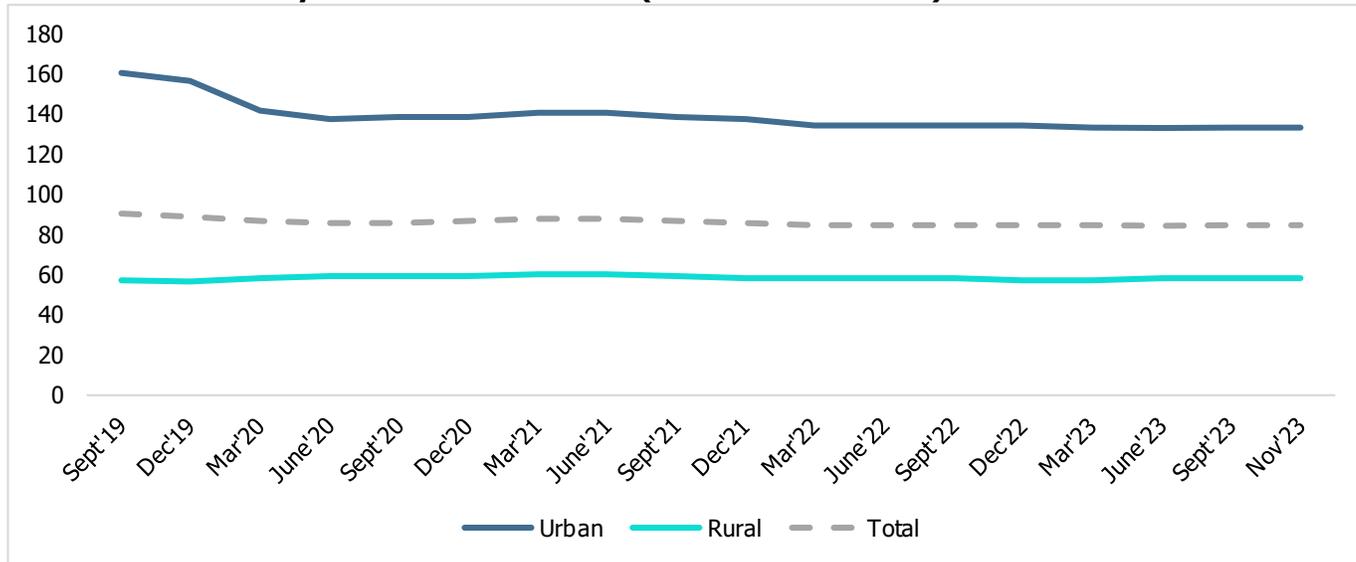
Source: TRAI, CareEdge Research

3.4 Tele-Density

Tele-density denotes the number of telephones per 100 people. It is an important indicator of telecom penetration. India has witnessed significant growth in tele-density over the years, driven by population growth, urbanization, economic development, and government policies promoting telecommunications expansion. Mobile telephony has been the primary driver of tele-density growth in India.

Tele-density levels vary between urban and rural areas, with higher levels observed in urban centres compared to rural regions. Efforts to improve rural connectivity and expand telecom infrastructure in remote areas have helped narrow the rural-urban tele-density gap over time. The tele-density (wireless and wireline) stood at 58.4% in rural areas and 133.36% in urban areas in November 2023. The overall tele-density increased marginally to 84.97% in November 2023 from 84.61% in November 2022 after a slump because of mobile number portability and a reversal in dual SIM-led growth in the past years.

Chart 21: Tele-Density of Telecom Subscribers (wireless and wireline)



Source: TRAI, CareEdge Research

The teledensity of top service areas and cities as of November 2023 are as follows:

Table 4: Teledensity of Top Services Areas

Sr. No.	Teledensity: Top 10 Service Areas	Nov'23
1.	Delhi	277.80
2.	Kerala	121.77
3.	Himachal Pradesh	120.07
4.	Punjab	113.31
5.	Maharashtra	103.11
6.	Tamil Nadu	102.71
7.	Karnataka	101.77
8.	Andhra Pradesh	94.08
9.	Gujarat	91.88
10.	Jammu & Kashmir	89.91

Source: TRAI, CareEdge Research

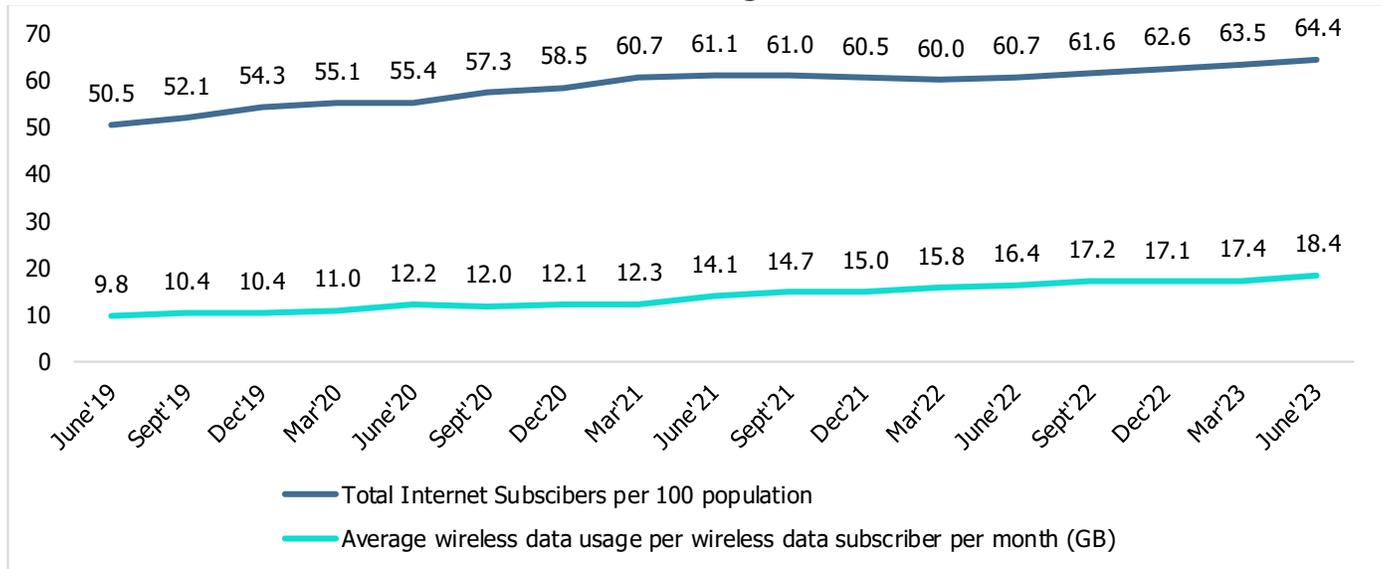
Kerala has the highest tele density at 121.77% followed by Himachal Pradesh at 120.07% and Punjab at 113.31%. Among cities, Delhi has the highest tele density of 277.80%.

The outlook for tele density in India appears optimistic, driven by various factors such as increasing smartphone penetration, affordable data plans, government initiatives promoting digital connectivity, and the expansion of telecom infrastructure in rural areas. Tele density is expected to continue its upward trajectory as telecommunications services become more accessible and affordable across the country. Additionally, advancements in technology and the rollout of 5G and upcoming 6G networks are likely to further enhance tele density by facilitating faster and more reliable connectivity. However, challenges such as the digital divide between urban and rural areas, regulatory hurdles, and infrastructure constraints may need to be addressed to ensure equitable access to telecommunications services and sustained growth in tele density. Overall, the outlook for tele density in India remains positive, with continued efforts towards digital inclusion and infrastructure development expected to drive further expansion in the telecommunications sector.

3.5 Wireless Data Usage and Smartphone Penetration

Indian telecom industry’s performance improved in FY23 led by tariff hikes and increased data usage. The average data consumption per subscriber per month improved by 9.87% y-o-y to 18.4 GB during June 2023, supported by the affordable pricing and continued pandemic-led trends such as work-from-home, higher usage of e-commerce, and virtual education among others which remain a major trend even after the pandemic. Furthermore, higher usage of video streaming applications and online games led to more subscribers adopting indoor entertainment options.

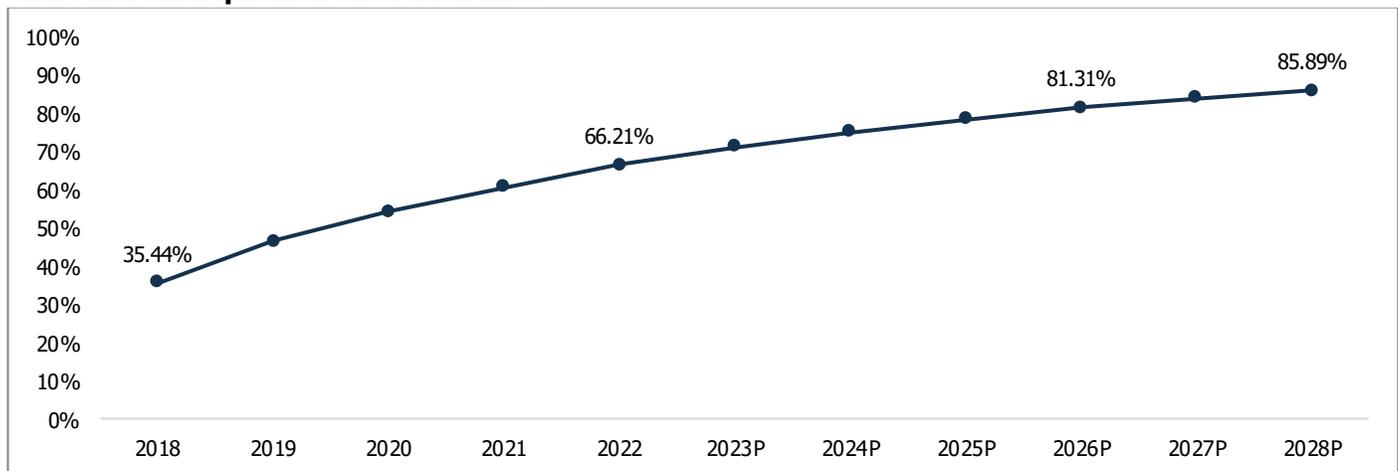
Chart 22: Performance Indicators of Wireless Data Usage



Source: TRAI, CareEdge Research

Ramp up in smartphone and internet penetration is one of the key growth drivers and play a significant role in development of Telecom industry. Smartphone and internet penetration have expanded the reach of towers to remote places, where traditional players were facing challenges.

Chart 23: Smartphone Penetration Rate



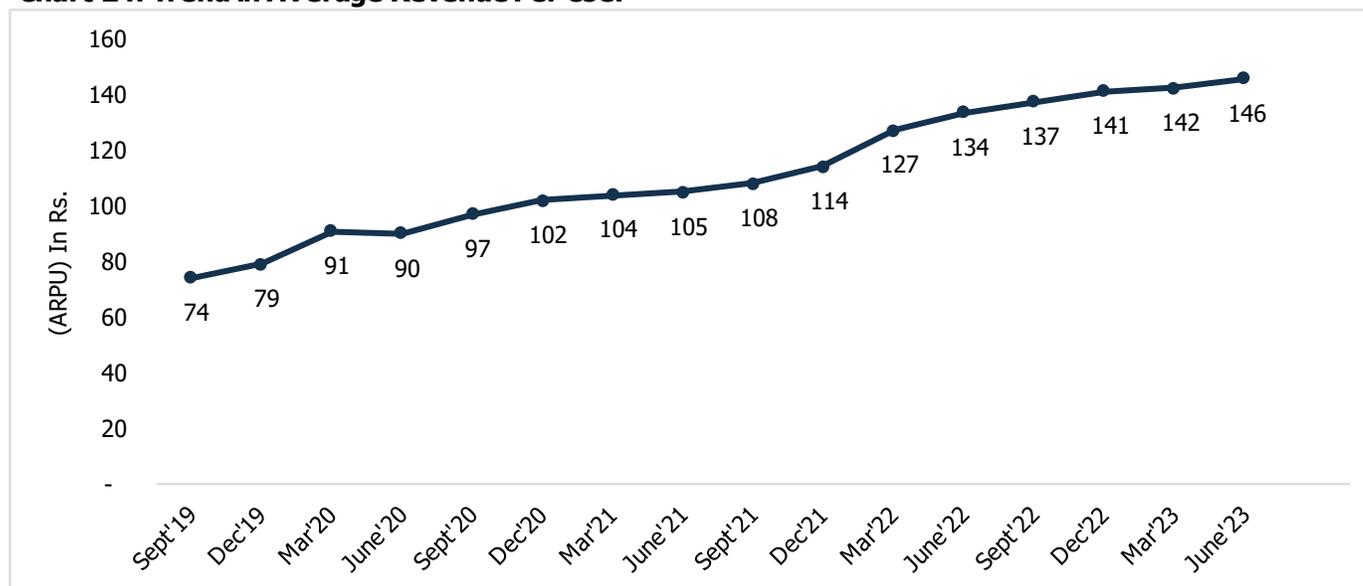
Source: Maia Research, CareEdge Research

3.6 Trend in Average Revenue Per User (ARPU)

In FY22, the telecom companies had increased tariffs for base post-paid plans. Further, the average data consumption per subscriber per month also increased by 14.3% y-o-y during FY23. As a result, the telecom industry’s average ARPU³ surged by 23.6% y-o-y to an average of Rs.141 during the quarter ended December 2022. Following that the growth rates moderated to 9% y-o-y to Rs 146 for Q1FY24.

Post-launch of 5G in October 2022, its usage accounted for only 4.59% of the total data consumption during the June ending quarter of FY24. Going forward, further penetration of the 5G spectrum would create more opportunities for growth in industrial ARPU.

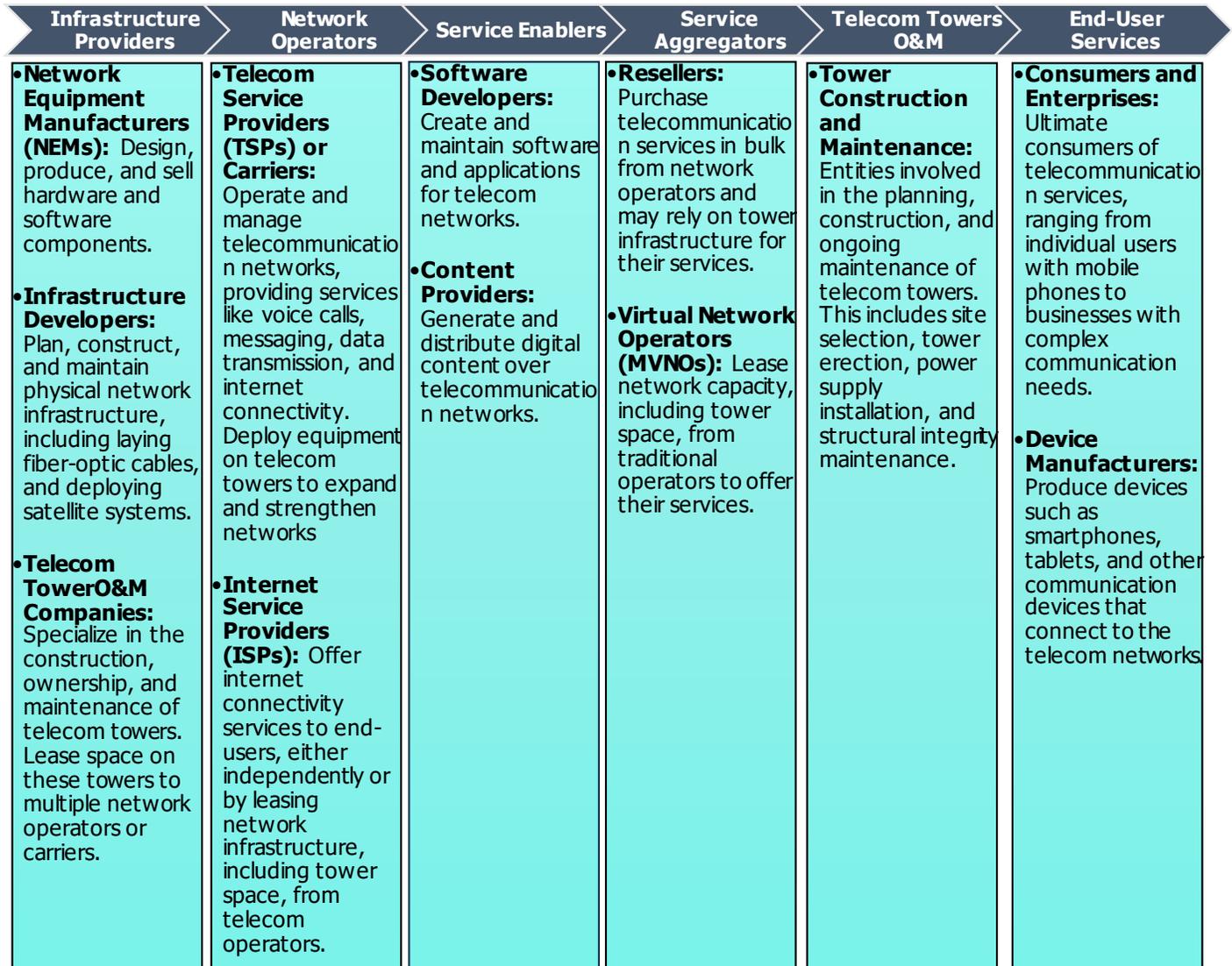
Chart 24: Trend in Average Revenue Per User



Source: Telecom Regulatory Authority of India (TRAI), CareEdge Research

³ ARPU per month is calculated by dividing net subscribers’ revenue by average number of subscribers

4 Telecom Sector Value Chain



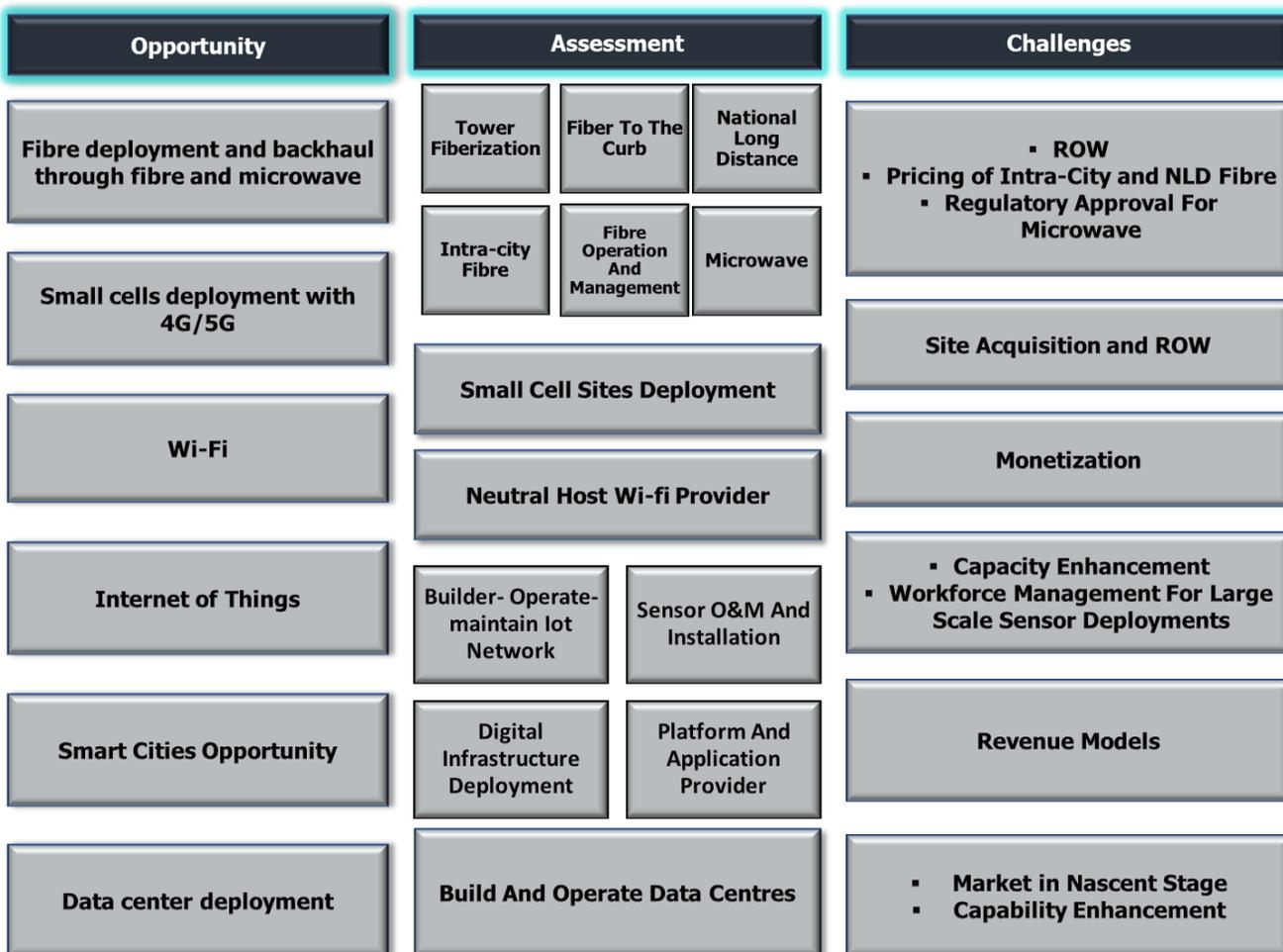
5 Telecom Tower Sector

5.1 Overview

The past ten years of India’s telecommunications revolution have been driven by a robust "towerco" industry. From 2007 to 2020, the number of towers has more than doubled, growing at a Compound Annual Growth Rate (CAGR) of 5% to reach 25,42,213. Currently, 83% of India’s tower sites are owned by towercos, including those backed by Mobile Network Operators (MNOs). This is second only to China (100%) and surpasses that of the US and Canada (70.8%), Europe (63.8%), South East Asia (27.3%), and Oceania (12.8%).

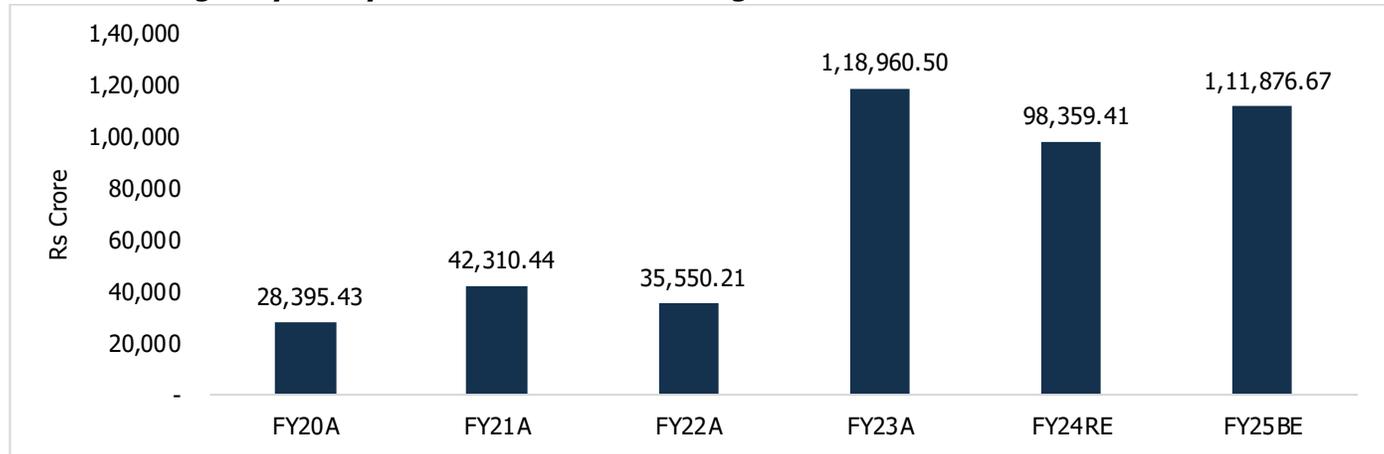
With innovation as its foundation, India’s telecom tower sector has established a distinguished presence worldwide. India pioneered the concept of passive infrastructure sharing, which has since become a global standard. This shift in the business model has yielded significant benefits – from accelerated market expansion and quicker time-to-market to operational and capital expenditure efficiencies, as well as the alleviation of capital expenditure burdens from telecom operators. The robust fundamentals of the tower industry have facilitated the seamless entry and exit of market participants, a task that would have otherwise been daunting, given the substantial capital investments required for network deployment. With the evolving narrative of the sector, the industry has demonstrated its capacity to adapt, reconfigure, and flourish across various dimensions. Furthermore, the Production-Linked Incentive (PLI) scheme announced for telecom manufacturing will contribute to increased hiring in this sector.

Chart 25: Opportunity Landscape of Telecom sector



According to the Union Budget 2024-25, a total outlay of Rs. 111876.7 cr. was allocated to the telecom sector including telecom infrastructure which is 14% more than the previous year's allocation indicating the increased thrust on connectivity in the country by the government.

Chart 26: Budgetary Outlay for Telecom Sector including Tower Infrastructure



Source: Union Budget

Trends in the Telecom Tower Sector -

- 5G Rollout:** India is currently undergoing extensive network deployments, boasting one of the swiftest 5G rollouts worldwide. A crucial element for the successful implementation of these 5G networks is the fiberization of mobile towers. Not only does fiberization support the immediate requirements of 5G, but it also positions the network for future advancements beyond 5G. With technology constantly evolving, establishing a fiber-based infrastructure facilitates smoother upgrades and adaptation to emerging demands.

While 5G introduces fresh growth opportunities for Internet Service Providers (ISPs), the industry must broaden its horizons and explore new avenues for expansion. Among these opportunities are the monetization of existing assets, such as through advertisements, billboards, and Out of Home (OOH) advertising at tower sites. Additionally, there is potential in opening Electric Vehicle (EV) charging stations at telecom tower sites and developing data centers. These innovative approaches not only diversify revenue streams but also contribute to the overall growth and sustainability of the telecommunications sector.

- Infrastructure Sharing:** Telecom operators are increasingly focusing on infrastructure-sharing arrangements to optimize costs. Shared tower infrastructure, fibre-sharing agreements, and network-sharing arrangements have become common strategies.

- Digital Transformation:** The industry is undergoing a digital transformation, with telecom operators diversifying into digital services, cloud computing, and Internet of Things (IoT) solutions to capture new revenue streams.

- Rural Connectivity Initiatives:**

Telcos have traditionally directed their focus towards urban India, driven by factors such as high population density and a higher average revenue per user (ARPU). However, the weaker spending capacity in rural areas, coupled with lower population density, has made the rural market less attractive for telcos.

In a notable shift, telcos are now recognizing the untapped potential of rural India. This change is spurred by a combination of factors, including the increasing consumption patterns, widespread adoption of smartphones, and the government's initiatives to enhance coverage in the hinterlands. The demand for connectivity has witnessed a significant surge, further amplified by the COVID-19 pandemic and government-led initiatives like Digital India, Telecom Development Plan, and BharatNet.

This convergence of market dynamics is compelling telcos to reevaluate and approach the rural market with renewed interest, as they seek to capitalize on the emerging opportunities in these previously overlooked areas. These initiatives often involve building or upgrading telecom infrastructure to bridge the digital divide.

- **Edge Computing:** Edge computing is gaining prominence, allowing data processing to occur closer to the source, and reducing latency. Telecom operators are exploring edge computing solutions to support emerging applications.
- **Satellite Connectivity:** The Indian government recently approved the Indian Space Policy 2023, aimed at both regulating and boosting private sector participation in the space sector. This policy is expected to bring clarity to foreign ownership restrictions for operators of satellite constellations in low-earth orbit (LEO) and medium-earth orbit (MEO). In turn, it is anticipated to address regulatory uncertainties surrounding commercial satellite broadband services in India.

Given India's substantial population and the government's emphasis on digital initiatives, the satellite internet market holds immense potential. Over the next few years, significant strides are expected in India's satellite communications segment. A primary application of satellite communications lies in providing connectivity in rural and remote areas to bridge the existing digital divide. With nearly 50% of India's population yet to be connected, satellite-based communications can play a pivotal role in overcoming this challenge.

In tandem with private initiatives, the government is making its foray into the satellite internet space through Bharat Broadband Network Limited (BBNL), a state-owned agency tasked with implementing the BharatNet project. This multifaceted approach reflects a concerted effort to leverage satellite technology for widespread connectivity and digital inclusivity in the country. Satellite-based connectivity is being explored to expand network coverage in remote and challenging terrains, contributing to a more comprehensive and accessible network.

- **Digital Services Growth:** Telecom operators are likely to further expand their portfolios of digital services, exploring opportunities in areas such as digital payments, streaming services, and cybersecurity.
- **IoT and Connected Devices:** The rise in the number of internet-connected devices has made the Internet of Things (IoT) increasingly crucial. This technology offers efficiency, agility, and the capability to monitor and connect various devices seamlessly. As a result, the IoT market is poised to generate substantial revenue, fueled by widespread adoption and ongoing technological advancements.

Telecom operators are recognizing the immense potential of IoT as a significant opportunity. Governments are actively promoting connectivity-driven initiatives, creating a broader landscape for IoT development. In our findings, we observe that Indian telecom operators are likely to engage in collaborations with industry partners, technology providers, and system integrators. This collaborative approach aims to establish comprehensive IoT ecosystems, capitalizing on the potential growth in this sector.

Consequently, the proliferation of IoT devices and the increasing demand for connected solutions are expected to drive substantial investments in IoT platforms, connectivity, and related services. This trend positions businesses strategically

to leverage the evolving landscape of the Internet of Things. The proliferation of IoT devices and the demand for connected solutions are expected to drive investments in IoT platforms, connectivity, and services.

• **Regulatory Developments:** In technological convergence, a host of issues arises, spanning policy, regulation, data privacy, and data security. Consequently, it becomes imperative that policies and regulations undergo continuous evolution to align with the rapid developments. There is a pressing need to reassess regulatory and licensing frameworks to navigate the converged arena. This reassessment is crucial to empower industry players in offering new services efficiently and ubiquitously. The Telecom Regulatory Authority of India (TRAI) emphasizes the shift towards a case-based approach for provisioning registrations and licenses. This departure from the conventional technology-centric approach is seen as essential for streamlined service provision in the converged era. Regulatory frameworks, including spectrum allocation policies and regulations related to data privacy, could impact investment decisions. Adaptation to evolving regulations will be crucial.

• **Cybersecurity Investments:** Cybersecurity is a critical focus within the telecom industry. Given the extensive sensitive data stored across complex networks, telecom companies are prime targets for cyberattacks. As we transition into the era of 5G/6G technology, new security risks emerge, necessitating proactive measures.

To fortify defenses, telecom companies must invest in robust IT infrastructure and deploy effective cybersecurity protocols, including threat detection, incident response, and prevention strategies. The advent of 5G/6G introduces additional vulnerabilities, particularly with IoT-enabled networks. Hackers can exploit unprotected devices like laptops, routers, and webcams, underscoring the urgency for telcos to prioritize cybersecurity.

In this context, blockchain technology emerges as a secure framework for communication service providers. It not only enhances the security of networks but also enables innovative and reliable services. By leveraging blockchain, telcos can minimize costs and improve revenue while safeguarding their networks and customers.

The escalating digitization of services further amplifies the need for increased investments in cybersecurity infrastructure and solutions. As threats in the digital landscape continue to rise, proactive measures become imperative for the telecom industry to ensure the security of their operations and maintain the trust of their customers. With the increasing digitization of services, investments in cybersecurity infrastructure and solutions are likely to grow to address the rising threats in the digital landscape.

• Tower Sharing

The infrastructure cost of constructing a tower will become more economical by the means of sharing of towers. Tower sharing created a strong incentive to the Indian telecom market, it allowed operators to reduce costs considerably and focus on core marketing activities while enabling new operators to rollout networks in record times, thus reducing the time to go to market for new operators. India currently has more than 400,000 towers at a tenancy ratio of 2.1 and has begun to focus more on operational improvements. Sharing of tower infrastructure has resulted to:

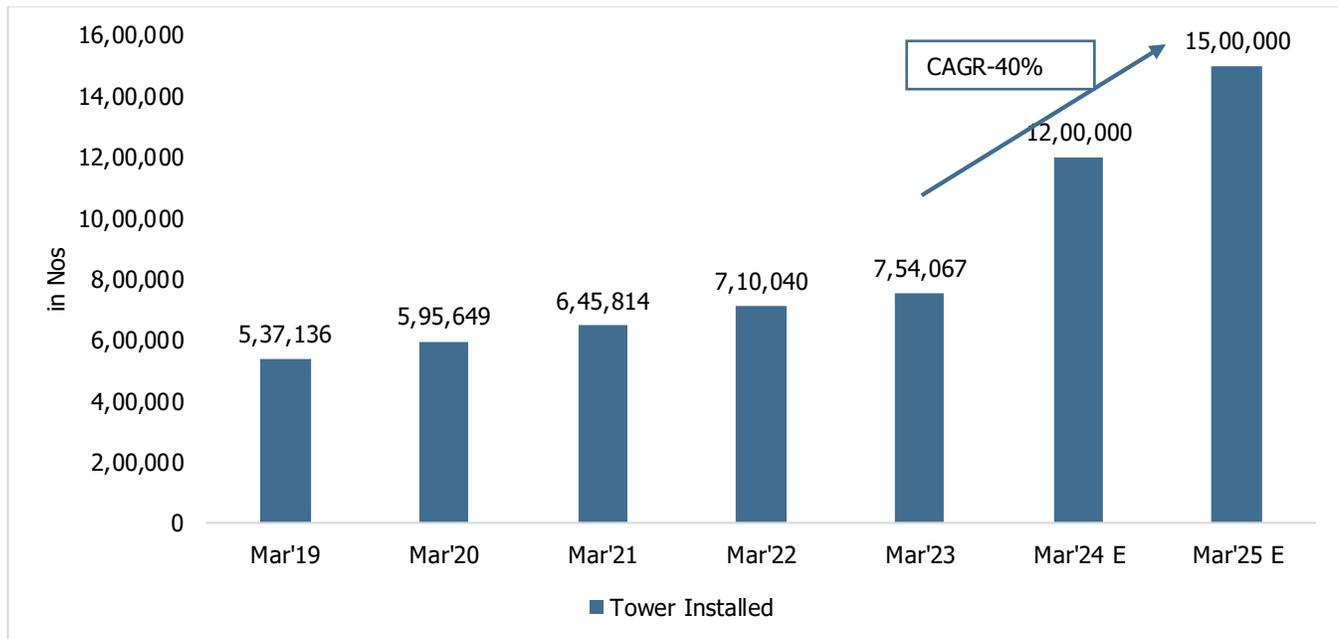
- Reduced capex & opex costs resulting in lowest tariff
- Ease of Faster rollouts in the far-fetched and rural areas
- Reduced diesel consumption per tenant, hence immense contribution to environmental protection
- Encouraged innovation in tower designs and implementation of newer technologies.

5.2 Trend in Number of Telecom Tower

As the number of mobile subscribers increases, telecom operators also need to expand their network infrastructure, including the installation of new towers, to meet the growing demand for voice and data services. Efforts to extend mobile connectivity to rural and remote areas often involve the installation of new telecom towers. Government initiatives and policies, such as the Universal Service Obligation Fund (USOF), have aimed at improving telecom infrastructure in underserved regions.

The rising demand for mobile data services, driven by factors like increased smartphone usage and digital content consumption, may prompt telecom operators to enhance their network capacity by adding more towers. The tower installed is expected to grow at a CAGR of 40% by the end of March 2025 according to National Broadband Mission.

Chart 27: Number of Towers Installed



Source: Department of Telecom

5.3 Trend in BharatNet

The primary goal of BharatNet is to connect over 250,000-gram panchayats (village councils) in rural and remote areas with high-speed broadband internet.

Phase I: The first phase focused on connecting approximately 100,000-gram panchayats. It involved laying optical fiber cables to provide high-speed internet access. The objective was to provide broadband connectivity at the Gram Panchayat (GP) level by connecting block headquarters (BHQs) to GPs by using existing fibre of Central Public Sector Undertakings (CPSUs) such as Bharat Sanchar Nigam Limited (BSNL), RailTel Corporation of India Limited (RailTel) and Power Grid Corporation of India Limited (PGCIL) and laying incremental fibre to bridge the connectivity gap up to the GPs. The Government owns the incremental Optical Fibre Cable (OFC), and the ownership of the existing fibre was to be continued to be vested with the current owners. This was considered Phase-I of BharatNet.

Phase-I was completed in December 2017 with implementation in over 1 lakh GPs. Subsequently, the scope of Phase-I was expanded to 1.25 lakh GPs (Revised work front Phase-I) as per the Cabinet approval of 19.07.2017.

Phase II: The second phase aimed to complete the remaining connections, covering the additional gram panchayats. This phase also included enhancing the network for improved efficiency. The modified strategy provides an optimal mix of media (OFC, Radio and satellite) to connect Gram Panchayats (GPs). Under Phase II, GPs are to be connected through multiple implementing models like State-led Model, Private Sector Model and CPSU Model, along with Last Mile connectivity in GPs through Wi-Fi or any other suitable broadband technology. Various States covered under different models of Phase II are:

State-Led Model: 8 states are being implemented under this model. Chhattisgarh, Gujarat, Jharkhand, Andhra Pradesh, Maharashtra, Odisha and Telangana are at various stages of implementation.

CPSU-Led Model: Under this model, BSNL is executing works in four states and union territories. Madhya Pradesh, Uttar Pradesh and Sikkim are at various stages of implementation.

Private Led Model: Punjab and Bihar have implemented the private sector model directly by BBNL. Work has almost been completed in both states.

Satellite: The satellite component of Phase II is being implemented by BBNL and BSNL. BSNL is implementing 1408 GPs and BBNL is implementing 3753 GPs.

Utilization of Bharat Net network:

The utilization of the network is through leasing bandwidth and dark fibre, Wi-Fi to access broadband or internet services in public places, and Fibre to the Home (FTTH).

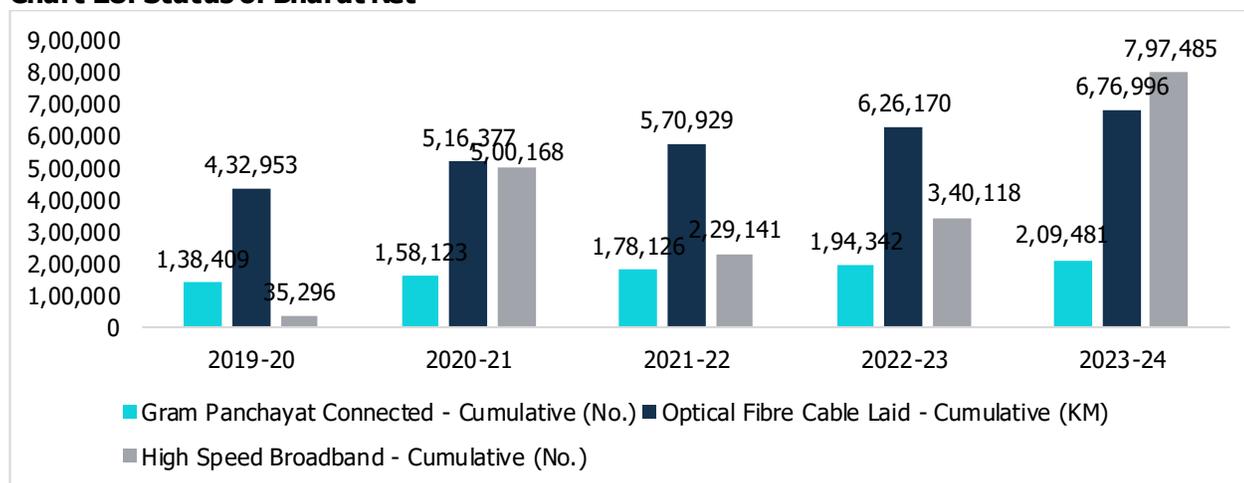
Fiber to the Home (FTTH): In addition to connecting gram panchayats, there has been a push toward providing Fiber to the Home (FTTH) connections to individual households in these connected areas.

As part of the project, the Last Mile Connectivity (LMC) to access broadband or internet services is to be provided through Wi-Fi in public places or any other suitable broadband technology, including FTTH at Government institutions such as schools, hospitals, post offices, anganwadis, police stations, etc.

The total funding of the Bharat Net (Phase-I and Phase-II), approved by the Cabinet, is Rs 42,068 crores.

As of December 2023, a total of Rs. 39,825 crores have been disbursed under Bharat Net Project since inception of the project.

Chart 28: Status of Bharat Net



Source: Department of Telecommunication

Table 5: State: UT-Wise Details of Fund Disbursed as on 31.12.2023 under BharatNet

S.No.	Name of States/UT	Total
1	Andaman & Nicobar	24.02
2	Assam	288.37
3	Bihar	1609.5
4	Chandigarh	0.82
5	Chhattisgarh	2635.75
6	Haryana	639.56
7	Jammu & Kashmir	259
8	Karnataka	1336.59
9	Kerala	206.07
10	Maharashtra	5475.29
11	Madhya Pradesh	3951.03
12	Punjab	1330.22
13	Rajasthan	1825.26
14	Uttar Pradesh	5331.15
15	Uttarakhand	348.54
16	West Bengal	641.43
17	Sikkim	87.96
18	Puducherry	9.17
19	Gujarat, D & N, Daman & Diu	3671.5
20	Lakshadweep	0.22
21	Telangana	2144.81
22	Odisha	1308.69
23	Jharkhand	978.88
24	Himachal Pradesh	123.3
25	Andhra Pradesh	1570.57
26	Tamilnadu	815.62
27	Ladakh	0.69
28	NE-I (Meghalaya, Mizoram and Tripura)	274.72
29	NE-II (Arunachal Pradesh, Manipur and Nagaland)	335.88
30	Other Miscellaneous expenses	2600.73
	Total	39825.34

Source: PIB

5.4 Outlook

The Indian telecom sector is growing at a fast pace with over 1.2 billion subscriber base and is expected to grow to about 1.5 billion subscribers base by 2025.

According to the National Broadband Mission, the telecom tower sector is expected to be driven by the following factors-

a. Availability of High Broadband Speeds

To provide an infrastructure capable of delivering higher speeds of broadband up to 50 Mbps in a phased manner at par with those of emerging and developed countries and with availability across the country, wherever necessary. This will enable the interactions between the government, businesses, and citizens to become more digital-based with high-speed connectivity.

b. Accelerate Fiberization

There are plans to increase the present route length of 22 lakh kilometers of the Optical Fiber Cable (OFC) to 50 lakh kilometers by 2025. This will be achieved through suitable incentive measures and collaboration with the States/UTs to have their RoW policy aligned with the Right of Way Rules notified by the Central Government. And to create a Broadband Readiness Index, to instill competition amongst States/UTs for the significant growth of fibre in the country.

c. Enhancement of Connectivity and Improve Quality of Service by Increasing Tower Density

To increase the tower density, to be at par with countries, leading in telecom infrastructure. The existing tower density is 0.42 towers per thousand population with around 5.65 lakh towers. This needs to be increased to 1.0 per thousand population, with the setting up of an additional 10 lakh towers.

This demand for new and emerging technologies such as 5G is to drive the telecom towers sector. Besides, to cater to high mobile data consumption and a phenomenal increase in the number of broadband users, the number of towers needs to be increased.

d. Increase Fiberization of Telecom Towers

At present, around 30% of telecom towers are connected on fiber which needs to be enhanced to at least at least 70% of the towers to be fiberized. To address this demand of large bandwidth as the average data consumption for each subscriber is continuously increasing telecom towers are expected to have robust backhaul to cater to high volume data requirements and better quality of services.

e. Mapping of Fiber

To create a Geographic Information System (GIS) based tool for accurate planning for new networks and seamless management of the entire integrated infrastructure and to set up a National Fiber Grid for keeping a record of the entire optical fibre network, within the country.

f. Facilitate Rollout of the 5G Network and Strengthening of the 4G network

To address the high bandwidth required for the deployment of the 5G network, 5G networks with the ability to completely transform the digital experience of all users and to open more use cases across sectors – education, healthcare, agriculture, mobility, manufacturing, public safety, etc., will be rolled out. This requires more BTS tower installation.

Table 6: Towers estimated to be added by 2025

	FY24	FY25
Tower (in Lakhs) cumulative	12	15
Fiberization of Telecom Towers (%) cumulative	65	70

Source: National Broadband Mission

Table 7: Total Funding till 2025

Infrastructure Component	Investment (In billion USD)
Investment in establishing Telecom Towers	35
Investment in Optical Fiber Infrastructure	30
Investment in other resources like spectrum, R&D and other network resources	35
Total	100

Source: National Broadband Mission

6 Optic Fibre Sector in India

6.1 Overview

The Indian optic fibre sector is a critical part of India’s telecommunication and data transmission infrastructure. With the increasing digitization across industries and the proliferation of high-speed internet, there is a growing demand for reliable and high-capacity fibre optic cables in the country. The optic fibre ensures seamless data transfer and supports advanced communication networks.

Fibre is a fast-growing infrastructure asset class. 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. Whereas government initiatives such as BharatNet’s and Digital India’s focus on telecom infrastructure, especially fibre, is also contributing to increased fibre deployment.

Additionally, telcos’ ambition of increasing FTTH/B penetration for residences, buildings, and enterprise customers is expected to boost the demand for fibre layouts. 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.

As per the report by GSMA and ABI, while optical fibre will play an important role, microwave backhaul will account for the majority of global backhaul links from 2021 to 2027, with around 65% market share.

Table 8: Comparison of Various Means of Backhaul Technologies

Segment	Microwave (7–40 GHz)	V-Band (60 GHz)	E-Band (70/80 GHz)	Fibre-Optic	Copper (Bonded)	Satellite
Future-Proof Available Bandwidth	Medium	High	High	High	Very Low	Low
Deployment Cost	Low	Low	Low	Medium	Medium/ High	High
Suitability for Heterogeneous Networks	Outdoor Cell-Site/Access Network	Outdoor Cell-Site/Access Network	Outdoor Cell-Site/Access Network	Outdoor Cell-Site/ Access Network	Indoor Access Network	Rural only
Interference Immunity	Medium	High	High	Very High	Very High	Medium
Range (Km)	5~30, ++	1~	~3	<80	<15	Unlimited
Time to Deploy	Weeks	Days	Days	Months	Months	Months

Source: TRAI

6.2 End-Users in Fibre Optic Network

Telecommunications:

Telecommunications is one of the primary end-user sectors for optical fibre. Telecom companies use optical fibre networks to transmit vast amounts of data over long distances with high speed and low latency. Optical fibre forms the backbone of modern telecommunications infrastructure, facilitating services such as internet connectivity, voice

communication, and video streaming. The telecommunication sector is expected to grow at a CAGR of 8% to 9% in the next three years.

Key uses of optical fibre in the telecommunications industry:

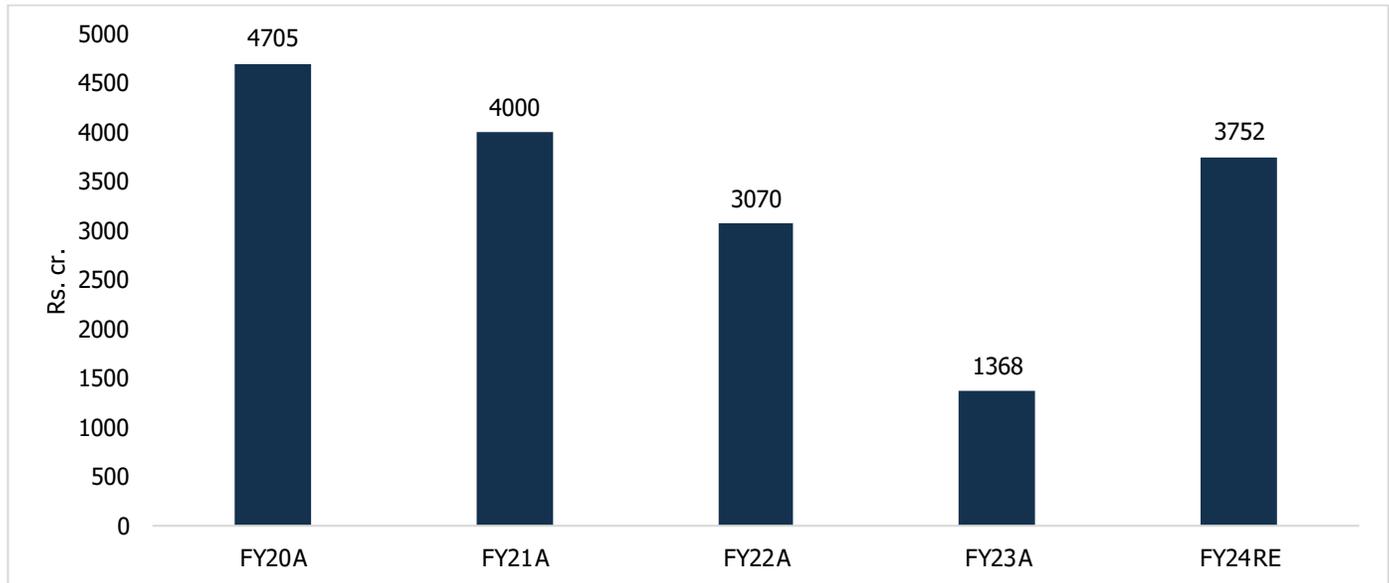
- **Long-Distance Communication:** Optical fibre is primarily used for long-distance communication due to its low signal attenuation and high bandwidth capabilities. It enables telecommunications providers to transmit voice, data, and video signals over vast distances with minimal signal loss.
- **Backbone Networks:** Optical fibre forms the backbone of telecommunications networks, including national and international communication networks. It serves as the infrastructure for high-capacity data transmission between central offices, data centres, and network aggregation points.
- **High-Speed Internet:** Optical fibre is the preferred medium for delivering high-speed internet services to residential, commercial, and industrial customers. Fiber-to-the-Home (FTTH) and Fiber-to-the-Premises (FTTP) deployments enable telecom operators to offer ultra-fast broadband connections with symmetric upload and download speeds.
- **Mobile Backhaul:** Optical fibre is used for mobile backhaul, connecting cell towers and base stations to the core network. Fibre optic links provide the high bandwidth and low latency required to support the increasing data traffic generated by mobile devices and smartphones.
- **Data Center Interconnectivity:** Optical fibre connects data centres and facilitates the interconnection of servers, storage systems, and networking equipment. High-speed fibre links enable data replication, backup, and disaster recovery, ensuring seamless operations and data availability.
- **Cloud Computing:** Optical fibre supports cloud computing services by providing fast and reliable connectivity between cloud data centres and end-users. Fibre-optic links enable the transfer of large volumes of data to and from cloud-based applications, platforms, and services.
- **Video Conferencing and Streaming:** Optical fibre enables high-quality video conferencing and streaming services by delivering real-time video and audio signals with low latency and high fidelity. Fibre-optic networks support the transmission of high-definition (HD) and ultra-high-definition (UHD) video content for telecommunication applications.
- **Voice over IP (VoIP):** Optical fibre supports Voice over IP (VoIP) services, allowing telecom operators to deliver voice communications over IP networks. Fibre-optic links provide the reliability and quality of service required for VoIP calls, including voice clarity, call stability, and low latency.
- **Network Resilience and Reliability:** Optical fibre enhances network resilience and reliability by offering robust performance in challenging environments, including harsh weather conditions and electromagnetic interference. Fibre-optic links are less susceptible to signal degradation and outages compared to traditional copper-based connections.

Government and Defense:

Governments and defence organizations utilize optical fibre for secure & reliable communication networks. Fibre-optic cables are deployed in military installations, government agencies, and critical infrastructure to transmit sensitive data, surveillance feeds, and command signals securely. Optical fibre provides a secure communication infrastructure for government agencies and defence organizations, enabling the transmission of sensitive data, classified information, and mission-critical communications. Additionally, fibre-optic networks offer high levels of security, immunity to electromagnetic interference (EMI), and resistance to eavesdropping. They are deployed for surveillance and intelligence gathering purposes, enabling the transmission of video feeds, sensor data, and reconnaissance information from unmanned aerial vehicles (UAVs), satellites, surveillance cameras, and other monitoring devices to command centres and intelligence agencies.

The capital allocation for modernization and infrastructure development of Defence Services has been increased to Rs 1,62,600 Cr, a growth of about 6% in FY24 as compared to FY23.

Chart 29: Optical Fibre Cable-Based Network for Defence Services



Source: Union Budget

Industrial Automation and Manufacturing:

Industrial sectors leverage optical fibre for automation, control, and monitoring applications in manufacturing plants and industrial facilities. Fibre-optic communication enables real-time data exchange between sensors, machinery, and control systems, enhancing efficiency, productivity, and safety in industrial operations.

Further, optical fibre serves as a high-speed communication medium for transmitting data between industrial equipment, sensors, controllers, and supervisory control and data acquisition (SCADA) systems. Fibre-optic networks provide reliable and high-bandwidth connectivity for real-time monitoring, control, and management of manufacturing processes. They form the backbone of industrial Ethernet networks, connecting devices such as programmable logic controllers (PLCs), human-machine interfaces (HMIs), robots, and sensors. Fibre-optic links enable fast and deterministic communication, supporting critical automation tasks and production workflows.

Transportation and Smart Infrastructure:

Transportation systems and smart city initiatives deploy optical fibre networks for traffic management, public safety, and infrastructure monitoring. Fibre-optic cables support intelligent transportation systems (ITS), surveillance cameras, traffic sensors, and smart grid solutions, enabling efficient and sustainable urban development.

Energy and Utilities:

Energy companies and utilities employ optical fibre for monitoring and managing power grids, pipelines, and utility networks. Fibre-optic communication enables remote monitoring of infrastructure, fault detection, and grid optimization, contributing to reliable and resilient energy distribution.

The following uses optic fibre as its main component-

Smart Grid

As per the National Smart Grid Mission (NSGM), Ministry of Power, a smart grid is an electrical grid with automation, communication, and IT systems that can monitor power flows from points of generation to points of consumption (down

to appliances level) and control the power flow or curtail the load to match generation in real-time or near real-time. NSGM was established by the Government of India in 2015 to plan and monitor the implementation of policies and programmes related to smart grid activities in India. In addition, the NSGM envisages capacity-building initiatives for distribution sector personnel in the field of smart grids.

Smart grids can be achieved by implementing efficient transmission & distribution systems, system operations, consumer integration, and renewable integration. They help to monitor, measure, and control power flows in real-time, which can contribute to the identification of losses, and thereby, appropriate technical and managerial actions can be taken to arrest the losses.

Furthermore, smart grid solutions can contribute to the reduction of transmission & distribution losses, peak load management, improved quality of service, increased reliability, better asset management, renewable integration, better accessibility to electricity, etc., and enable self-healing grids.

Moreover, the primary aim of the smart grids is to improve the reliability of the electricity networks and make the grid amenable to renewable energy inputs through distributed generation. Further, increased efficiencies with smart grids and smart meters empower consumers to manage their electricity consumption in a better manner and help them reduce their bills.

Smart Meters

Smart meters are digital meters similar to conventional meters. They record data on energy consumption. Also, they are capable of transmitting the energy consumption data to utilities at specific intervals, which permits more frequent monitoring of consumption alongside assisting in reducing T&D losses.

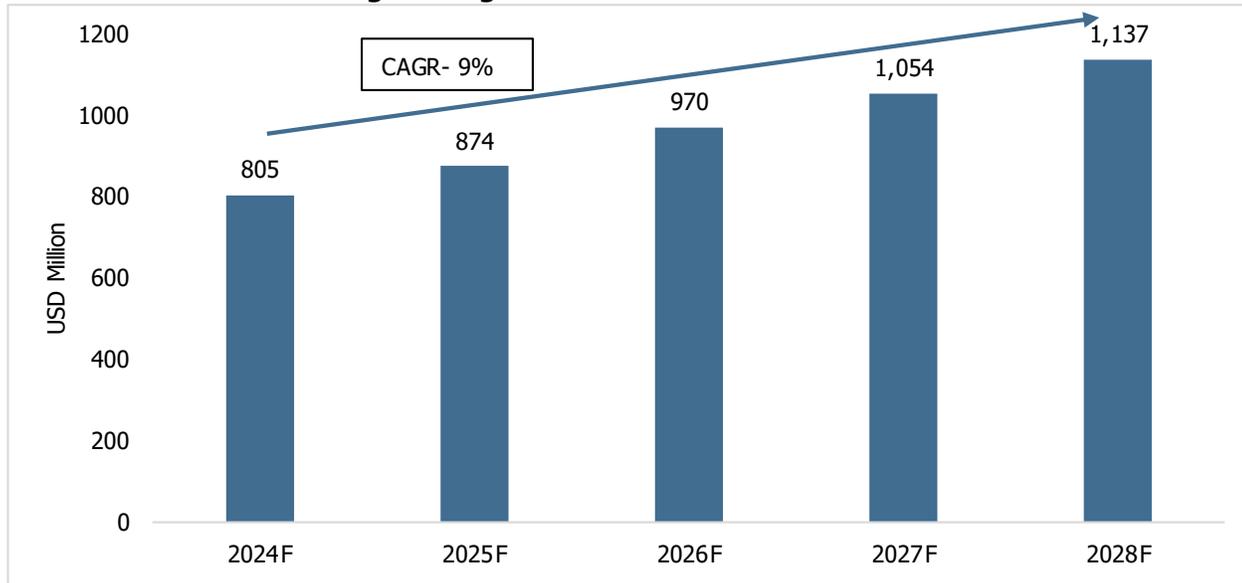
Further, smart meters are being installed under various government schemes including NSGM and Integrated Power Development Scheme (IPDS) wherein the government is providing funding to the states for implementing smart metering projects launched by DISCOMs.

For instance, Energy Efficiency Services Limited (EESL) is implementing projects launched by various DISCOMs in Uttar Pradesh, Haryana, Bihar, Rajasthan, Andaman & Nicobar Islands, Delhi, etc., wherein EESL is infusing the initial capital expenditure and DISCOMs are paying back to EESL on monthly rental basis.

High-Voltage Transmission Lines

Fibre optics are deployed along high-voltage transmission lines to provide communication capabilities for remote monitoring and diagnostics. Fibre-optic cables are installed on transmission towers or bundled with overhead conductors, allowing utilities to monitor line conditions, detect faults, and perform predictive maintenance activities. The High Voltage Transmission Line market size is expected to grow at a CAGR of 9% from the year 2024 to 2028.

Chart 30: Market Size of High Voltage Transmission Lines in India



Source: Maia Research, CareEdge Research

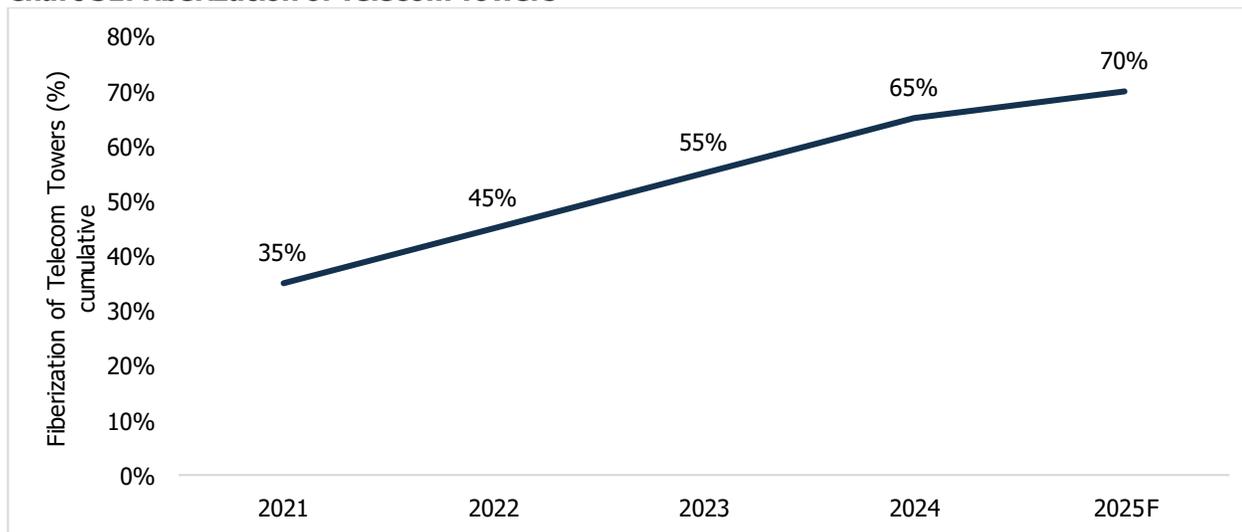
6.3 Outlook

Optical fibre has evolved as the most practical wired solution for backhaul, considering its extraordinary capacity. Owing to its almost limitless capacity and scalability, it is the right choice for high-capacity routes where logistics are manageable, the capacity need is high, and the potential revenue gain offsets the expense. In the coming years, its share in the mobile backhaul network is likely to go up owing to the expected growth in the data traffic and the increasing requirement of backhaul for new technologies such as LTE, LTE Advanced, IMT-2020, etc.

The National Broadband Mission released by DoT in December 2019, envisaged to increase by around two and half times the number of fiberized telecom towers in the country.

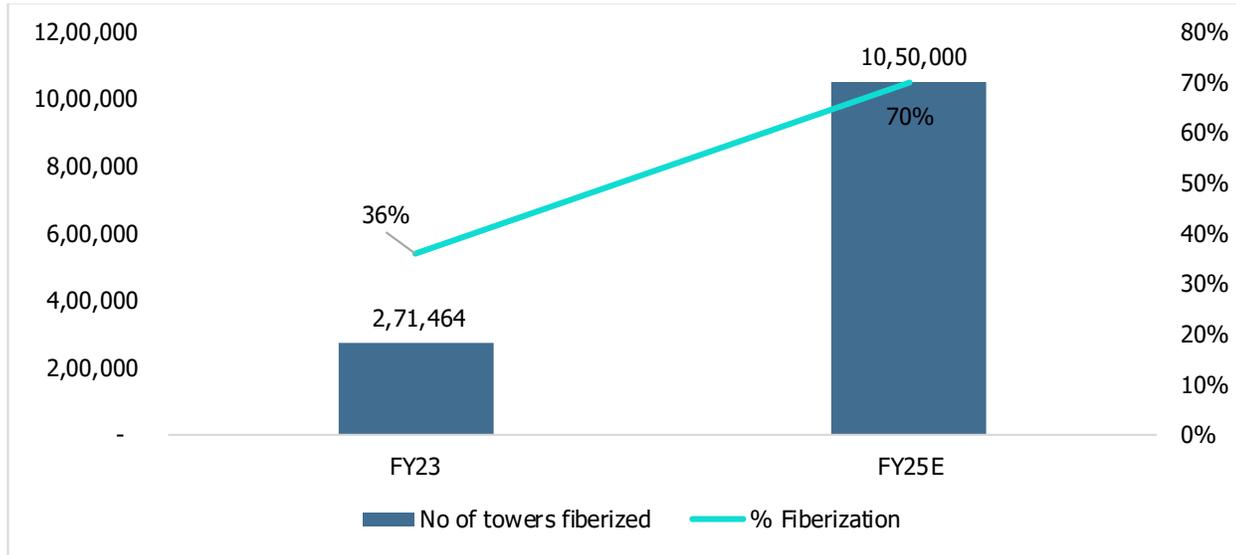
The National Broadband Mission, 2019 has set the 5-year target as below:

Chart 31: Fiberization of Telecom Towers



Source: Consultant Report, TRAI

Chart 32: Number of Fiberized towers in India



Source: CareEdge Research

About 2,86,545 towers have been fiberized i.e. 36% of the total tower installed i.e. 7,54,067 at the end of FY23, approximately 10,50,000 towers are targeted to be fiberized out of estimated installed 15,00,000 towers by FY25.

7 Demand Drivers of the Telecom Tower Industry

• Untapped Rural Market

The rural tele density in India stood at 58.4% areas on November 2023 significantly low compared to the urban areas which have been reporting tele density of more than 100% over the years. This gap, in turn, allows the telecom industry to provide its services to the untapped rural population, which, in turn, is expected to drive the demand for tower availability in rural areas.

Even while the rural market has low technology adoption, the young population in rural areas are primarily keen to take advantage of the facilities provided by telecom service providers. In addition to this, growth in the availability of affordable smartphones is expected to increase their usage in rural areas thereby resulting in higher demand for telecom services in these areas and hence telecom towers.

• 5G Technology

The government had offered 72GHz airwaves for 20 years across ten 5G bands (600 MHz, 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300 MHz and 26 GHz) with reserve price of Rs. 4.3 lakh crores and offers low bands, mid bands, and high bands. The government has sold 71% (51.2 GHz) of the over 72 GHz of airwaves that were offered.

A total of 28,88,086 5G Base Transceiver Stations (BTS) have been installed across 37 states as of January 2024. These BTS have majorly been installed in the states/UT of Maharashtra, Uttar Pradesh, Tamil Nadu, Gujarat, Karnataka, Delhi, and West Bengal. These states consist of about 55% of the total 5G BTS. Big telecom companies like Jio and Airtel are prioritizing these states as they are larger markets.

The 5G services were launched on Oct 2022. Within 8 months of launch, 2,00,000 sites covering 700 districts have been installed. 5G network has been rolled out in all 28 states and 8 UTs till date. Chardhams (Badrinath, Kedarnath, Gangotri, and Yamotri) are also covered with 5G Mobile coverage and have fibre connectivity.

This momentum in 5G installation across the country is expected to drive up the tower demand by the telecom players, especially Base Transceiver Stations.

• 6G Technology

The telecom sector is continuously evolving in India with high technological advancements from wire-line to mobile services and from 2G to 3G to 4G to 5G and now to 6G. International Telecommunication Union has approved the 6G Vision Framework with the Department of Telecommunications playing a key role in the process of framing this vision document.

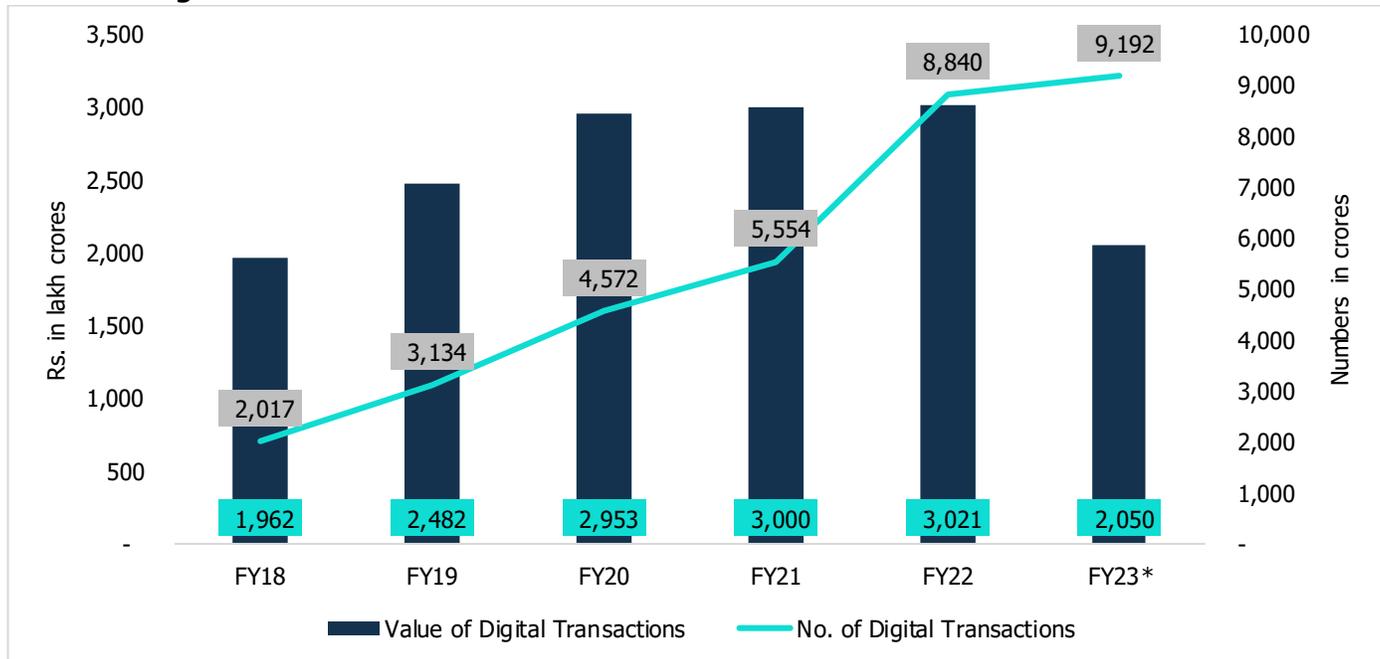
In March 2023, the Government of India released the "Bharat 6G Vision" document and announced that India will be a front-line contributor in designing, developing, and deploying 6G technology by 2030. The government has formed the Bharat 6G Alliance (B6GA) to provide a platform for the collaboration of companies, academia, research institutions, and standard development organizations. B6GA will also forge coalitions and synergies with other 6G Global Alliances, fostering international collaboration and knowledge exchange.

Under the Telecom Technology Development Fund (TTDF), a grant of Rs. 240.51 crores and two agreements have been signed – the 6G THz Testbed with Orbital Angular Momentum (OAM) & Multiplexing through consortium and 6G THz Testbed with Orbital Angular Momentum (OAM) & Multiplexing through consortium of SAMEER with IIT Madras, IIT Guwahati and IIT Patna.

• Increasing Digital Transactions

The number of digital transactions in India has seen exponential growth from 2,017 crore transactions in FY18 to 9,192 crore transactions in FY23 (up to December 2022). The availability of various digital payment mechanisms significantly facilitated the purchase of essentials online during COVID-19 leading to business continuity and adherence to social distancing norms. The availability of various convenient modes of digital payment solutions has led to rising financial inclusion and ease of living for the masses. The rising preference for digital transactions will also lead to a rise in internet usage in the urban regions and improving awareness is expected to drive up the demand.

Chart 33: Digital Transactions - Trend in Numbers and Value



Source: PIB

• Telecom Tower Sharing and Outsourcing

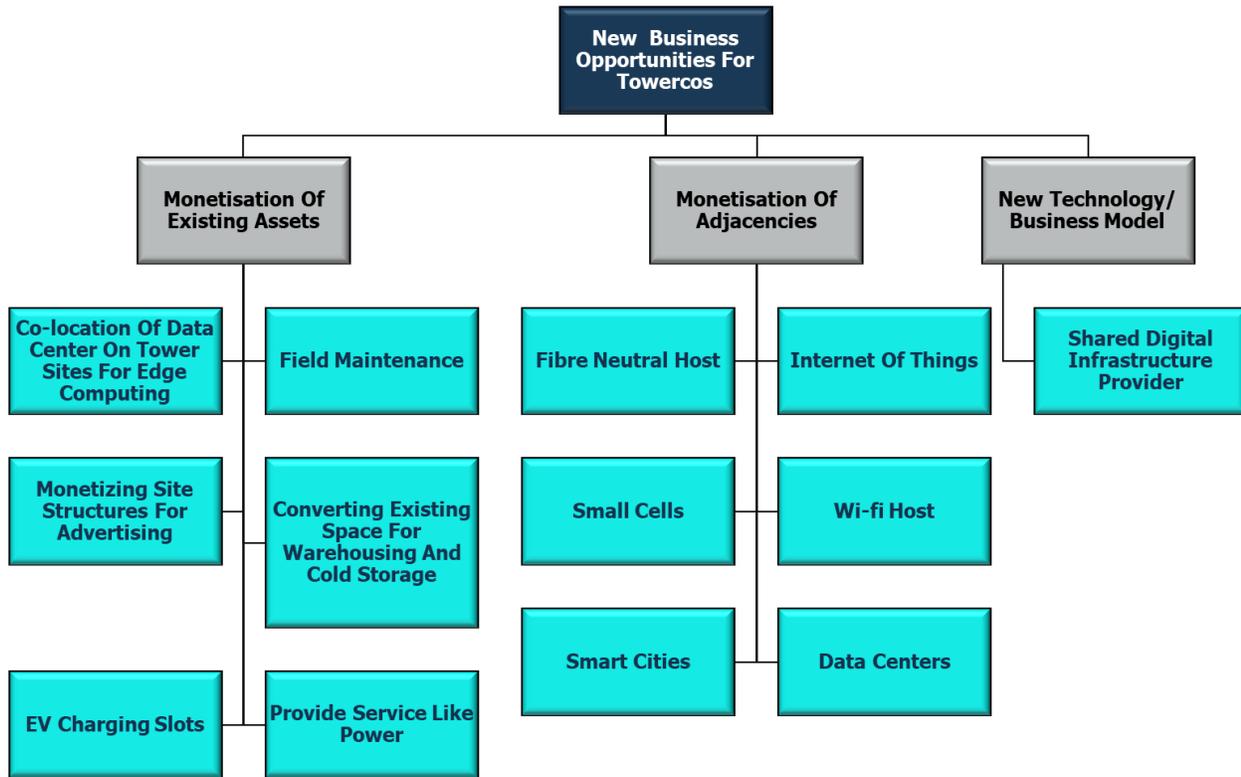
Tower sharing and outsourcing are common practices used by telecom operators to cut expenses and improve operational effectiveness. Given this practice, there is a greater need for the shared tower infrastructure that specialty tower companies offer.

Leasing towers from tower firms enables telecom carriers to rapidly introduce services. Tower companies promote infrastructure sharing, whereby operators, rather than deploying their own towers for networks, utilize towers established by tower companies, which are shared among multiple operators. This results in significantly more efficient capital expenditure. Senior executives in tower companies anticipate a substantial decline in tenancy-sharing agreements for telecom towers in a scenario where Vodafone Idea exits the market.

• Emerging Technologies and Services

The telecom infrastructure is under increased opportunities due to the introduction of new services and technologies like Machine-to-Machine (M2M) and the Internet of Things (IoT), necessitating the installation of more towers to accommodate the variety of communication requirements.

Chart 34: Opportunity Landscape for Telecom Tower Sector in Vision 2030



• **New Customer Segments:** New customer segments such as government and infrastructure are expected to emerge in the near future. The 'Digital India' initiative presents a gamut of opportunities for the telecom tower companies.

8 Challenges of the Telecom Tower Industry

The telecom tower industry in India faces various challenges that can impact its growth and operations. These challenges stem from a combination of regulatory, economic, technological, and environmental factors.

Some of the key challenges faced by the telecom tower industry in India are:

• Operator Consolidation

In the case of operator consolidation, the requirement for additional sites might get reduced among the consolidating players negatively impacting the tenancies for tower companies. However, consolidation will be restricted to smaller players, thereby having a limited impact on tower companies.

The Indian telecom has consolidated into 3 major players having a market share of 98%. The price war in the telecom industry led to stressed financials at telcos and expedited consolidation or exit. This led to the companies not being able to pay the rentals to the tower companies.

• NetCo & Other Infrastructure Sharing

The operators might enter into NetCo agreements wherein they share their networks for cost optimization, due to which the site requirement for different operators would be less. NetCo and other infrastructure-sharing arrangements in the Indian telecom sector facilitate cooperation among operators to maximize the use of network infrastructure, encompassing shared access to fibre optic cables, towers, and other essential assets, thereby enhancing operational efficiency and cost-effectiveness.

• Traffic Off-Loading

Traffic off-loading in the Indian telecom sector involves redirecting data or voice traffic from conventional cellular networks to alternative networks like Wi-Fi or femtocells, aiming to relieve congestion, enhance network performance, and optimize user experience. Due to large traffic volumes expected in the next 4-5 years, operators are expected to off-load a large amount of traffic on microsites, small cells, and Wi-Fi, which might render the macro site tenancy growth less than expected.

• Alternate Access Technologies

Alternate access technologies in the telecom sector encompass alternative approaches to delivering connectivity and communication services to users beyond conventional wired or cellular networks. These technologies offer diverse solutions tailored to specific requirements, aiming to extend coverage and enhance service delivery.

Entry of new market players such as Comcast and Google can pose further competition to network operators. Technology disruptions like MVNOs using Wi-Fi hotspots and Google's gigabit internet can significantly impact mobile network operators' business, and in turn, can reduce tower site demand as well.

• Procurement of Telecom Equipment from Trusted Sources

Another challenge for the telecom industry is to ensure that they procure telecom equipment from trusted sources for the purpose of national security and also seek permission from designated authorities for the upgradation of existing networks utilizing telecom equipment not designated as trusted products. This, in turn, may increase the procurement cost for Indian telcos. However, these directions will not affect ongoing annual maintenance contracts (AMC) or updates to existing equipment already inducted in the network as of date to the effect as per the Department of Telecommunications (DoT).

9 Government Policies and Initiatives

Statutory Body in the Telecom Sector

Telecom Regulatory Authority of India (TRAI) is the statutory body for the Indian telecom sector. Since the sector is highly regulated, TRAI as a sector regulator plays a pivotal role in development, broadcasting and cable services.

The Telecom Regulatory Authority of India (TRAI) Act, 1997 provides for the establishment of TRAI and the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) to regulate telecommunication services, adjudicate disputes, dispose of appeals and protect the interest of service providers and consumers in the sector.

9.1 Government Initiatives

1. National Broadband Mission (NBM)

NBM was launched on 17th Dec 2019 with a vision to fast track the growth of the digital communications infrastructure, bridge the digital divide, facilitate digital empowerment and inclusion, and provide affordable and universal access to broadband for all.

The objective of the mission-

- It aims to strengthen telecommunication technologies and infrastructure
- A million kilometre of optical fibre cable was to be laid
- The tower density was aimed to be increased from 0.42 per thousand population to 1 tower per thousand population by 2025
- The mission aims to increase the fiberisation of towers from 30% to 70% by 2025

Progress-

- **Broadband Connectivity to Villages** - The scope of BharatNet in July 2021 has been extended to all inhabited villages beyond GPs in the country. The timeline of the Project is up to 2025.
- **Availability of Broadband Speeds (Mbps)** - The Telecom Regulatory Authority of India (TRAI) has been obtaining crowd-sourced data about download and upload speeds for different service providers through the TRAI My Speed App. It is expected that the broadband speeds up to 50 Mbps by 2024-25.
- **Fiberization (Lakh Kms) Cumulative** - Total Optical Fibre Cable (OFC) laid is approximately 34.62 Lakh Km as of June 2022. It is envisaged to be increased up to 50 Lakh Km by 2024-25.
- **Towers (in Lakhs) Cumulative** - 7.6 Lakh towers have been installed up to May 2022. It is envisaged to be increased up to 15 Lakh towers by 2024-25.
- **Fiberization of Telecom Towers/ Base Transceiver Station (BTS) (%) Cumulative** - Approximately 35.11% of Telecom Towers/ BTSs are fiberized as of December 2022. It is envisaged to be increased up to 70% by 2024-25.
- **Mapping of Fiber Cumulative** - 10 Lakh Route KMs of Optical Fibre Cable laid by the PSUs is mapped on the PM GatiShakti NMP Portal.

2. BharatNet

BharatNet was also launched under this mission to improve the connectivity in the rural regions of the country. The project was launched with an aim to provide broadband connectivity to 2.6 lakh Gram Panchayat in the country in a phased manner. Phase 1 was completed in Dec 2017 covering 1 lakh Gram Panchayat.

As of 31st March 2023, 6,32,031 km of optical fibre cable has been laid, and a total of 1,92,428 Gram Panchayats have been connected by optical fibre cable.

• Connectivity to Villages

The government has accorded approval to connect 354 villages in border areas of Jammu and Kashmir, Ladakh, Himachal Pradesh, Uttar Pradesh, Bihar, Rajasthan, Gujarat, Uttarakhand, Karnataka and West Bengal.

As of Oct 2022, out of the 354 uncovered villages, 275 have been provided coverage by the installation of 254 mobile towers. An additional 55 villages have also been approved under the scheme out of which 19 have been covered.

• 4 G-Based Mobile Service in 502 Uncovered Villages under Aspirational District Scheme

States of Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan having 502 uncovered villages have been planned for provisioning of 4 G-based mobile services under this scheme. As of Oct 2022, 132 villages have been covered by installing 106 mobile towers.

• Comprehensive Telecom Development Plan (CTDP) for North-Eastern Region

Under this scheme, the government is implementing mobile connectivity on 2G for uncovered villages along National Highways of Assam, Manipur, Mizoram, Nagaland, Tripura, Sikkim and Arunachal Pradesh by setting up towers. The scope was to cover 1,481 uncovered villages by installing 1,094 towers.

As of Oct 2022, 316 towers have been installed covering 475 villages. Another project for provision of 4G mobile services in 2,374 uncovered villages in Arunachal Pradesh and 2 districts of Assam was approved. In Arunachal Pradesh, 19 towers have been commissioned covering 27 villages, while in Assam, 54 sites have been commissioned covering 67 villages.

• Provisioning of 4G Mobile Services in 85 Uncovered Villages and Seamless Mobile Coverage along NH-4 in Andaman and Nicobar Islands

Agreement for setting up 82 towers to provide mobile services on 4G technology in 85 uncovered villages and 42 towers for providing 4G mobile services to bridge the gaps in mobile connectivity along uncovered National Highways. As of Oct 2022, 105 tower sites have been approved as against 124 tower sites.

• Access Points Deployed Under PM-WANI

The framework of the Prime Minister's Wi-Fi Access Network Interface (PM-WANI) was approved in December 2020 to proliferate broadband through Public Wi-Fi Networks. As of December 2022, a total number of 1,48,023 hotspots have been installed.

3. Bharat 6G Alliance

Under this scheme, the Government of India is to facilitate next-generation 6G research and innovation in India to be able to contribute front-line in 6G technology and manufacturing by 2030. The Department of Telecommunications constituted a Technology Innovation Group on 6G (TIG-6G) in November 2021 with members from Ministries, research and development institutions, academia, standardization bodies, Telecom Service Providers and industry to develop Vision, Mission and Goals for the 6G and also develop a roadmap and action plans for 6G in India.

The TIG-6G in turn constituted six Task Forces with industry, academia, R&D institutions and Government as members of Multi-Disciplinary Innovative Solutions, Multiplatform Next Generation Networks, Spectrum for Next Generation Requirements, Devices, International Standards Contribution and Funding Research and Development.

An Apex Council is constituted to lay down the Phase-wise objectives of the Bharat 6G Mission and consult the Bharat 6G Alliance.

The Mission will be completed in two phases:

- Phase 1 from 2023-2025 (2 years)
- Phase 2 from 2025-2030 (5 years)

9.2 Enabling Policies

1. Digital Communications Commission

The policy was set up by the government of India on 11th April 1989 to deal with various aspects of telecommunications. The policy was redesigned as the 'Digital Communications Commission' from the 'Telecom Commission' on 22nd Oct 2018.

The Digital Communications Commission is responsible for:

- Formulating the policy of the Department of Telecommunications for approval of the Government;
- Preparing the budget for the Department of Telecommunications for each financial year and getting it approved by the Government; &
- Implementation of Government's policy in all matters concerning telecommunication.

9.3 Reforms

There are various telephone reforms that shaped the current telecom sector. Details of the same are as follows:

1. Indian Telegraph Right of Way (Amendment) Rules, 2022

In order to enable the speedy rollout of 5G, the Indian Telegraph Right of Way (Amendment) Rules, 2022 were introduced which facilitate faster and easier deployment of telegraph infrastructure. The amended rules contain provisions for the usage of street furniture for the installation of small cells and telegraph lines. The fees and charges are also rationalized for seeking Right of Way (RoW) permissions by Telecom Service Providers (TSPs) and Infrastructure Providers (IP) to bring uniformity across the country.

2. Wireless Planning and Coordination (WPC) Rules

The government has brought procedural reforms to wireless licensing. These include the delicensing of various frequency bands to promote innovation, manufacturing and export, as under:

- Spectrum in 865-868 MHz band delicensed for facilitating IoT and M2M, RFID etc. applications.
- 9 KHz to 30 MHz band delicensed for contactless Inductive Charging etc.
- 433-434.79 MHz band delicensed for various Short-Range Devices (SRD) applications.

The government has also released National Frequency Allocation Plan 2022 giving guidance to the users of the spectrum to plan their network in accordance with relevant frequency and parameters.

3. PM GatiShakti National Master Plan Platform for 5G rollout

The telecom assets are being mapped on PM GatiShakti National Master Plan Platform. Around 10 lakh Rkm of optical fibre cable (OFC) laid by PSUs i.e. BSNL, BBNL, RailTel, GAIL, PowerGrid has been mapped and around 23 lakh Base Transceiver Stations (BTS) of all Telecom Service Providers (TSPs) have been mapped with details like fiberized and non-fiberized etc.

The tool developed by Bhaskaracharya National Institute for Space Applications and Geoinformatics (BISAG) on PM GatiShakti National Master Plan calculates the required length and route of the nearest OFC to a particular fiberized tower. Street furniture like the electricity poles, bus shelters, traffic lights, etc. laid by the state government are being progressively mapped. The DoT NMP platform is being integrated with the State NMP platforms so that various assets of the state are visible on the NMP DoT platform.

4. Design-Led Manufacturing Under Telecom PLI Scheme-

The scheme is based on the Production Linked Incentive Scheme under Atma Nirbhar Bharat Abhiyan with an aim of boosting domestic manufacturing and exports in the target segments of telecom and networking products to encourage Make in India. The Production Linked Incentive Scheme for Telecom and Networking Products was approved in February 2021 with an outlay of Rs. 12,195 crores for a period of 5 years. There is a 4-7% incentive on the sale of specified products under the scheme. The support under the Scheme is to be provided for a period of five (5) years, i.e. from FY 2021-22 to FY 2025-26.

Union Budget 2022-23 announced design-led manufacturing for 5G products to facilitate design-led manufacturing of 5G products under the PLI scheme for telecom and network products. It provides additional incentives of 1% over the existing incentives for products that are designed and manufactured in India. A total of 42 companies including 28 MSMEs have been approved by the Department of Telecommunications, out of which 17 companies are approved for the additional incentive of 1% under design-led manufacturing criteria.

The various other initiatives are as follows:

1. Telecom Technology Development Fund (TTDF) Scheme-

TTDF Scheme aims to fund R&D in rural-specific communication technology applications and form synergies among academia, startups, research institutes, and the industry for building and developing the telecom ecosystem. It will also help in creating the ecosystem for research, design, prototyping, use cases, pilots, proof of concept testing, etc. The scheme entails grants to Indian entities to encourage and induct indigenous technologies tailor-made to meet domestic needs.

2. Revival Plan of MTNL and BSNL-

In its meeting held on 27.07.2022, the Union Cabinet approved the revival plan of MTNL and BSNL. The highlights of the same are as follows:

- Raising Rs. 17,571 crores through sovereign guarantee bonds by MTNL for a term of 10 years or more with a waiver of guarantee fee for repaying the high-cost debt and restructuring it with a new substantial loan. The principal/interest will be repaid by MTNL through the proceeds of the rental/sale of land assets.

- All telecom services in Delhi and Mumbai will be provided by BSNL through the leasing of operational assets or any other appropriate model. After BSNL takes over the operation of MTNL in Delhi and Mumbai, the remaining assets with MTNL would continue to monetize to discharge its loan liabilities.
- The government will provide budgetary support of Rs. 1,600 crores for restructuring and operational integration of Telecom PSUs as a one-time grant for the unsustainable debt of MTNL.
- Sanction of capex of RS. 22,471 crores as equity infusion in BSNL in FY23 and FY24. It includes the project requirement of MTNL of RS. 1,851 crores in Delhi/Mumbai.

3. Champion Service Sector Scheme (CSSS)-

The Champion Service Sector Scheme is a central sector scheme of the Department of Commerce. It is an umbrella scheme with 2 sub-schemes of DoT.

Table 9: Details of sub-schemes in CSSS

Sub-Scheme under CSSS	Proposal Approver (2022-23)	Amount Approved
Brand Building of India as Telecom Manufacturing and Services Destination	Proposal for participation in 6 events/ exhibitions	Rs. 11.92 Cr
Digital Communication Innovation Square (DCIS)	Proposal for funding of 43 startups/ MSMEs/ consortiums	Rs. 51.56 Cr

4. Transition to the Next Generation of Internet Protocol-

The DoT has been working with ISPs, equipment manufacturers, data centre providers, states, UTs, central ministries, and departments for a smooth transition to Internet Protocol version 6 (IPv6). As a result, the majority of the stakeholders are ready to handle IPv6 traffic and offer IPv6 services. With an IPv6 capability ratio of 79.23%, India ranks 2nd out of 240 countries as per the latest information of the Asia Pacific Network Information Centre (APNIC).

5. Establishment of Digital Intelligence Unit (DIU)-

The DIU was created with an objective of strengthening the trust in digital ecosystem and mitigating frauds involving telecom resources. DIU has been conceptualized for the implementation of Big Data Analytics and Artificial Intelligence-based solutions to generate intelligence for uncovering telecom-related frauds in India.

6. Development of Online License Management System of DoT-

For issuing various types of licenses and registration certificates, a web-based portal 'SARAL SANCHAR' (Simplified Application for Registration and Licenses) has been developed by the Department of Telecommunications. SaralSanchar portal has also integrated with the National Single Window System (NSWS), BharatKosh, MCA-21 and NIC e-office to enable smooth filing, payment and processing of applications.

7. Launch of Bharat Digicom Innovation Portal-

Bharat Digicom Portal has been launched to promote the ecosystem of digital communication technologies and applications in India which is being developed by DoT along with TCoE (Telecom Centre of Excellence). It is a single-point engagement platform for all stakeholders.

10 Competitive Landscape

10.1 Financial Parameters

Indus Towers and GTL Infrastructure Ltd. are the two largest players in the telecom tower construction sector. Since their revenues and other parameters are not comparable to SAR Televenture in terms of size of business, Indus Towers and GTL Infrastructure Ltd are excluded from the competitive landscape and the comparable companies Suyog Telematics and Kore Digital are considered in the peer comparison.

Total Revenue

Indus Tower Limited is the largest player in terms of revenue but SAR Televentures have increased their revenue by 584% y-o-y which is more than any of its peers.

Table 10: Total Revenue of Telecom Tower Companies (Rs. Lakh.)

Peers	FY21	FY22	FY23	Sep-22	Sep-23
SAR Televenture Ltd	91	475	3,252	321	3,582
Indus Towers Ltd	14,55,120	28,06,970	28,74,300	1,50,193	14,36,210
GTL Infrastructure Ltd	1,44,884	1,47,689	1,48,533	72,748	74,701
Suyog Telematics Ltd	13,453	13,185	15,228	7,297	8,329
Kore Digital Ltd	398	1,694	2,127	616	1,502

Source: Company Annual Reports, CareEdge Research

[Note: 0% in the below charts indicates data unavailability or negative ratios

Formula Used-

EBITDA Margin= EBITDA/Operating Revenue

PAT Margin= PAT/Operating Revenue

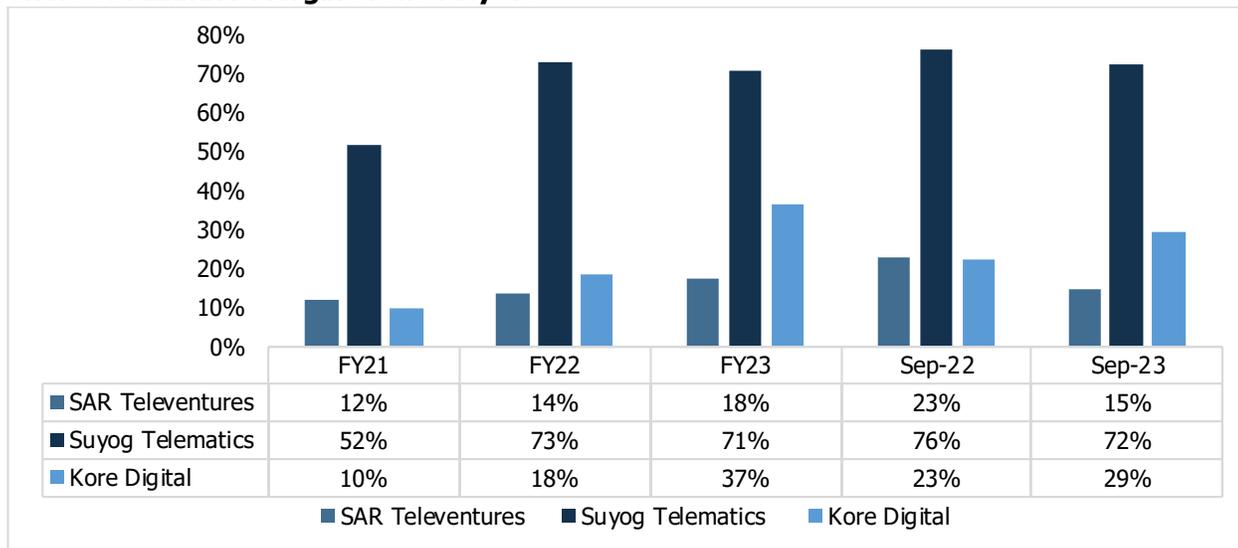
ROE= PAT/ Shareholder's Equity

ROCE= EBIT/Average Equity+ Average Long-Term Liability]

EBITDA Margin

SAR Telventure Ltd has the EBITDA Margin of 18% in FY23 showing increased profitability, improved revenue and lower operating expense.

Chart 35: EBITDA Margin of the Players

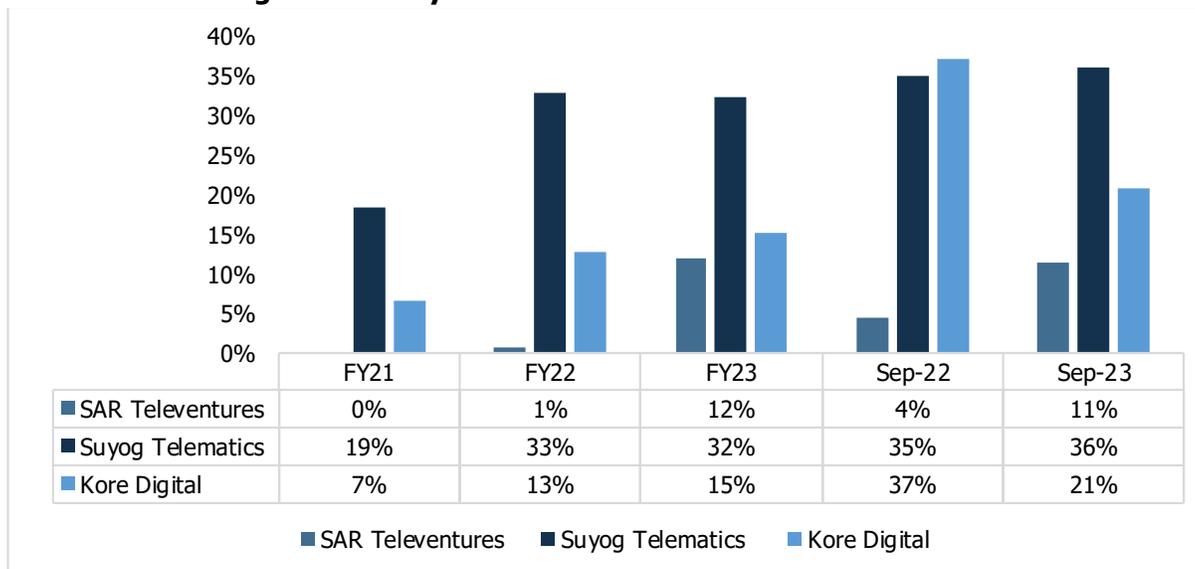


Source: Company Annual Reports

PAT Margin

In FY23, Suyog Telematics reported the highest PAT Margin of 32% followed by Kore Digital and SAR Televenture Ltd of 15% and 12% respectively. SAR Televenture Ltd has the highest growth in PAT Margin amongst its peers.

Chart 36: PAT Margin of the Players

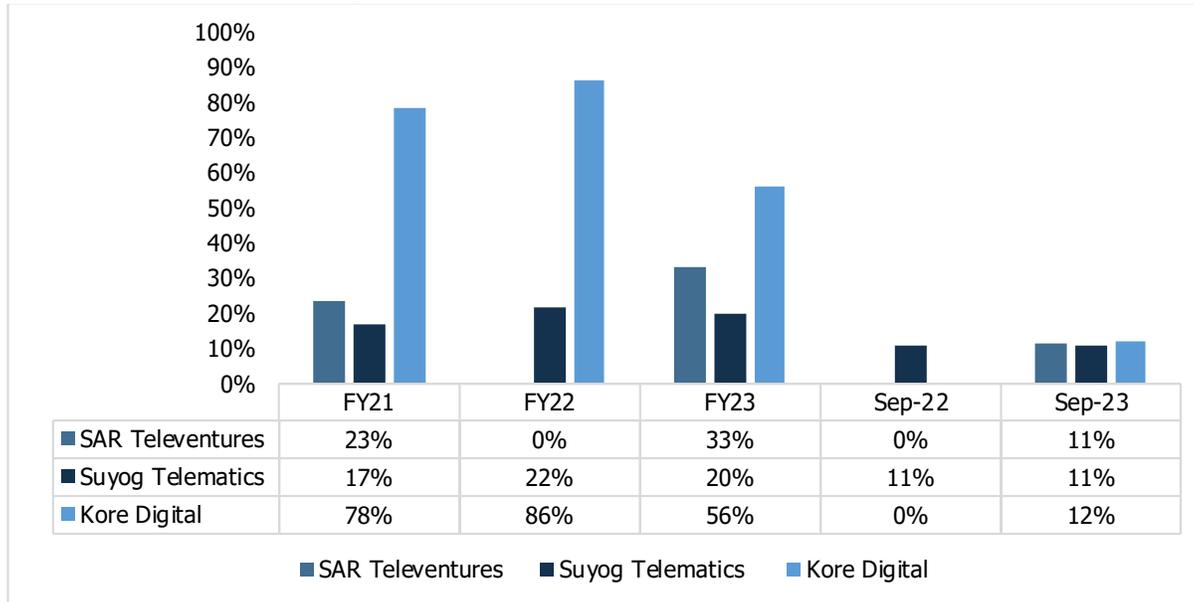


Source: Company Annual Reports

Return on Equity

SAR Televenture Ltd has significant improvement in their Return on Equity of 33% from negative ROE in FY22 because of improved revenue in FY23.

Chart 37: Return on Equity (RoE) of the Players

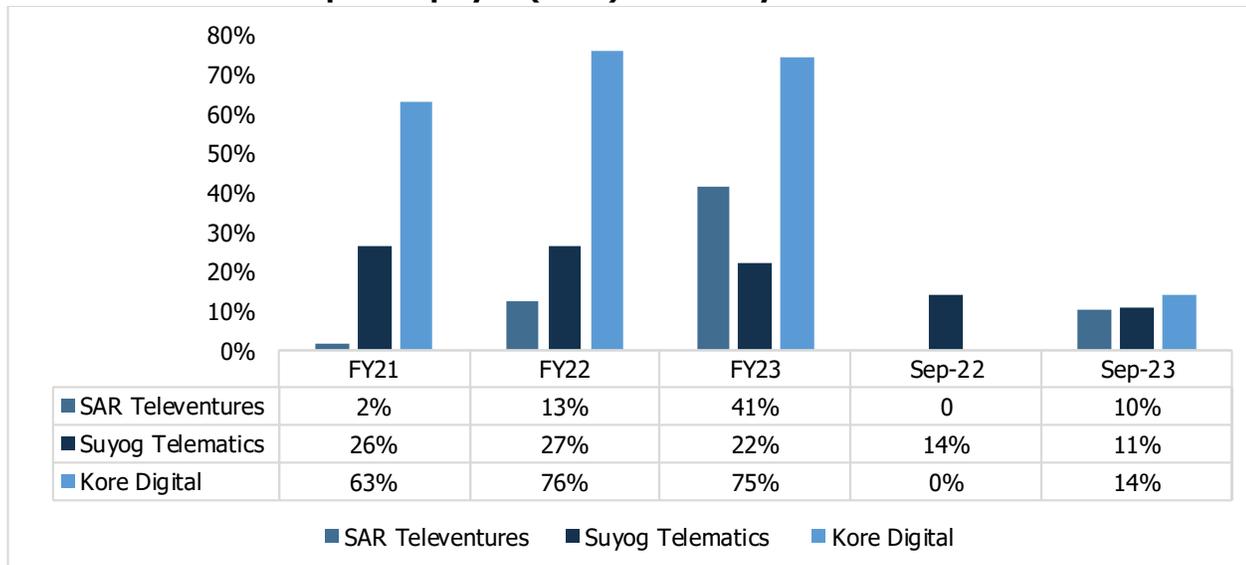


Source: Company Annual Reports

Return on Capital Employed

SAR Televenture Ltd have the highest ROCE of 41% in FY23 which indicated increased profitability per unit of capital employed. Kore Digital has the highest ROCE of 75% in FY23 followed by SAR Televenture Ltd.

Chart 38: Return on Capital Employed (RoCE) of the Players

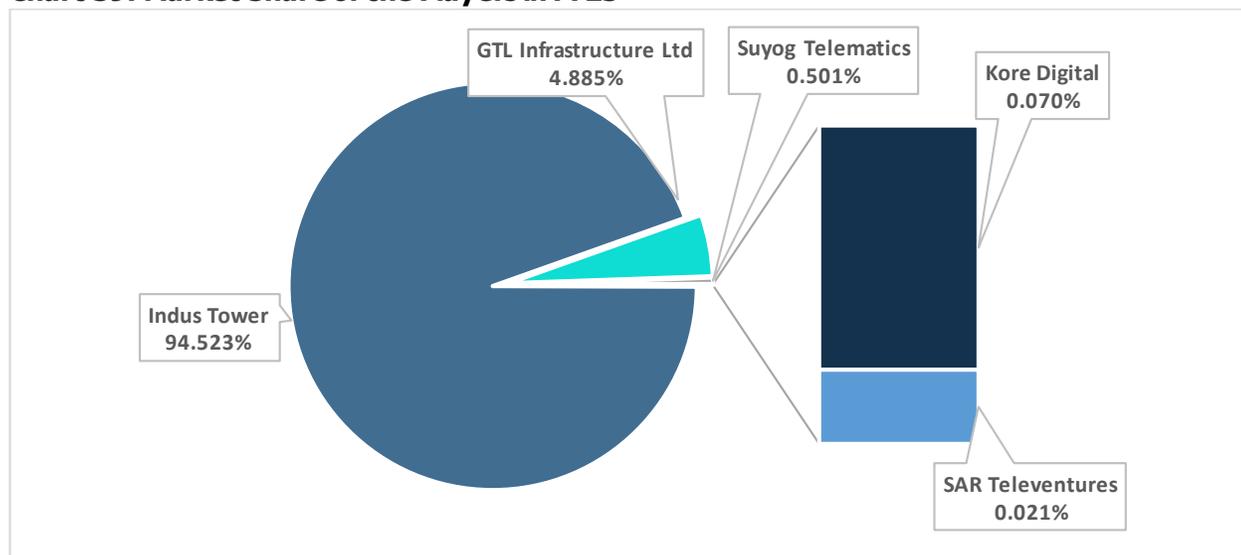


Source: Company Annual Reports

Market Share

In FY23, Indus Tower commanded the highest market share of 94.5% in terms of Revenue generated among the players. Market share held by GTL Infrastructures, Suyog Telematics, Kore Digital and SAR Televentures were 4.9%, 0.5%, 0.07% and 0.02% respectively.

Chart 39: Market Share of the Players in FY23



Source: Company Annual Reports

10.2 Player Profiles

SAR Televenture

SAR Televenture Limited, is engaged in providing telecommunication solutions to telecom network operators for telecom industry in India and has international operations in UAE through its subsidiary M/s SAR TELEVENTURES FZE.

With a professional team, SAR has installed 373 towers and leased to Airtel and plans to deploy over 1500 additional 5G/4G towers by FY25. SAR holds the following ISO certifications- ISO 9001:2015 for Quality Management Systems, ISO 45001:2018 for Occupational Health and Safety Management and ISO 9001:2015 for Environment Management System. The company is registered as Infrastructure Provider Category- I (IP-I) with Department of Telecommunication (DOT). SAR Televenture Ltd had a turnover of more than Rs. 2500 Lakhs in the fiscal year FY23.

Table 11: Company Financials of SAR Televenture(INR Lakhs)

Particulars	FY21	FY22	FY23	Sep-22	Sep-23
Operating Revenue	90.7	472.9	3246.2	319.3	3578.0
Total Revenue	90.7	475.3	3251.6	320.9	3581.5
Expenses	79.9	410.0	2675.8	247.3	3057.7
EBITDA	10.8	65.3	575.9	73.6	523.8
DnA	9.7	40.9	103.2	37.9	88.4
EBIT	1.1	24.4	472.7	35.8	435.4
PAT	-2.7	3.7	388.4	14.0	405.9
EBITDA margin (%)	12%	14%	18%	23%	15%

PAT margin (%)	-3%	1%	12%	4%	11%
Total Equity	-11.6	-7.7	1178.7	N/A	3554.5
Total Assets	144.8	410.8	2420.7	N/A	4705.5
Long Term Liabilities	137.0	267.6	841.5	N/A	706.6
Current Liabilities	19.4	151.0	397.5	N/A	1151.1
Return on Equity	23%	-48%	33%	N/A	11%
Return on Capital Employed	2%	13%	41%	N/A	10%

Source: Company Annual Reports, Company's Quarterly Financial Reports

(Consolidated Basis)

Indus Towers

Indus Towers Limited is India's leading provider of passive telecom infrastructure and it deploys, owns and manages telecom towers and communication structures, for various mobile operators. The Company's portfolio of over 211,775 telecom towers, makes it one of the largest tower infrastructure providers in the country with a presence in all 22 telecom circles and have installed 1,92,874 towers. Indus Towers caters to all wireless telecommunication service providers in India. The Company has been the industry pioneer in adopting green energy initiatives for its operations.

Table 12: Company Financials of Indus Towers (INR Lakhs)

Particulars	FY21	FY22	FY23	Sep-22	Sep-23
Operating Revenue	13,95,430	27,71,720	28,38,180	14,86,390	14,20,840
Total Revenue	14,55,120	28,06,970	28,74,300	15,01,930	14,36,210
Expenses	6,69,440	12,77,430	18,61,480	5,29,000	7,12,340
EBITDA	7,85,680	15,29,540	10,12,820	9,72,930	7,23,870
DnA	2,98,580	5,42,220	5,44,100	2,70,940	2,95,220
EBIT	4,87,100	9,87,320	4,68,720	7,01,990	4,28,650
PAT	3,33,820	6,37,310	2,04,000	1,34,910	2,64,260
EBITDA margin (%)	56%	55%	36%	65%	51%
PAT margin (%)	24%	23%	7%	9%	19%
Total Equity	15,87,700	22,15,050	21,10,950	20,47,490	23,69,890
Total Assets	44,94,370	47,96,760	46,57,240	47,03,610	52,15,530
Current Liabilities	13,94,630	8,82,690	8,16,280	10,68,240	10,23,770
Long term liabilities	15,11,610	35,65,630	37,86,480	15,87,880	18,21,870
Return on Equity	21%	29%	9.6%	7%	11%
Return on Capital Employed	16%	17%	8%	20%	11%

Source: Company Annual Reports, Company's Quarterly Financial Reports

(Consolidated Basis)

GTL Infrastructure

GTL Infrastructure Ltd. (GTL Infra) is India's largest independent Telecom Tower company, managing 22,847 towers nationwide. Specializing in shared passive telecom infrastructure, it enables Wireless Telecom Operators to shift capital expenditure to operational costs. Operating under long-term contracts (5-10-15 years), GTL Infra supports the vision of connected India, contributing to Digital India through its state-of-the-art tower network. The company is engaged in prestigious projects with the Department of Telecommunications and COAI, including USO for rural telecom infrastructure. GTL Infra, listed on BSE and NSE, is a key player in fostering nationwide connectivity.

Table 13: Company Financials of GTL Infrastructure (INR Lakhs)

Particulars	FY21	FY22	FY23	Sep-22	Sep-23
Operating Revenue	1,40,968	1,46,273	1,45,786	72,016	70,339
Total Revenue	1,44,884	1,47,689	1,48,533	72,748	74,701
Expenses	1,14,043	1,05,103	1,43,020	68,264	45,244
EBITDA	28,258	30,841	42,586	3,752	25,095
DnA	54,718	50,357	50,357	25,645	16,461
EBIT	-23,877	-7,733	-44,844	-21,893	8,634
PAT	-1,27,077	-1,47,467	-1,81,691	-59,741	-27,203
EBITDA margin (%)	22%	29%	4%	5%	36%
PAT margin (%)	-90%	-101%	-125%	-82%	-36%
Total Equity	-1,28,710	-2,74,554	-4,54,074	-3,32,302	-4,67,740
Total Assets	6,44,666	5,55,458	4,27,083	5,23,481	4,27,608
Current Liabilities	7,10,032	7,64,216	8,21,823	7,92,129	8,38,750
Long Term Liabilities	63,344	4,74,554	3,41,824	N/A	N/A
Return on Equity	99%	54%	40%	18%	6%
Return on Capital Employed	-4%	-1.6%	-11.1%	6.4%	-2.1%

Source: Company Annual Reports, Company's Quarterly Financial Reports

(Consolidated Basis)

Suyog Telematics

Suyog Telematics Limited (STL) is one of the fastest-growing passive telecom infrastructure providers in India. It is engaged primarily in the business of installing, commissioning and servicing poles, towers and optical fibre cable (OFC) systems, catering to the telecommunication industry with operators across 12 telecom circles of the country and having installed 4,263 towers, they partner with the telecom providers to host their active telecommunication infrastructure in different geographies.

Table 14: Company Financials of Suyog Telematics (INR Lakhs)

Particulars	FY21	FY22	FY23	Sep-22	Sep-23
Operating Revenue	13,180	12,634	14,364	6,775.36	7,953.5
Total Revenue	13,453	13,185	15,228	7,296.94	8,328.5
Expenses	6,620	3,970	5,080	2281.08	2446
EBITDA	6832.7	9214.6	10148.4	5157.2	5741
DnA	1,571	2,158	2,643	885.96	1541.5
EBIT	5261.8	7057.0	7505.2	4271.2	4199.6
PAT	2,440	4,138	4,631	2355.47	2848.7
EBITDA margin (%)	52%	73%	71%	76%	72%
PAT margin (%)	19%	33%	32%	35%	36%
Total Equity	14,350	18,831	23,426	21,199.82	26390.8
Total Assets	31,354	36,086	47,978	43670.24	53355.6
Long Term Liabilities	8815.4	10956.6	14212.28	14628.35	15997.5
Current Liabilities	8,815	6,299	10,339	7842.07	10967.3
Return On Equity	17%	22%	20%	11.1%	10.8%

Return on Capital Employed	26%	27%	22%	14%	11%
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Source: Company Annual Reports, Company's Quarterly Financial Reports

(Consolidated Basis)

Kore Digital

Kore Digital Limited, a telecom and infrastructure development expert, boasts a track record of over 600 pole-based cell sites, diverse RTTs, GBTs, and Microwave backhaul projects in Mumbai and its environs. With a 700 KM Optical Fiber Cable Infrastructure Backbone, the company completed a prestigious FTTC project for the Indian Navy, earning quality certification from LAVITON US. Currently engaged in key projects like duct route construction, traffic management systems, and micro-surfacing, Kore Digital Limited is a lead system integrator for major telecom players and provides cutting-edge connectivity solutions to top corporate clients.

Table 15: Company Financials of Kore Digital (INR Lakhs)

Particulars	FY21	FY22	FY23	Sep-22	Sep-23
Operating Revenue	397.8	1693.9	2127.5	616	1501.9
Total Revenue	397.9	1694.5	2127.5	616	1501.9
Expenses	356.9	1381.4	1652.9	476.7	1061
EBITDA	40.9	312.5	778.3	139.5	440.9
DnA	4.9	8.4	25.2	10	15.4
EBIT	36	30	753.2	129	425.4
PAT	25.9	217.9	322.2	228.57	310.9
EBITDA margin (%)	10%	18.4%	22%	23%	29.3%
PAT margin (%)	7%	13%	15%	37%	21%
Total Equity	34	252	574.3	N/A	2634.3
Total Assets	575.4	1,441.6	3,598	N/A	5687.4
Long Term Liability	23.2	149.7	435.89	N/A	421.7
Current Liabilities	519.3	1,109.7	2,784.6	N/A	2802
Return on Equity	63%	76%	75%	N/A	14%
Return on Capital Employed	64%	157%	79%	N/A	23%

Source: Company Annual Reports, Company's Quarterly Financial Report

(Consolidated Basis)

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