Wireless Data Services in India

An Analytical Report

Telecom Regulatory Authority of India
Government of India

सत्यमेव जयते

TRAI

Telecom Regulatory Authority of India

(IS/ISO 9001-2008 Certified Organisation)

Wireless Data Services in India

An Analytical Report

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From the Desk of the Chairperson

The Telecom Regulatory Authority of India (TRAI), in recent years, has taken many initiatives to empower the consumer and promote the growth of telecommunications sector. Telecommunications is one of the fastest evolving sectors in the world and telecom providers need to innovate continually in order to remain competitive. The new technologies have led to convergence of networks with a single network delivering voice as well as data services. This has resulted in an explosive growth in data usage in India accompanied by a sharp fall in prices. The mobile data usage per subscriber in India is amongst the highest in the world and the price of data amongst the lowest.

With the forbearance regime adopted by TRAI in telecom tariff, intense competition and technological developments in the sector, the last few years have witnessed greater wireless data usage for communication and entertainment. With the mobile service providers employing technologies like Long Term Evolution (LTE)/4G technologies, proliferation of affordable mobile handsets and low tariffs, the volume of usage of data is expected to grow similarly in future also.

This report is based on information & statistics from various resources available with TRAI and is an in-house exercise. I must acknowledge the efforts put in by the TRAI's Finance and Economic Analysis (F&EA) team led by Shri S.K. Mishra, Principal Advisor (Finance and Economic Analysis).

This report provides an excellent perspective of the wireless data usage and its growth in India. We hope this report will be useful to stakeholders.

R.S. SHARMA
Chairperson


FINANCE REPORT
ACCOUNT REPORT
DASHBOARD > INCOME
DAILY WEEKLY MONTHLY
5M$
4M$
3M$
2M$
1M$
MON TUE WED THU FRI SAT SUN
TOTAL INCOME
37.91%
31.86%
30.23%
LINE ITEMS 16.15 M$
SHIPPING 0.15 M$
TAXES 0%
TOTAL 16.3 M$
LINE ITEMS 13.5 M$
SHIPPING 0.2 M$
TAXES 0%
TOTAL 13.7 M$
LINE ITEMS 13.00 M$
SHIPPING 0 $
TAXES 0%
TOTAL 13.00 M$

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CHAPTERS

Introduction

This Report presents the Key Parameters and growth trends of Wireless Data Usage, Wireless Data Subscribers, Market Share in Wireless Data Services, Wireless Data Revenue, Average cost to subscriber for Wireless Data etc. in the last four years. The information available in this report is largely based on the data/information provided by the telecom service providers to the Telecom Regulatory Authority of India.

Last four years have witnessed unprecedented growth in wireless data usage for communication and entertainment. With the entry of a new TSP using Long Term Evolution (LTE)/4G technology and also the consequent gradual adaptation of this technology by the leading incumbents, data usage has grown sharply and it is expected to grow further in future also. Upgradation of mobile networks from 2G to 4G in large parts of the country along with availability of smart phones at relatively affordable prices is driving the mobile internet subscriptions. On one hand, with the steep decline in tariffs of telecommunication services, the affordability has increased, on the other hand the content, not only in English and Hindi, but in regional languages also, is readily available at affordable price to the consumers. As a result, consumption of data has increased multifold. Access to internet has empowered millions of Indians by giving them access to real-time information, government services, e-markets, and social media. This development is having a positive impact on improving their quality of life with digital information.

This report has been divided into four chapters: -

(1) Wireless data subscribers,

(2) Volume of wireless data usage,

(3) Revenue from wireless data usage

(4) Wireless Data Usage – Future

Chapter-1

Chapter-1 is about the wireless data subscription which includes yearly net addition and year-on-year growth rate of wireless data subscribers. This also includes distribution of technology-wise and LSA-wise number of wireless data subscribers, share of PSUs and Private operators in wireless data subscribers, etc.

Chapter-2

Chapter-2 discusses year-wise volume of wireless data usage which includes total volume of wireless data usage, its yearly growth rate, volume of per subscriber wireless data usage, distribution of technology-wise data usage, etc.

Chapter-3

Chapter-3 is related to annual revenue collected by the wireless telecom service providers from their customers for wireless data usage. It also includes annual growth of data revenue, average revenue per data subscriber for wireless data usage, average cost to subscriber for per GB wireless data services, etc.

Chapter-4

Chapter-4 deliberates about the projections about growth of wireless data services in Indian Telecom Sector and international trends in growth of wireless data services. Apart from the data available with TRAI, various other recent research reports and the projections made therein, have been cited.

Executive Summary

- The rapid revolution of tele-communications services in India has aided the overall economic and social development of the country. It has enabled better connectivity among users and greater use of information and communication technology (ICT) services and emergence of a variety of new business models. Due to length and breadth of the country, wireless access network is the primary source for such connectivity. Last few years have seen rapid transformation of the Indian telecom sector with introduction of LTE technology and the resultant intense competition among telecom service providers.
- Total number of wireless data subscribers increased from 424.02 million at the end of the year 2017 to 578.20 million at the end of the year 2018 with yearly growth rate of 36.36%. The number of wireless data subscribers was 281.58 million at the end of the year 2014.
- The volume of total wireless data usage increased from 20,092 million GB during the year 2017 to 46,404 million GB during the year 2018 with yearly growth of 131%. The volume of total wireless data usage was 828 million GB during the year 2014.
- 4G technology (LTE – Long Term Technology) was introduced in India during the year 2016. During a short period of time, 4G data technology became the market leader in wireless data usage. The share of 4G data usage in total volume of wireless data usage has been 86.85% during the year 2018.
- Total revenue collected from wireless data usage was Rs. 54,671.44 crore (excluding rental revenue) in the year 2018 as compared to Rs. 38,882 crore in the year 2017.
- The volume of average wireless data usage per wireless data subscriber per month has increased from 4.13 GB during the year 2017 to 7.69 GB during the year 2018.

- The average cost to subscriber for per GB wireless data usage was Rs. 11.78 per GB during the year 2018 as compared to Rs. 19.35 per GB during the year 2017. It may be noted that the average cost to subscriber for wireless data was Rs. 226 per GB during the year 2015 i.e. before introduction of 4G (LTE) technology.
- After the entry of a new telecom player in wireless telecom service with state-of- the-art 4G technology in the year 2016, average cost to subscriber for wireless data has declined steeply during the years 2017 and 2018, due to intense tariff competition in the telecom service sector.
- Average revenue per wireless data subscribers (data ARPU) per month increased from Rs. 79.98 in the year 2017 to Rs. 90.61 in the year 2018. It was recorded Rs. 71.25 per wireless data subscriber per month in the year 2014.
- Number of wireless data subscribers has increased year on year and simultaneously, the volume of wireless data usage increased multifold during the last two years. However, average revenue per wireless data subscriber showed mixed trend during the last four years.
- The year 2016 ushered in a revolution in the way Indians used mobile data owing to the widespread deployment of 4G, but the world is swiftly moving on to even greater levels of data usage with the commercial deployment of 5G technologies in the near future.
- Both, the Government of India and the telecom industry, have announced that they have initiated preparatory steps for smooth and efficient rollout of 5G for the benefit of the consumers and the overall economic development of the country.

Chapter 1:

Wireless Data Subscribers

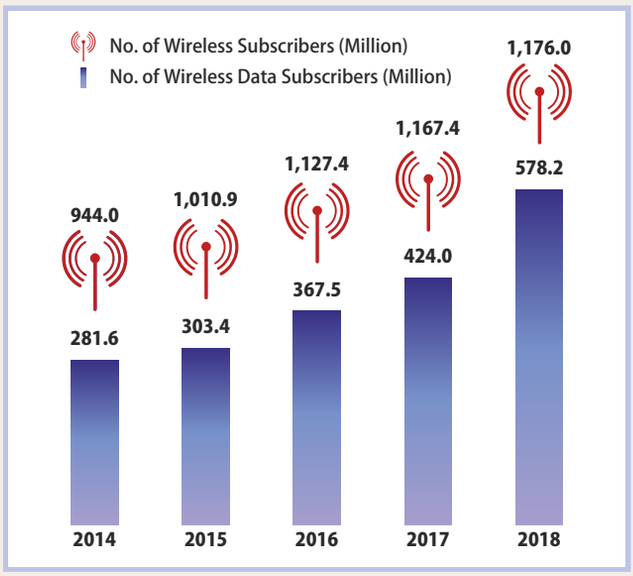
As per information received from the wireless access service providers, number of wireless data subscribers has increased from 424.02 million at the year ending 2017 to 578.20 million at the year ending 2018 with yearly growth rate of 36.36%. Merely five years ago, at the close of year 2013, there were only 227.91 million wireless data subscribers in the country.

Total number of wireless data subscribers comprises number of GSM (including LTE) and CDMA data subscribers. Number of GSM data subscribers includes 2G, 3G and 4G data subscribers.

Total number of wireless telephone subscribers was 1176.00 million at the year ending 2018. Out of total number of wireless telephone subscribers, the number of wireless data subscribers was 578.20 million at the year ending 2018. Thereby, the share of wireless data subscribers was 49.17% of the total wireless telephone subscribers at the year ending 2018. The share of such wireless data subscribers was 36.32% of the total wireless subscribers at the end of year 2017. It can be seen from Chart 1.2 that 2016 onwards the wireless access subscribers have increasingly opted for wireless data subscription also.

The following Charts depict the number of wireless subscribers and wireless data subscribers and their share.

Chart 1.1: Trend of total wireless telephone subscribers and total wireless data subscribers



Nonetheless, despite the phenomenal growth trajectory of wireless data subscribers in the last five years, 50% of the total wireless subscribers – 598 million in absolute numbers, still do not avail data services.

Chart 1.2: Share of number of wireless data subscribers over total number of wireless subscribers

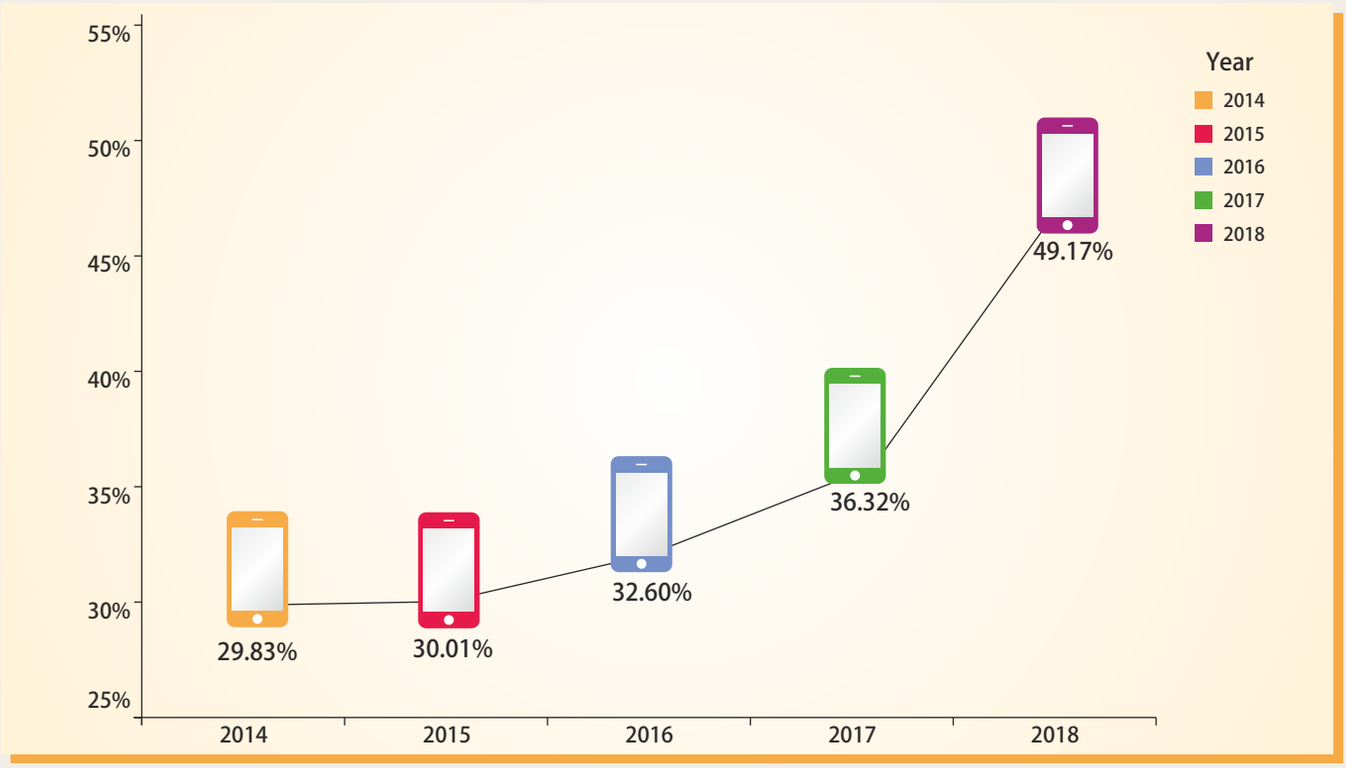


Table 1.1: Number of Wireless Data Subscribers (in million)

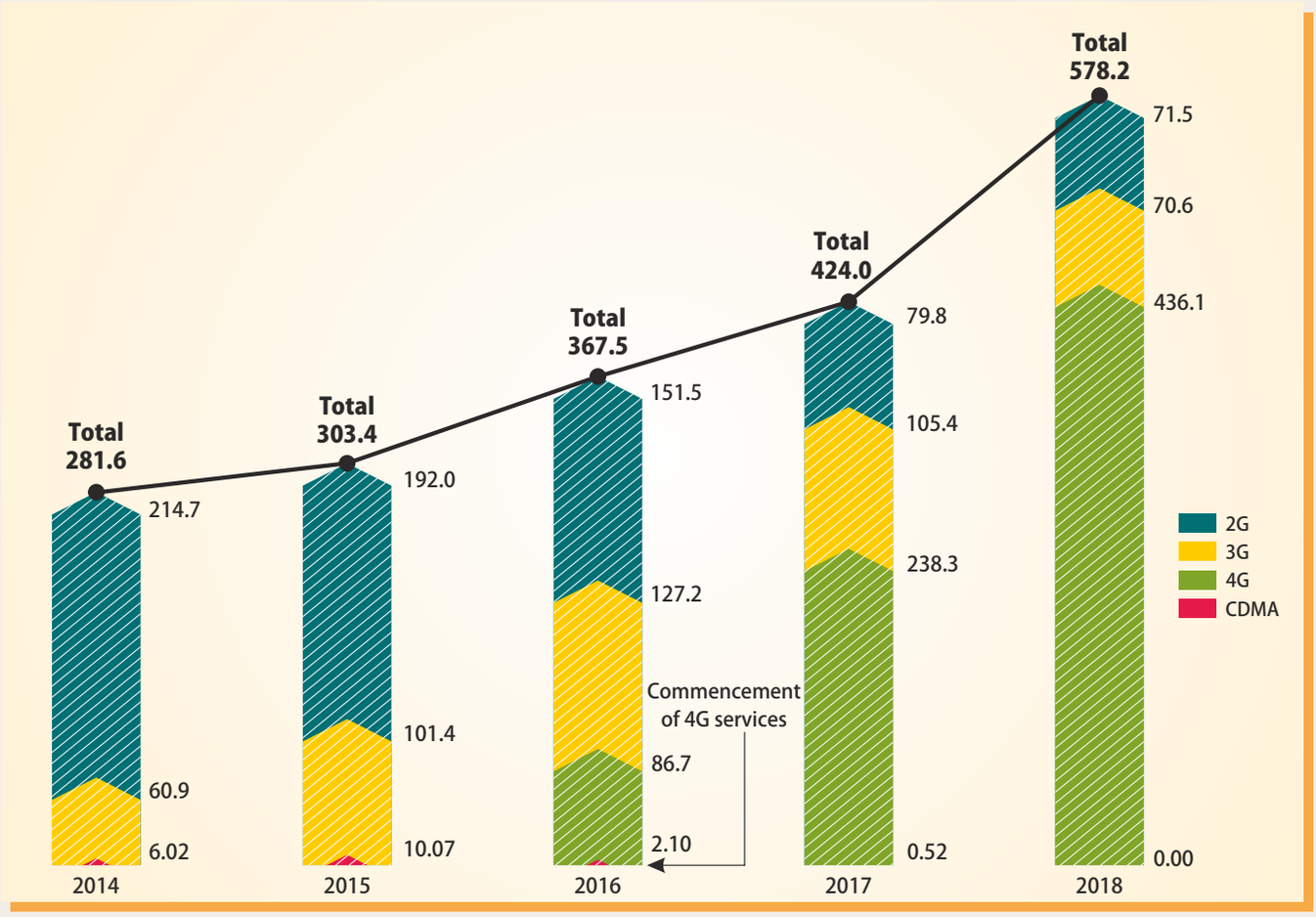
Year of Year Ending	No. of Wireless Subscribers (million)	No. of Wireless Data Subscribers (million)	Year Over Year Growth in Wireless Subscribers	Year Over Year Growth in Wireless Data Subscribers
2014	943.97	281.58		
2015	1,010.89	303.40	7.09%	7.75%
2016	1,127.37	367.49	11.52%	21.12%
2017	1,167.44	424.02	3.55%	15.38%
2018	1,176.00	578.20	0.73%	36.36%

As can be seen in Chart 1.2 and Table 1.1, growth of wireless data subscribers is much more than the growth of total wireless telephone subscribers in the last few years.

Percentage of number of wireless data subscribers over total wireless subscribers increased from 36.32% at the year ending 2017 to 49.17% at the year ending 2018. Share of wireless data subscribers was 29.83% over total wireless subscribers at the year ending 2014.

Post 2016, the explosive growth of wireless data subscribers can be attributed to the introduction of 4G (LTE) technology at affordable rates on a pan-India scale. In a short period of two years, 4G technology became the leading technology as reflected in the following Chart 1.3.

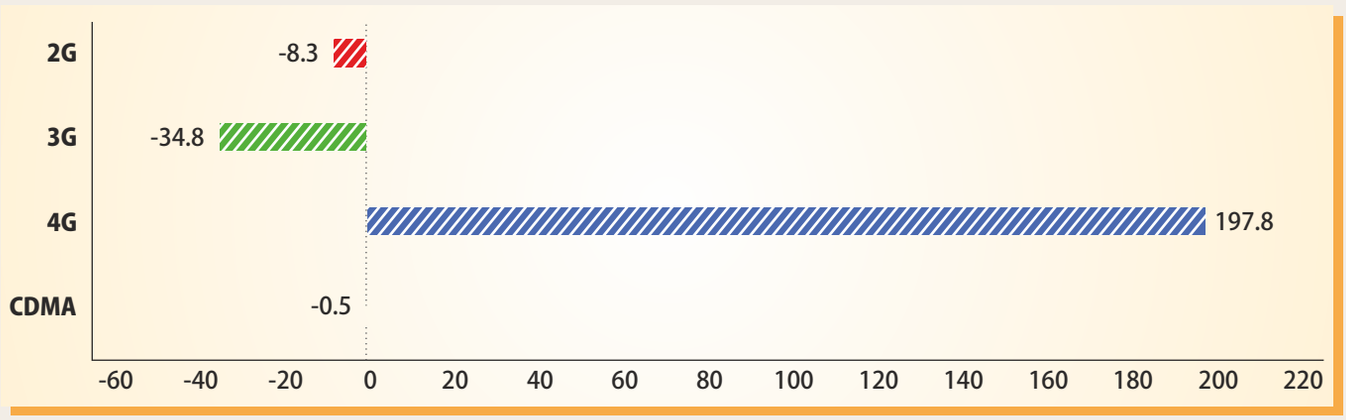
Chart 1.3: Technology-wise trend in number of wireless data subscribers at the end of the year



As may be seen in the Chart 1.3, during the last two years, number of 4G data subscribers increased manifold from 86.68 million at the end of year 2016 to 436.12 million at the year ending 2018. On the other hand, number of 2G, 3G and CDMA data subscribers showed declining trend over the years. It may be inferred that 2G, 3G and CDMA data subscribers have gradually shifted to 4G (LTE) technology.

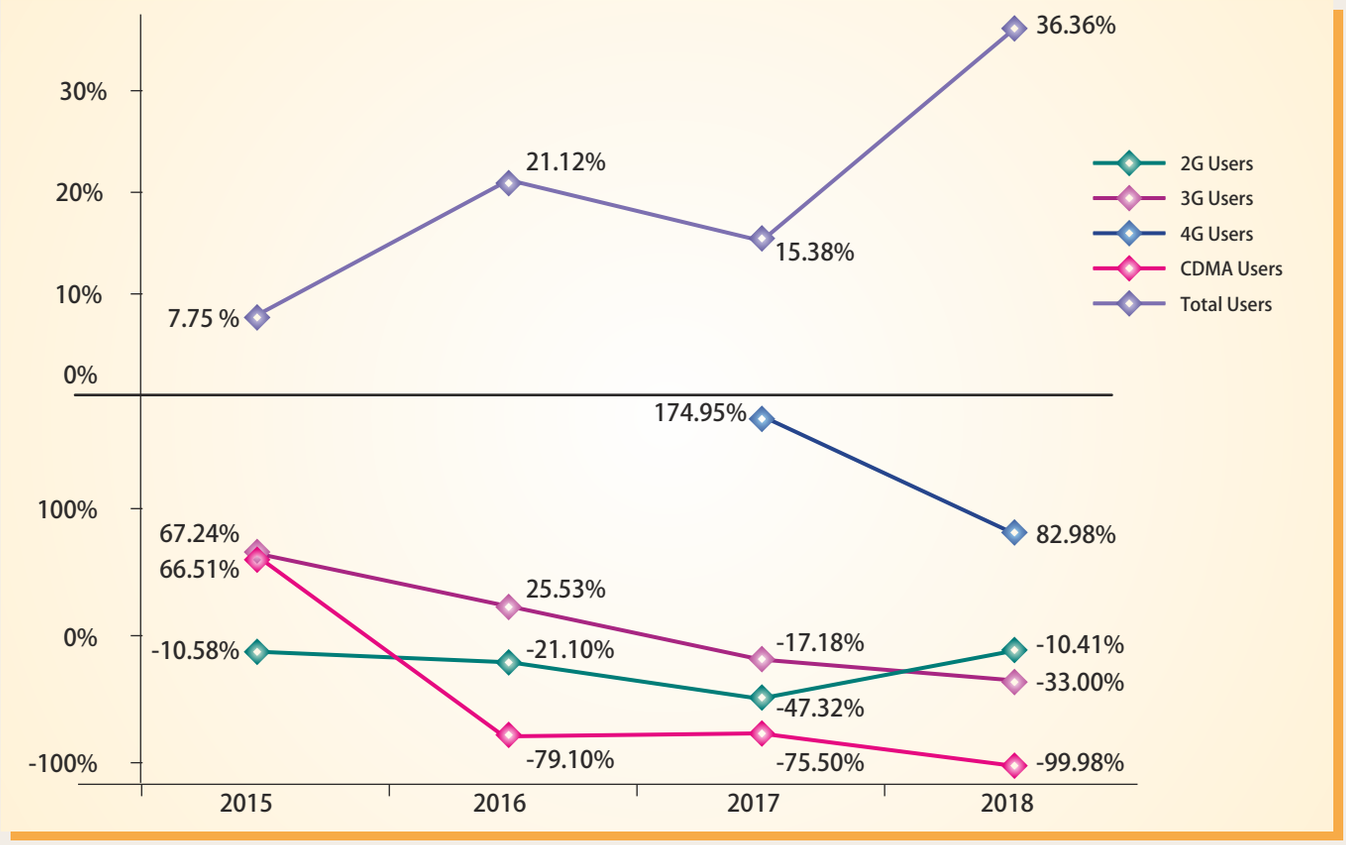
The following Chart depicts technology-wise net addition/decline in total number of wireless data subscribers during the year 2018. As can be observed, 4G technology has seen a net addition of 197.8 million subscribers during 2018 whereas 2G and 3G technology are losing their subscribers' base. This steep addition to 4G subscriber base can be attributed not only to new subscribers but also to shifting of subscribers from 2G/3G/CDMA to 4G.

Chart 1.4: Technology-wise trend of net addition in wireless data subscribers during the year 2018 (in million)



The following Chart shows the technology-wise yearly growth (%) in number of wireless data subscribers during the last three years.

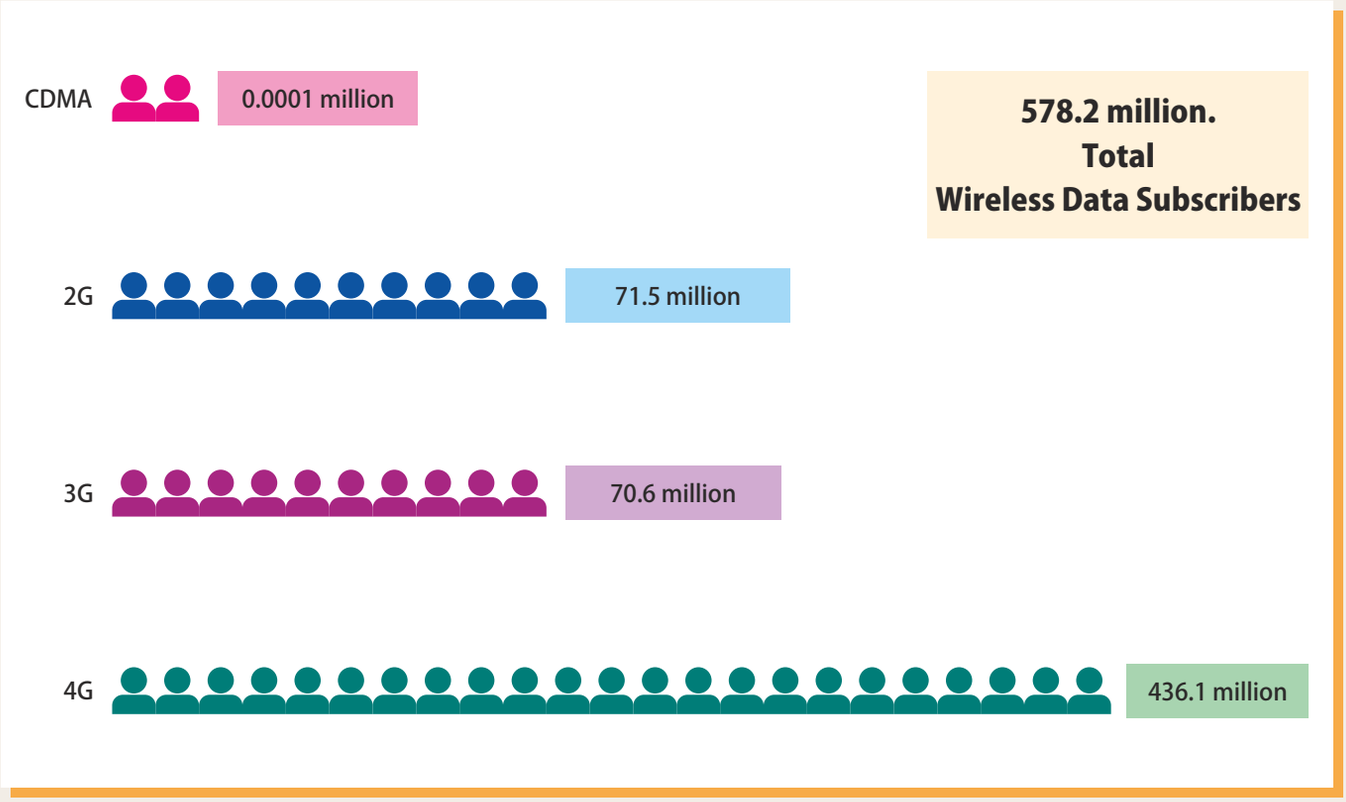
Chart 1.5: Technology-wise yearly growth (%) in number of wireless data subscribers



It may be seen in the Chart 1.5 that wireless data subscription of 2G, 3G and CDMA technologies showed decline from the year ending 2017 to year ending 2018. However, total number of wireless data subscribers increased by 36.36% during the year due to tremendous growth in number of 4G subscribers in 2018.

The following Chart depicts the technology-wise distribution of number of wireless data subscribers at the end of year 2018.

Chart 1.6: Technology-wise distribution of number of wireless data subscribers at the end of the year 2018



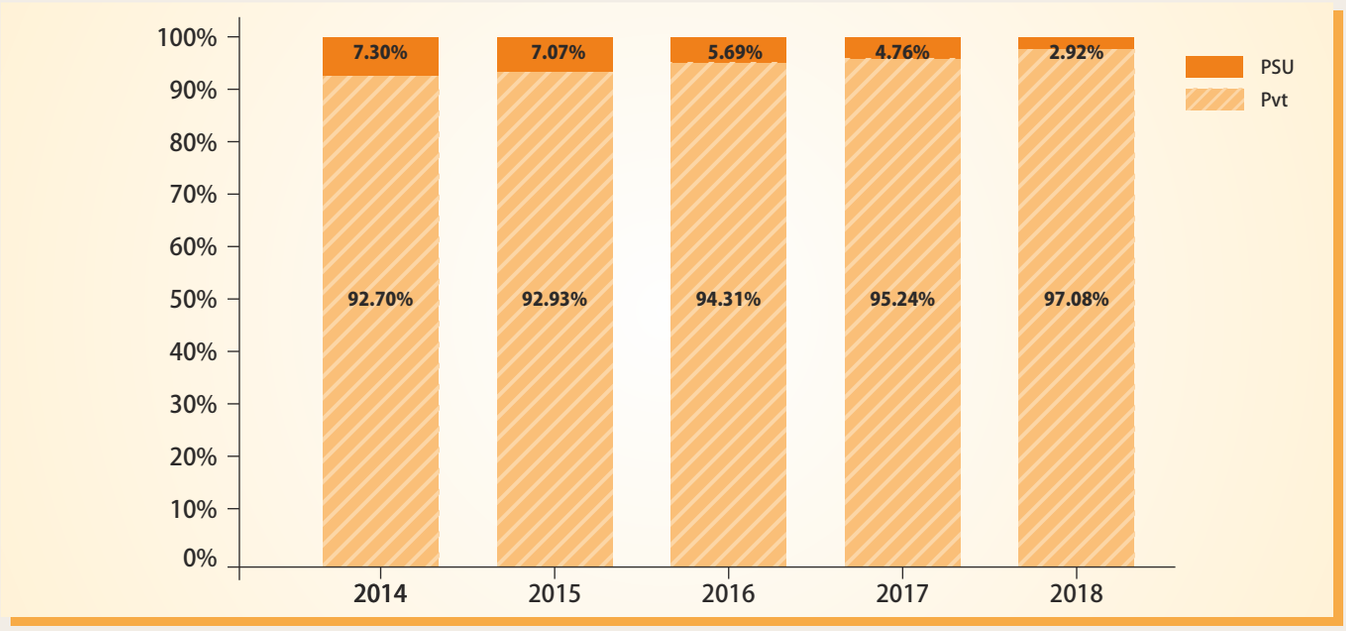
Out of total number of wireless data subscribers of 578.20 million at the year ending 2018, the share of public sector undertakings (BSNL & MTNL) is 16.91 million which constitutes 2.92% of the total wireless data subscription (Table 1.2). On the other hand, private telecom operators have 97.08% of market share with 561.29 million wireless data subscribers at the end of 2018.

Table 1.2: Distribution of number of Wireless Data Subscribers in Private & PSU operators (in million)

Year	PSU	Pvt	Grand Total
2014	20.6	261.0	281.6
2015	21.4	282.0	303.4
2016	20.9	346.6	367.5
2017	20.2	403.8	424.0
2018	16.9	561.3	578.2

The following Chart depicts the trend of Private vs. PSU market share of wireless data subscription during the last five years.

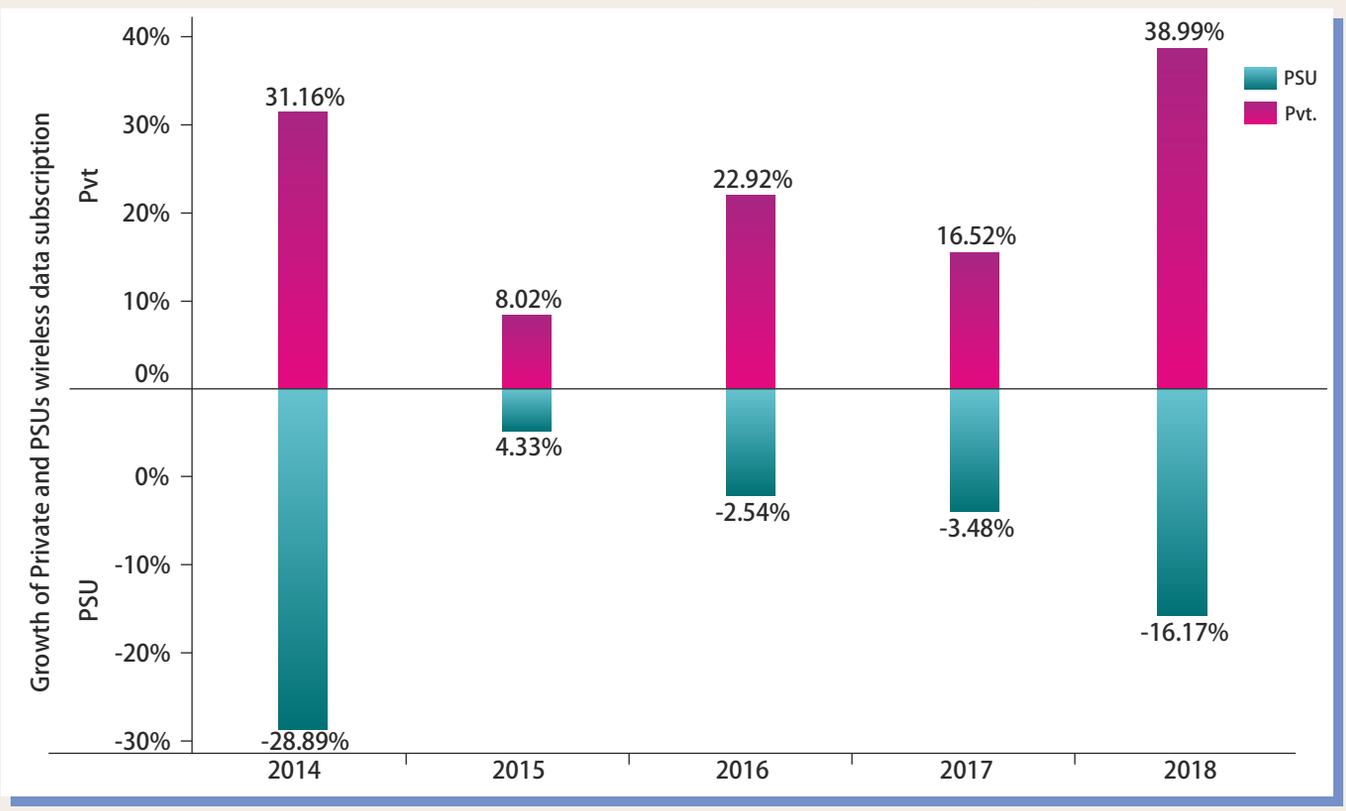
Chart 1.7: Private vs. PSU market share (%) of wireless data subscription



Share of public sector undertakings in total wireless data subscription has declined from 7.30% in the year 2014 to 2.92% in the year 2018. Market share of private players in total wireless data subscription has increased from 92.70% in the year 2014 to 97.08% in the year 2018. Here, it may be noted that PSUs (BSNL and MTNL) do not have 4G spectrum.

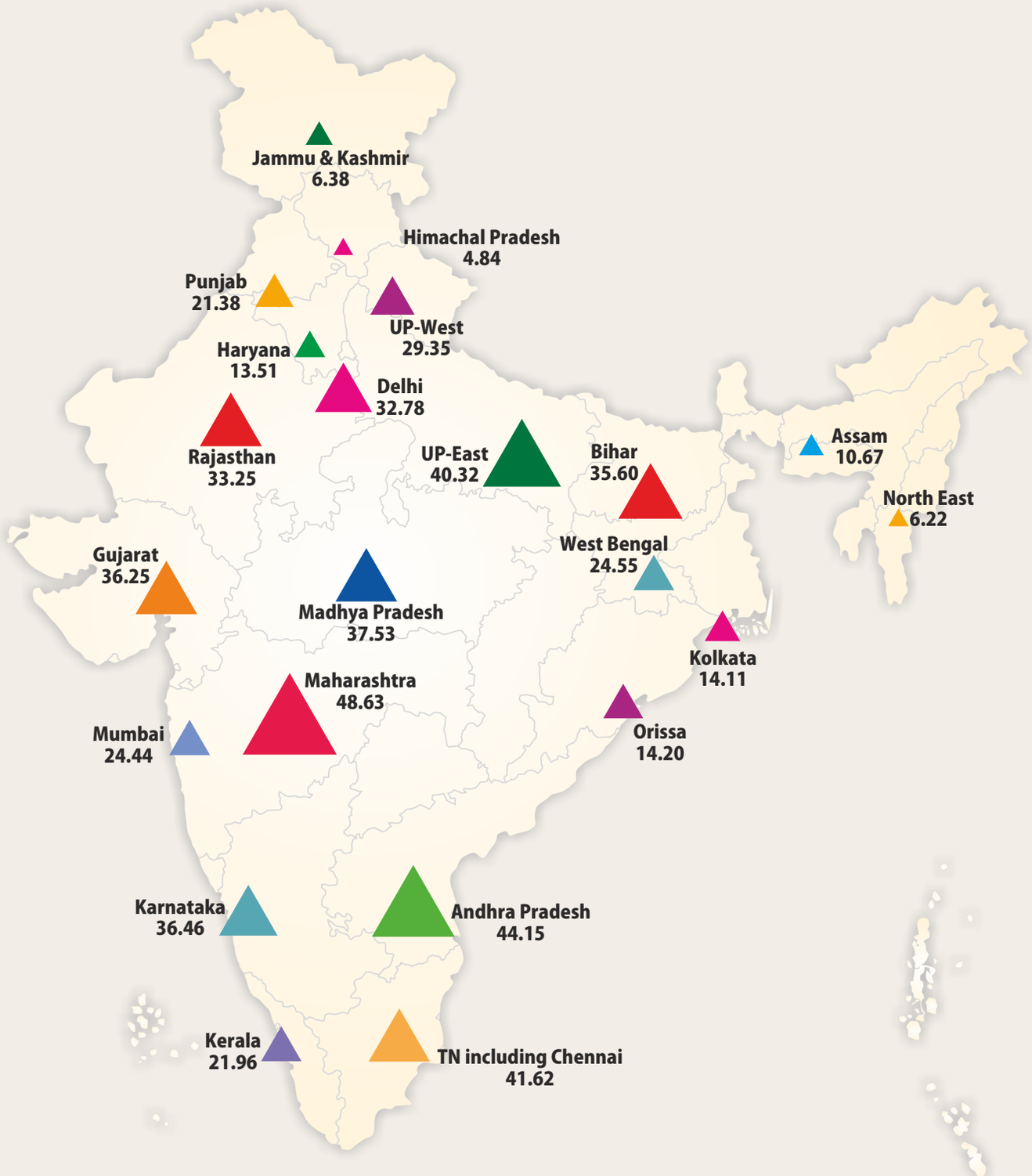
The following Chart represents the year-on-year growth of Private and PSUs wireless data subscription during the last five years. It may be seen that private sector telecom operators have registered positive growth over last 5 years, whereas public sector telecom operators have registered negative growth over 5 years (except for the year 2015).

Chart 1.8: Growth of Private and PSUs wireless data subscription



The following Chart depicts the Licensed Service Area (LSA) wise distribution of wireless data subscribers at the end of year 2018.

Chart 1.9: Distribution of LSA-wise wireless data subscribers (in million) as on 31st December, 2018



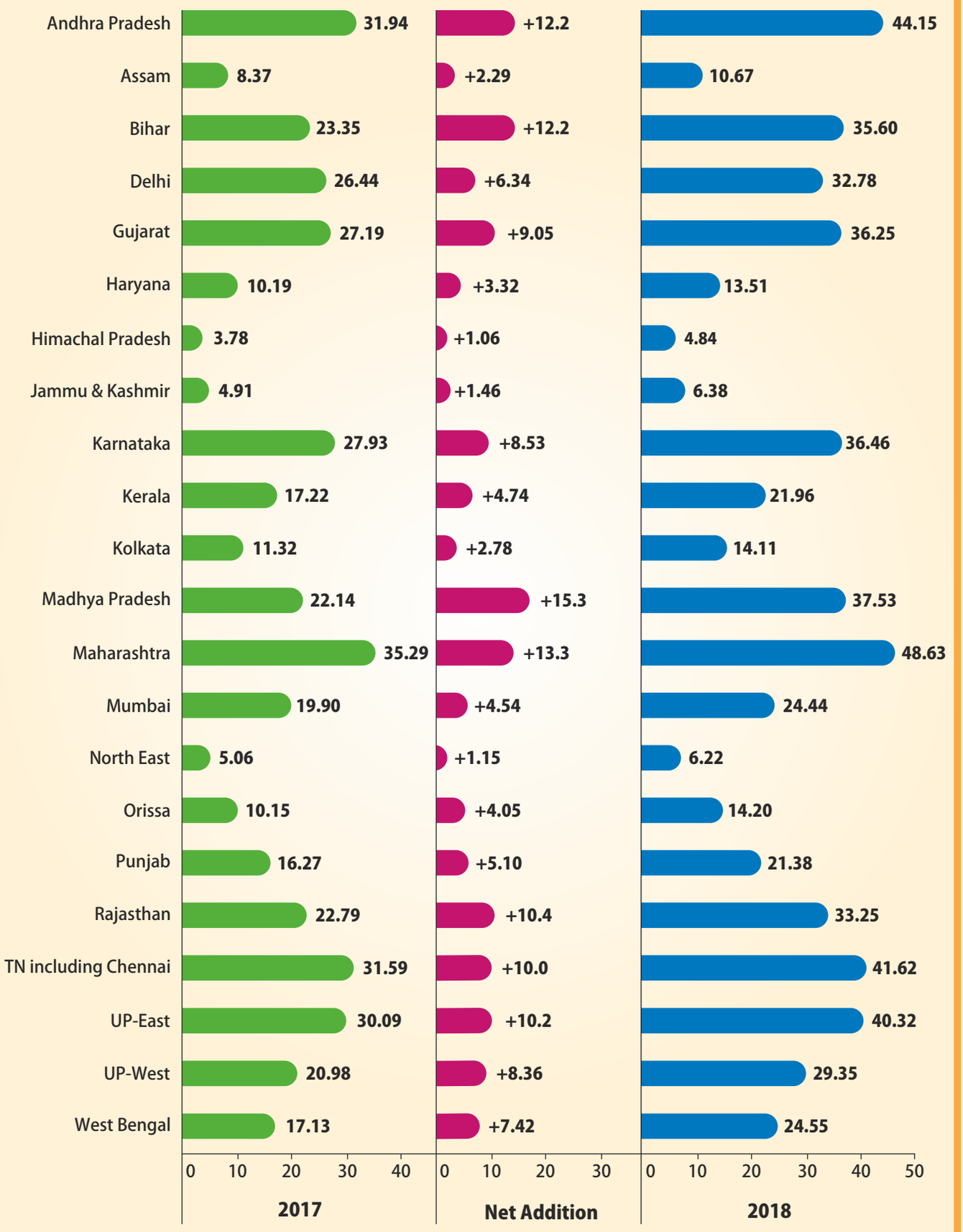
At the end of the year 2018, Maharashtra service area had maximum number of wireless data subscribers of 48.63 million followed by Andhra Pradesh service area (44.15 million).

Table 1.3: Service area wise number of Wireless Data subscribers (in million) and yearly growth (%)

Service Area	2017	2018	% Growth
Andhra Pradesh	31.94	44.15	38.20%
Assam	8.37	10.67	27.40%
Bihar	23.35	35.60	52.45%
Delhi	26.44	32.78	23.99%
Gujarat	27.19	36.25	33.30%
Haryana	10.19	13.51	32.58%
Himachal Pradesh	3.78	4.84	28.09%
Jammu & Kashmir	4.91	6.38	29.93%
Karnataka	27.93	36.46	30.58%
Kerala	17.22	21.96	27.54%
Kolkata	11.32	14.11	24.62%
Madhya Pradesh	22.14	37.53	69.49%
Maharashtra	35.29	48.63	37.82%
Mumbai	19.90	24.44	22.86%
North East	5.06	6.22	22.91%
Orissa	10.15	14.20	39.93%
Punjab	16.27	21.38	31.40%
Rajasthan	22.79	33.25	45.91%
TN including Chennai	31.59	41.62	31.76%
UP - East	30.09	40.32	34.00%
UP -West	20.98	29.35	39.89%
West Bengal	17.13	24.55	43.35%
Grand Total	**424.02**	**578.20**	**36.36%**

All service areas showed growth in their wireless data subscribers during the year 2018. Madhya Pradesh service area showed maximum net addition of 15.39 million wireless data subscribers (69.5%) during the year 2018 followed by Maharashtra service area with net addition of 13.34 million wireless data subscribers (37.82%).

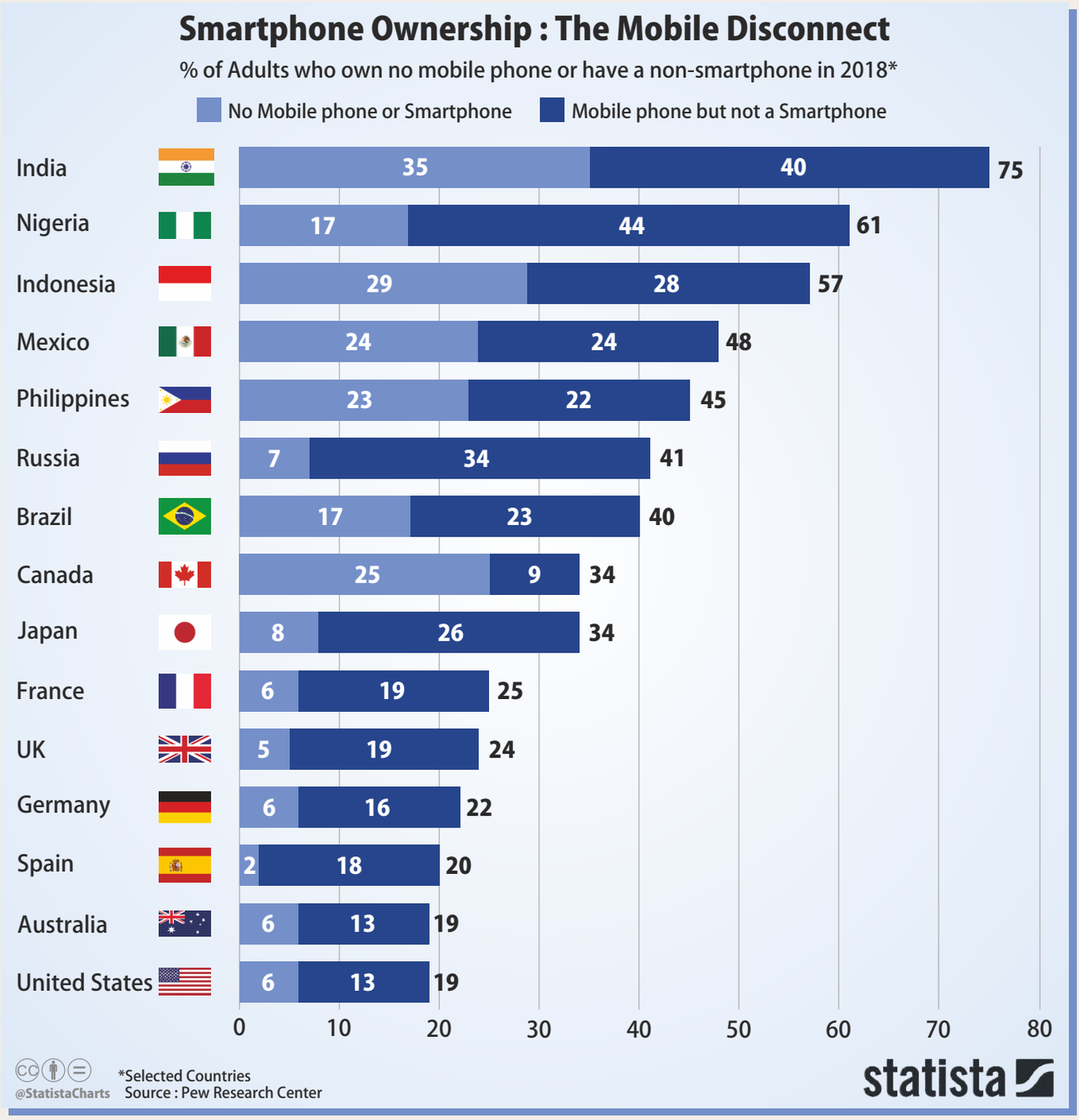
Chart 1.10: LSA-wise net addition of Wireless Data Subscribers during the year 2018 (in million)



Statistics of Smartphone and Feature Phone ownership in India

(Courtesy: Statista)

Chart 1.11: Smartphone penetration in some developed and developing countries



Source: www.statista.com

The above Chart shows a low Smartphone penetration in India as compared to some other developed and developing countries as per statistics given by Statista on the use of Feature Phone, No Phone and Smartphone in some countries viz. Nigeria, Indonesia, Spain, Mexico, India, US, Germany etc. Smartphone ownership rates remain low in India. In 2018, 75 percent of Indian adults did not own a smartphone. 35 percent had no phone at all while 40 percent owned a Feature Phone. Therefore, a considerable market exists in India for user-friendly smartphones at reasonable prices. This will not only increase the data usage on broadband but also increase the mobile broadband penetration in urban and rural areas. The spread of smartphones will help to grow the country's economy by promoting access to information, communication, education, commerce, infrastructure etc.

Chapter 2:

Wireless Data Usage

This chapter presents various statistics related to wireless data usage based on the data reported by the wireless telecom service providers to TRAI on monthly basis. As shown below, the wireless data usage has increased rapidly, since the launch of 4G technology in India in 2016.

Total volume of wireless data usage increased from 20,092 million GB in the year 2017 to 46,404 million GB in the year 2018 with yearly growth rate of 131%. Total volume of wireless data usage in the year 2014 was only 828 million GB.

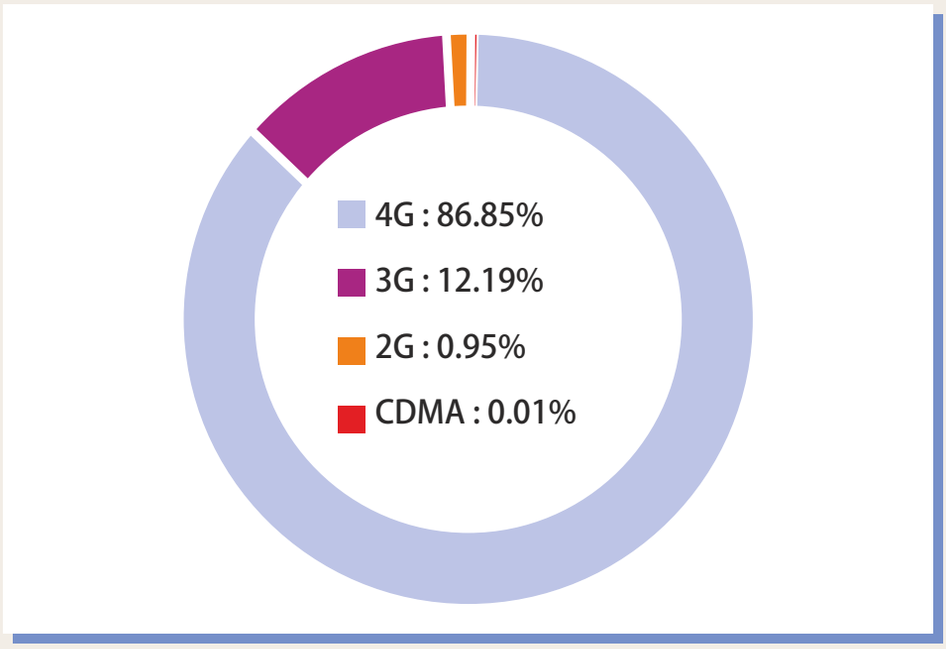
Wireless data usage comprises data usage by GSM subscribers and CDMA subscribers during the year. GSM data usage includes volume of 2G, 3G and 4G data usage. Technology-wise distribution of volume of wireless data usage is mentioned in the following table.

Table 2.1: Volume of Yearly Wireless Data usage (in million GB)

Year Ending	2G Data Usage	3G Data Usage	4G Data Usage	CDMA Data Usage	Total Volume of Data Usage
2014	340	349		138	828
2015	479	700		196	1,375
2016	477	1,221	2,775	169	4,642
2017	423	3,187	16,426	56	20,092
2018	443	5,654	40,304	3	46,404

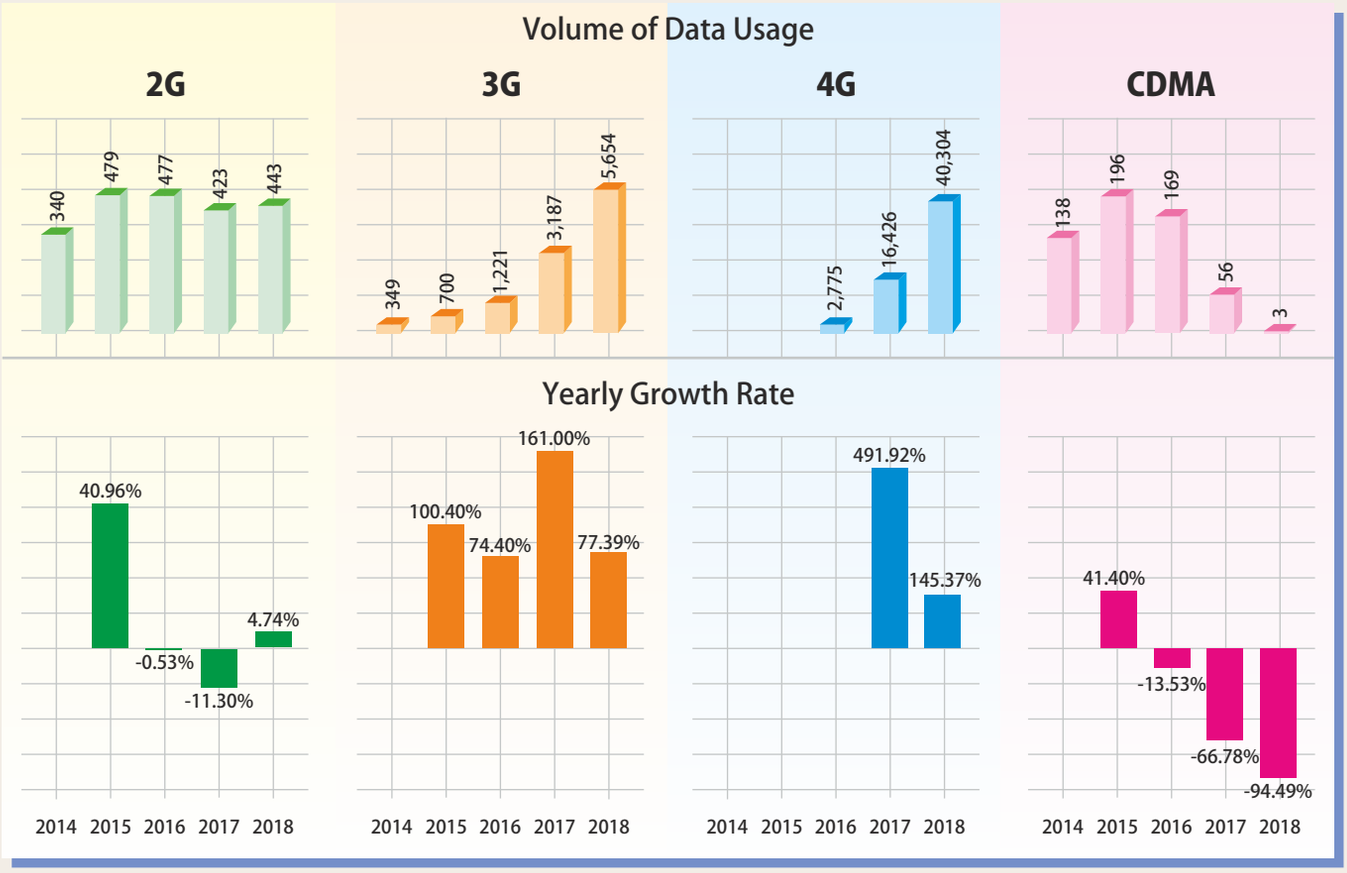
As depicted in Table 2.1 (above) and Chart 2.1 (below), out of the total volume of wireless data usage of 46,404 million GB in the year 2018, 4G (LTE) technology contributed the major part of 86.85% with volume of 40,304 million GB in the year 2018. Share of 2G, 3G and CDMA data usage is 0.95%, 12.18% and 0.01% respectively in the total volume of wireless data usage.

Chart 2.1: Share (%) of technology-wise total volume of wireless data usage in the year 2018



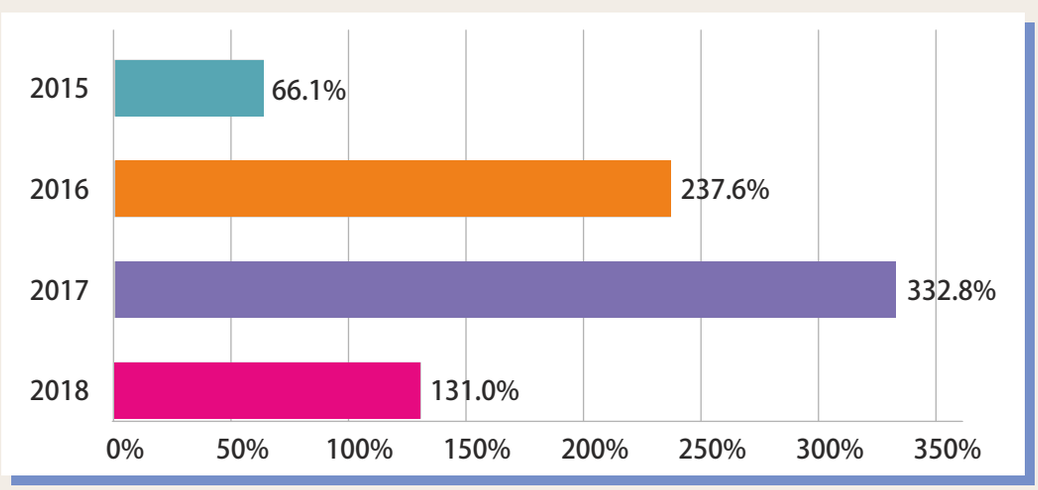
The following Chart depicts the technology-wise distribution of volume of data usage and year-on-year growth rate during the last five years.

Chart 2.2: Technology-wise distribution of volume of data usage (million GB) and yearly growth rate



Volume of 4G data usage increased by 145.37% in the year 2018 over the previous year. Service providers started reporting of 4G data volume during the year 2016 (Q.E. June, 2016) and the volume of 4G data usage increased manifold from 2,775 million GB in the year 2016 to 40,304 million GB in the year 2018. 4G(LTE) technology became the popular and market leader in respect of wireless data usage during the short period of two years from its introduction in India. Volume of 2G and 3G data usage yearly increased by 4.74% and 77.39% in the year 2018. On the other hand, volume of CDMA data usage declined sharply by 94.49% during the same period.

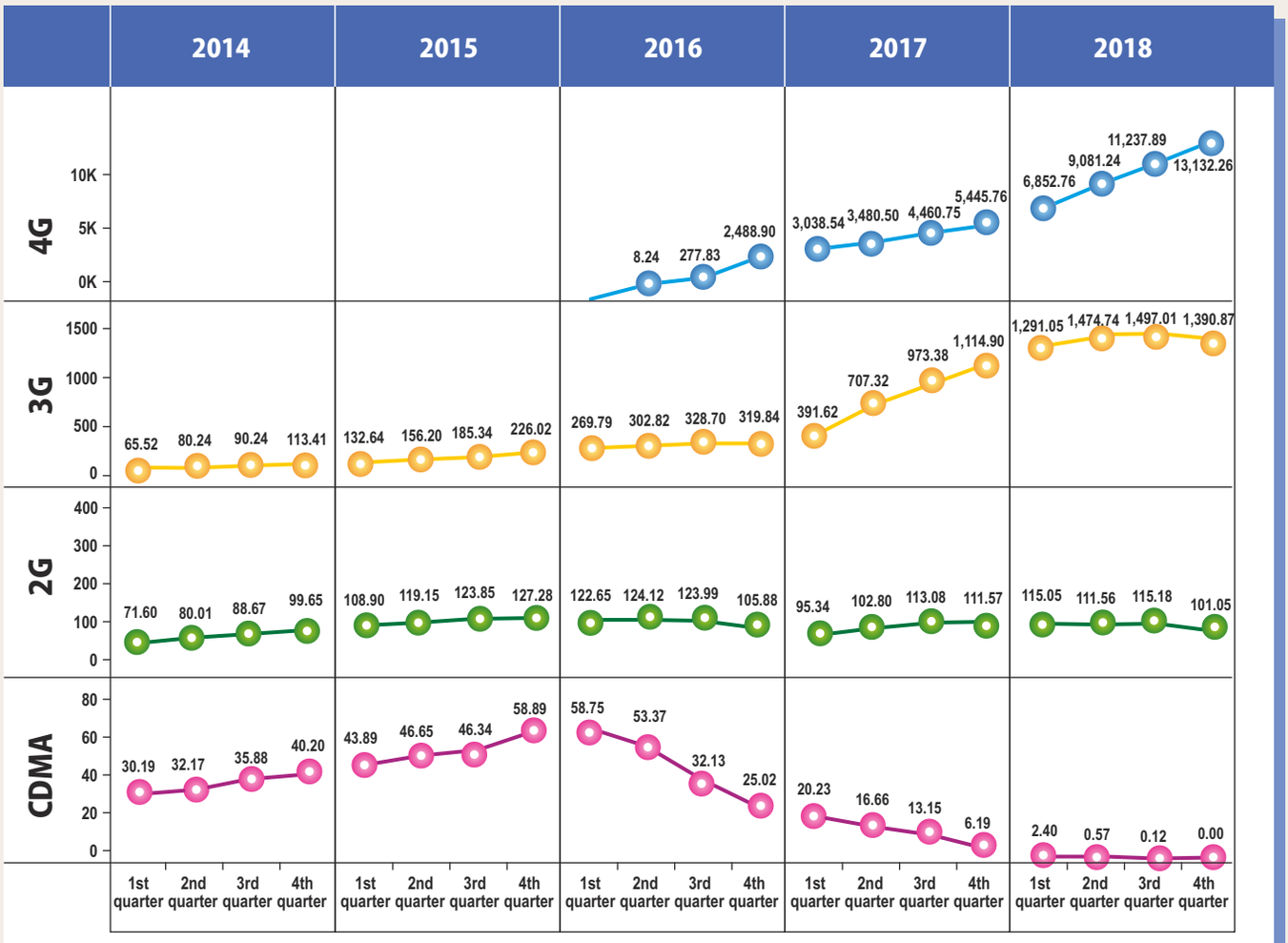
Chart 2.3: Trend of yearly growth in volume of wireless data usage (%)



Total volume of wireless data usage increased by 131% in the year 2018 over the previous year, as compared to the growth rate of 332% in the year 2017. With the introduction of 4G technology in India in 2016 and the promotional offers given by the new player, the growth rate of wireless data usage jumped from 66.1% (in 2015) to 237.6% (in 2016) which further increased to 332.8% (in 2017). With the stabilization of 4G technology in 2018, the growth rate of wireless data usage was recorded at 131% over the previous year.

The following Chart depicts the quarterly trend of technology-wise growth of volume of wireless data usage during the last four years.

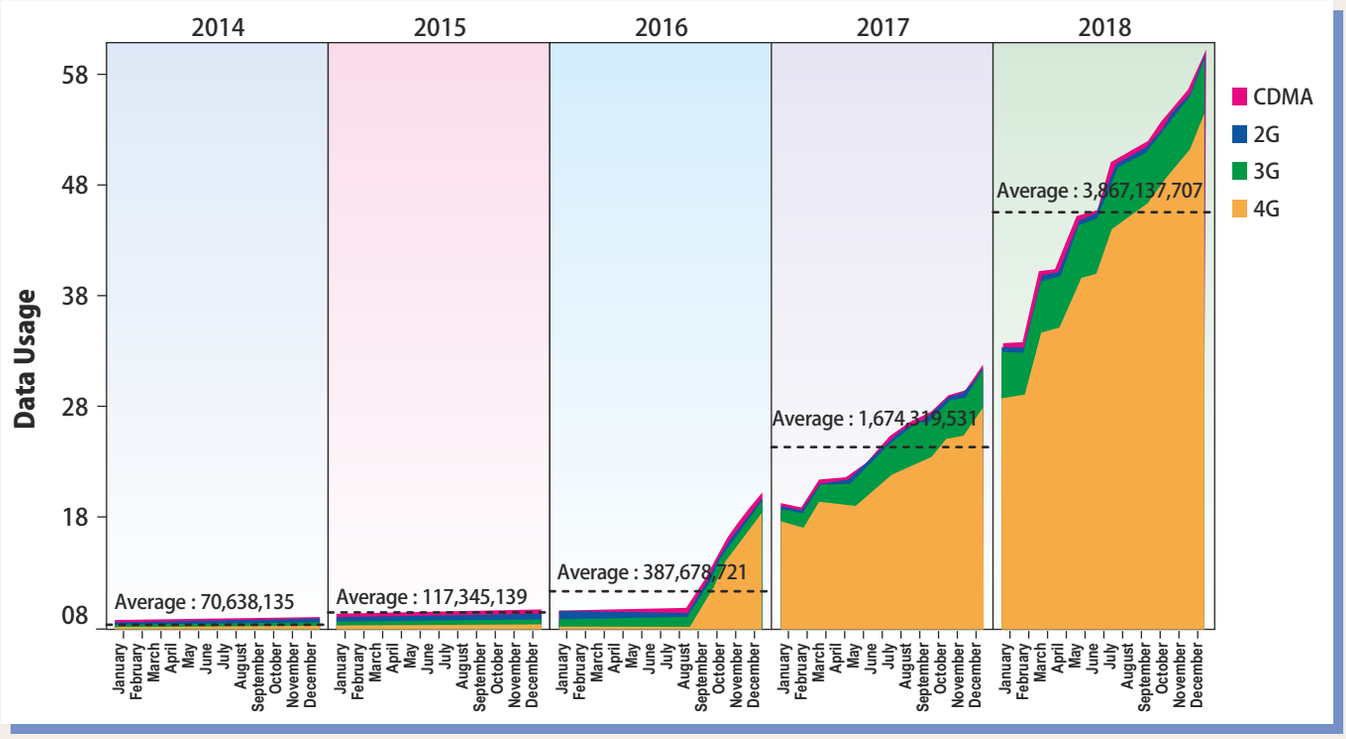
Chart 2.4: Quarterly trend of technology-wise growth of volume of wireless data usage (in million GB)



It may be seen in the above Chart that wireless data usage by subscribers on 2G technology has remained constant over the years. However, with the introduction of 4G technology during the year 2016, volume of wireless data usage by subscribers on 3G technology has also increased (though not at the same rate as in case of subscribers on 4G technology). The trend has been reversed in case of subscribers on CDMA technology and their usage of wireless data has reduced significantly since 2016 and has become negligible. These trends show that the wireless data subscribers are shifting to 4G technology from other technologies.

Chart 2.5 shows the monthly wireless data usage during the last five years.

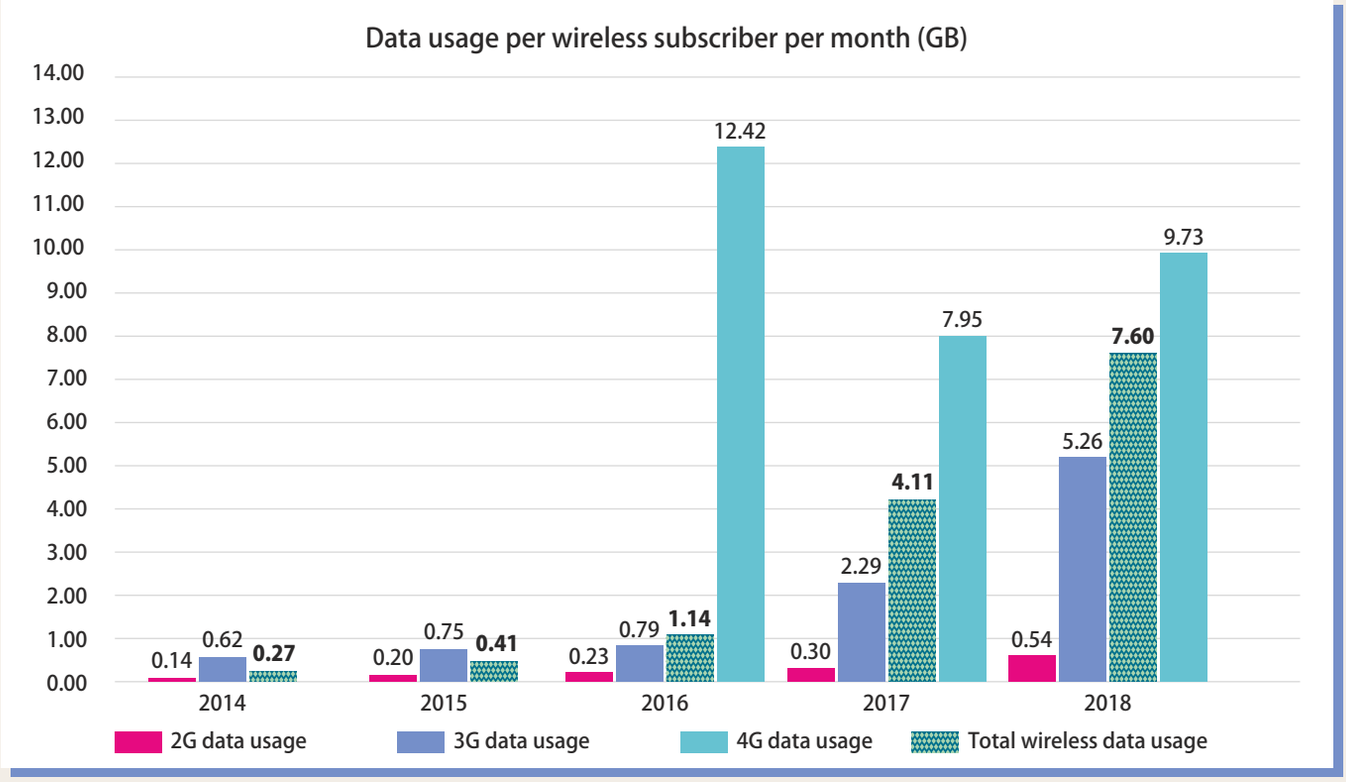
Chart 2.5: Monthly trend of technology-wise volume of wireless data usage (in GB)



The volume of average wireless data usage has increased sharply from 387.69 million GB per month in the year 2016 to 1,674.32 million GB per month in the year 2017 and it increased further to 3,867.14 GB per month during the year 2018 by the wireless data subscribers. The volume of average wireless data usage was 70.64 million GB per month in the year 2014 (Refer Chart 2.5).

The following chart depicts the technology-wise average data usage per wireless data subscriber per month during the last five years.

Chart 2.6: Trend of Average Wireless Data usage (in GB) per wireless data Subscriber per month [1]



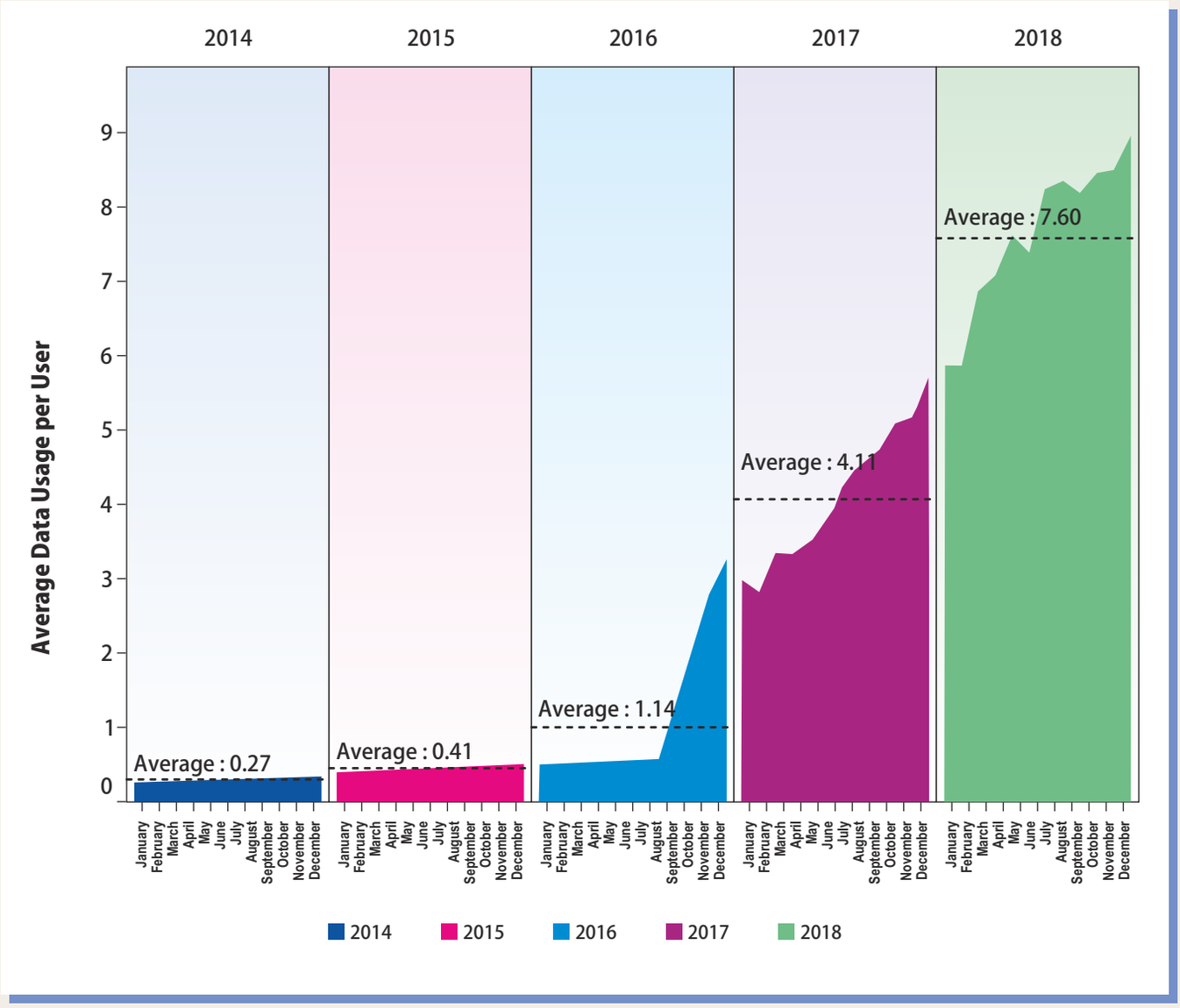
[1]Average wireless data usage per wireless data subscriber per month has been calculated in respect of total volume of wireless data usage during the year and the total number of average wireless data subscribers of the year.

Chart 2.6 illustrates average wireless data usage per wireless data subscriber per month increased from 4.11 GB during the year 2017 to 7.60 GB during the year 2018. The average wireless data usage per wireless data subscriber per month was 0.27 GB in the year 2014 which increased to 1.14 GB per month in 2016. With the introduction of 4G technology in 2016, the wireless data usage per wireless data subscriber per month registered significant improvement over the years and reached 7.60 GB during the year 2018 (refer Chart 2.6).

After the introduction of 4G technology in 2016, average wireless data usage per subscriber per month, for 4G subscribers, was recorded at 12.42 GB per month which decreased to 7.95 GB per month and then stabilized at 9.73 GB per month in 2018. For 3G subscribers also, average wireless data usage per subscriber per month increased from 0.79 GB per month in 2016 to 5.26 GB per month in 2018 (refer Chart 2.6).

The above data can be analyzed monthly also. The following Chart 2.7 depicts the average data usage (in GB) per wireless data subscriber per month during the last four years.

Chart 2.7: Monthly trend of average wireless data usage (in GB) per wireless data subscriber per month



It may be seen in Chart 2.7 that the average data usage per wireless data subscriber per month increased sharply from the month of August, 2016 onwards and it shows an increasing trend continuously.

The following Chart depicts the comparison of average wireless data usage per subscriber per month in India as compared to some other developed / developing countries.

Chart 2.8: Comparison of average wireless data usage per subscriber per month (in GB) in India as compared to some other developed/developing countries[2]

[2] Source: FortuneIndia.com

It may be seen that India is a leading country in wireless data consumption per subscriber per month as compared to USA, UK, Singapore, Japan and South Korea.

The following table depicts service area-wise yearly volume of wireless data usage with yearly growth from the year 2017 to the year 2018.

Table 2.2: Service area-wise volume of wireless data usage (in million GB) and its yearly growth

Service Area	2017	2018	Growth
Andhra Pradesh	1,487.1	3,250.6	118.6%
Assam	369.2	917.4	148.5%
Bihar	1,177.0	3,003.5	155.2%
Delhi	1,298.8	2,723.0	109.7%
Gujarat	1,473.9	3,384.3	129.6%
Haryana	491.0	1,137.8	131.7%
Himachal Pradesh	178.0	398.3	123.7%
Jammu & Kashmir	222.0	541.6	143.9%
Karnataka	1,384.0	3,015.9	117.9%
Kerala	814.0	1,766.1	117.0%
Kolkata	543.7	1,041.9	91.6%
Madhya Pradesh	1,189.8	2,828.0	137.7%
Maharashtra	1,647.1	3,973.5	141.2%
Mumbai	811.9	1,737.9	114.0%
North East	212.4	474.8	123.5%
Orissa	474.9	1,134.2	138.8%
Punjab	888.5	1,890.9	112.8%
Rajasthan	1,077.4	2,594.7	140.8%
TN including Chennai	1,541.9	3,442.4	123.3%
UP - East	1,238.3	2,743.5	121.6%
UP -West	937.1	2,601.0	177.5%
West Bengal	633.6	1,798.3	183.8%
Grand Total	**20,091.8**	**46,399.7**	**130.9%**

Out of the total volume of wireless data usage of 46,400 GB during the year 2018, Maharashtra service area has maximum share with 3,974 million GB followed by Tamil Nadu (including Chennai) with 3,442 million GB wireless data usage. All service areas except Kolkata, showed more than 100% yearly growth in the volume of wireless data usage.

The following Table depicts the LSA-wise average wireless data usage per data subscriber per month during the years 2017 and 2018 and its growth.

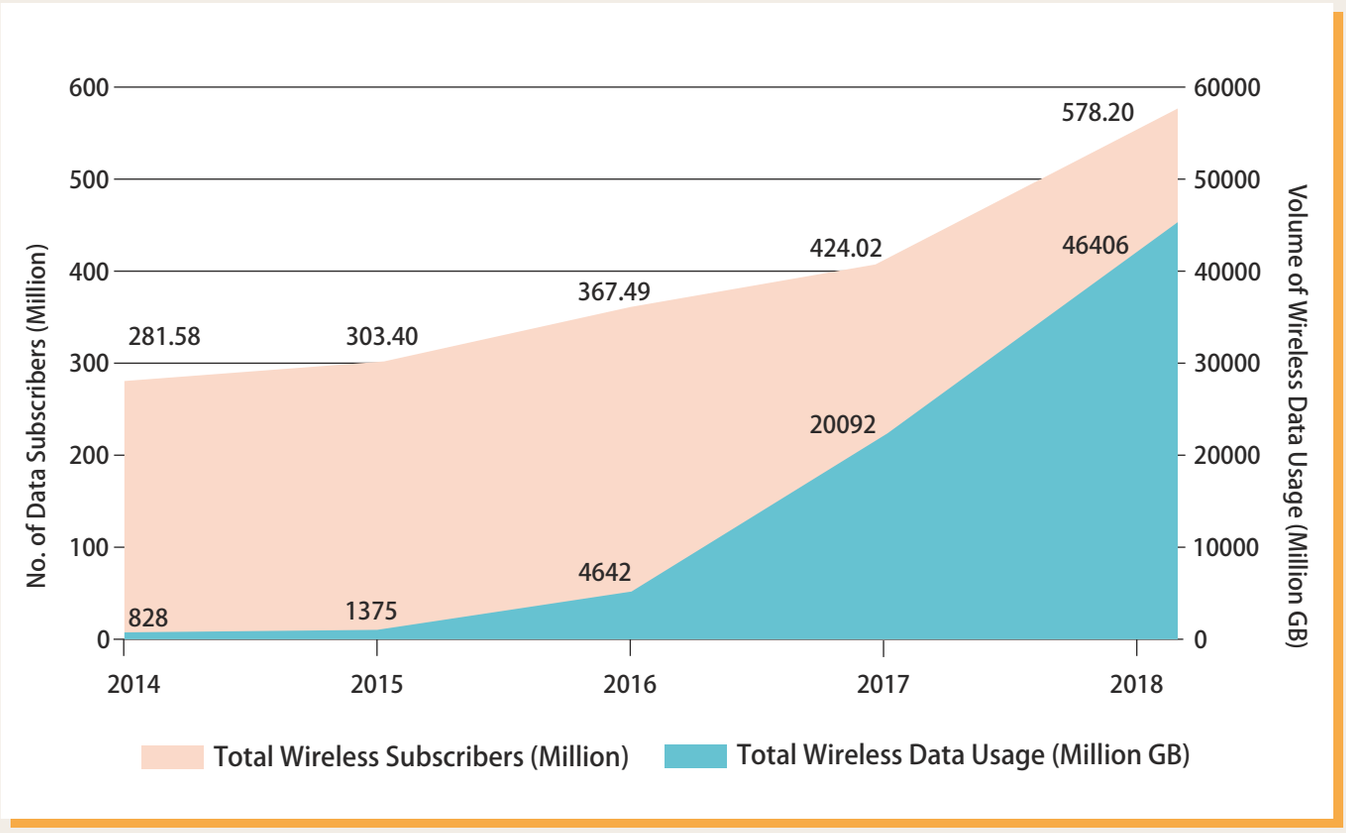
Table 2.3: LSA-wise average wireless data usage (in GB) per wireless data subscriber per month

Service Area	2017	2018	% Growth
Andhra Pradesh	4.0	6.9	69.8%
Assam	3.7	7.9	110.3%
Bihar	4.2	8.1	92.0%
Delhi	4.2	7.5	80.1%
Gujarat	4.7	7.4	56.9%
Haryana	4.3	8.0	87.9%
Himachal Pradesh	4.0	6.5	61.9%
Jammu & Kashmir	4.0	7.9	94.9%
Karnataka	4.4	7.7	75.6%
Kerala	4.2	7.4	74.5%
Kolkata	4.2	6.8	64.0%
Madhya Pradesh	4.4	7.6	71.2%
Maharashtra	4.0	7.8	92.7%
Mumbai	3.6	6.4	80.2%
North East	3.6	6.9	91.3%
Orissa	3.9	7.5	93.8%
Punjab	4.7	8.1	72.9%
Rajasthan	4.1	7.4	79.7%
TN including Chennai	4.2	7.5	78.0%
UP - East	3.5	6.3	76.3%
UP -West	3.9	8.3	116.3%
West Bengal	3.1	7.0	121.9%
Overall	**4.1**	**7.4**	**81.5%**

Average wireless data usage per wireless data subscriber increased from 4.1 GB per month in the year 2017 to 7.4 GB per month in the year 2018. During the year 2018, the average wireless data usage per wireless data subscriber per month has been the maximum in U.P. (West) service area (8.3 GB) followed by Punjab and Bihar service areas (8.1 GB in each) among all service areas. U.P. (East) service area recorded the minimum average wireless data usage of 6.3 GB per wireless data subscriber per month during the year 2018.

West Bengal, U.P.(West) and Assam service areas showed tremendous growth of more than 100% in volume of average wireless data usage per data subscriber per year from year 2017 to the year 2018. All other LSAs also showed yearly growth of more than 50% during the same period (refer Table 2.3).

Chart 2.9: Trend of growth in wireless data subscribers (million) and volume of wireless data usage (GB)



Both volume of wireless data usage and number of wireless data subscribers have shown positive growth over the years. However, rate of growth of volume of wireless data usage is much higher than the growth in wireless data subscribers. This shows that wireless data usage per subscriber sharply increased during the last two years.

Chapter 3:

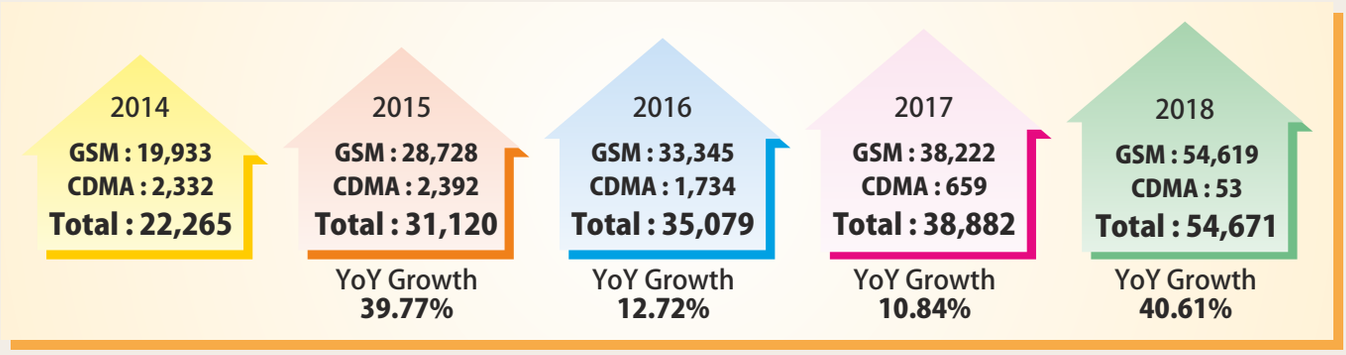
Revenue from Wireless Data Usage

This chapter presents statistics of revenue from wireless data services (excluding revenue from rental) based on the quarterly data reported to TRAI by the wireless Telecom Service Providers (TSPs), relating to the revenue collected by TSPs for the usage of wireless data by their subscribers during the period.

Total revenue from wireless data usage increased from Rs. 38,882 crore in the year 2017 to Rs. 54,671 crore in the year 2018 with yearly growth rate of 40.61%. The total revenue from wireless data usages was Rs. 22,265 crore in the year 2014.

The following Chart depicts yearly wireless data revenue from GSM, CDMA and total wireless data usage.

Chart 3.1: Yearly Revenue from Wireless Data Usage (in crore Rs.)



As we have seen the declining trend in number of CDMA data subscribers and the volume of CDMA data usage in Chapter-1 and Chapter-2 respectively, the revenue from CDMA data usage also shows declining trend over year-on-year.

Revenue of GSM data services comprises the total revenue of 2G, 3G and 4G (LTE) data usage during the year. GSM data revenue has registered significant growth year-on-year during the last four years.

The following Chart depicts the year-on-year growth in revenue of wireless data usage during the last five years.

Chart 3.2: Year-on-year trend of revenue of wireless data usage (in crore Rs.)

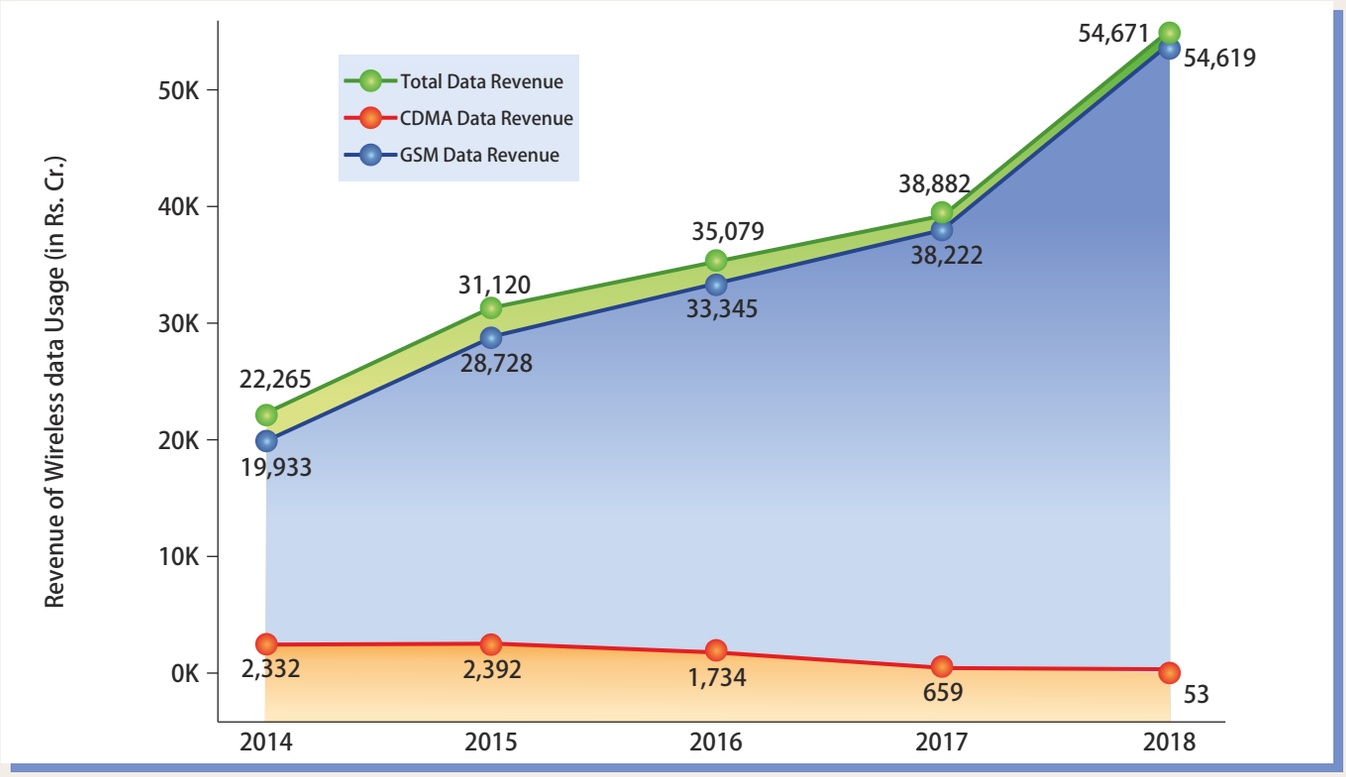
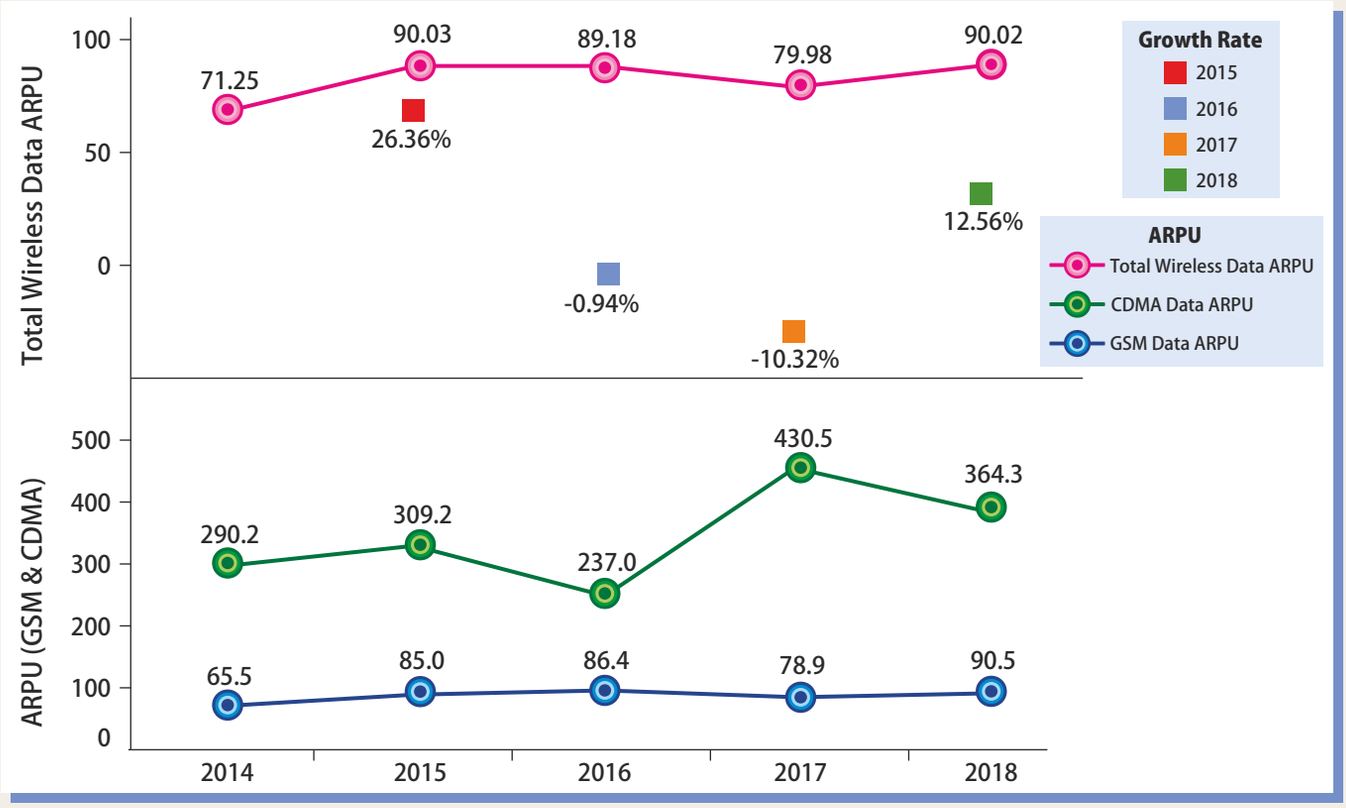


Chart 3.2 depicts the trend in average revenue per wireless data subscriber (data ARPU) per month for wireless data usage during the years 2014 to 2018. Average revenue for data services has been derived by dividing total yearly revenue of wireless data services by the average number of wireless data subscribers during the year.

It may be seen in the following Chart 3.3 that wireless data ARPU has shown a mixed trend over last 5 years. It increased from 71.25 in 2014 to 90.03 in 2015 and then retreated to 79.98 in 2017. It again increased to 90.02 in 2018. Somewhat similar trend is noted in GSM data ARPU, wherein ARPU increased from 65.47 in 2014 to 86.38 in 2016 and then retreated to 78.87 in 2017. It again increased to 90.55 in 2018. CDMA data ARPU is significantly higher than GSM data ARPU, but this could be due to substantial reduction of CDMA subscribers.

Chart 3.3: Trend of Average Data Revenue (data ARPU) per wireless data subscriber per month for wireless data service (in Rs)



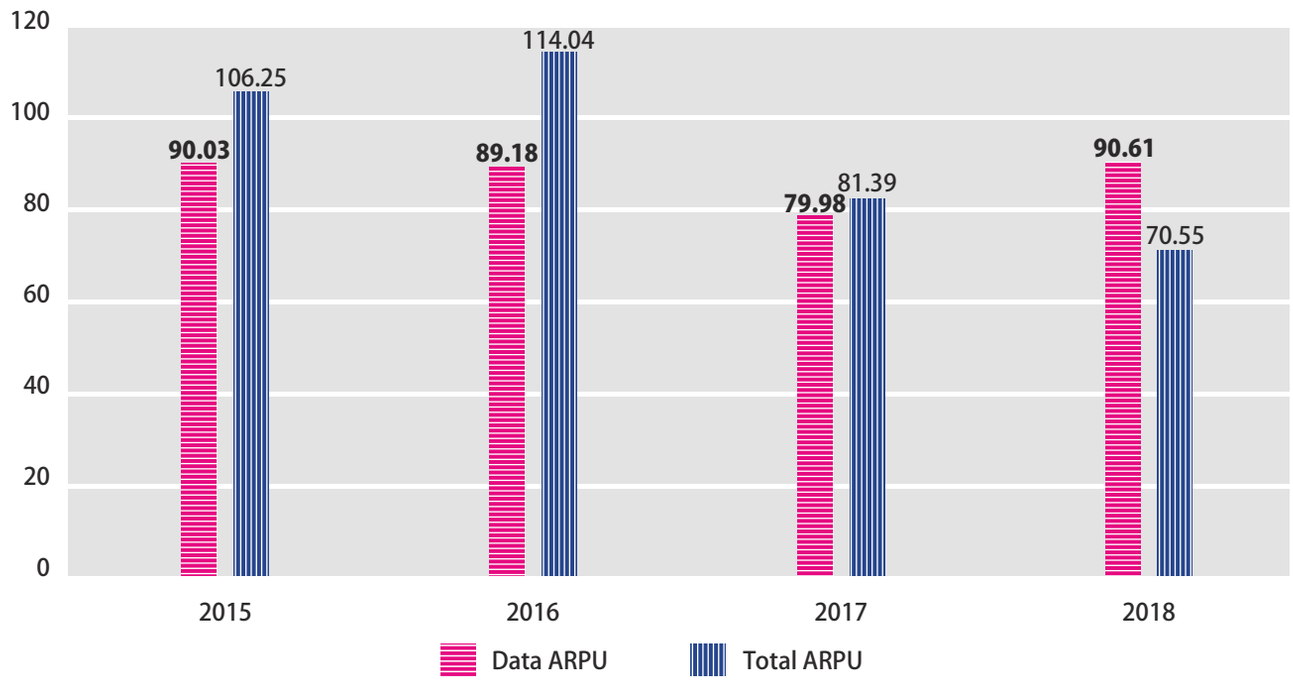
It is noted that the average data revenue per wireless data subscriber per month increased by 12.56% in the year 2018, however it declined by 0.94% and 10.32% in the year 2016 and 2017 respectively.

The average cost to subscriber for wireless data in the year 2014 was Rs. 269 per GB and in the year 2015, it was Rs. 226 per GB. On introduction of 4G (LTE) technology in India, average cost to subscriber for wireless data usage sharply declined to Rs. 75.57 per GB during the year 2016. Further, average cost to subscriber for wireless data declined from Rs. 19.35 per GB in the year 2017 to Rs. 11.78 per GB in the year 2018.

When we analyze the average cost to subscriber in terms of GSM users and CDMA users then average cost to subscriber of GSM data shows declining trend over the last four years and it declined from Rs. 289 per GB in the year 2014 to Rs. 11.77 per GB in the year 2018. Average CDMA data cost to subscriber per GB shows mixed trend during the same period. However, average cost to subscriber for overall wireless data service shows declining trend over the period.

The following Chart 3.4 depicts the trend between Wireless Data ARPU and total wireless ARPU (voice, data & SMS) during the last four years.

Chart 3.4: Trend of Wireless data ARPU and total wireless ARPU per month (in Rs)



Wireless data ARPU has been derived by dividing the total wireless data revenue by total wireless data subscribers. Similarly, wireless ARPU has been derived by dividing the total subscriber revenue by total number of wireless subscribers during the period.

Total wireless ARPU per month declined from Rs. 81.39 per month during the year 2017 to Rs. 70.55 per month during the year 2018, however, Data ARPU increased from Rs. 79.98 to Rs. 90.61 during the same period.

The following Chart 3.5 shows the technology wise (GSM and CDMA) trend of average cost to subscriber for wireless data during the year.

Chart 3.5: Trend of technology-wise Average cost to subscriber for Per GB wireless data (Rs.)

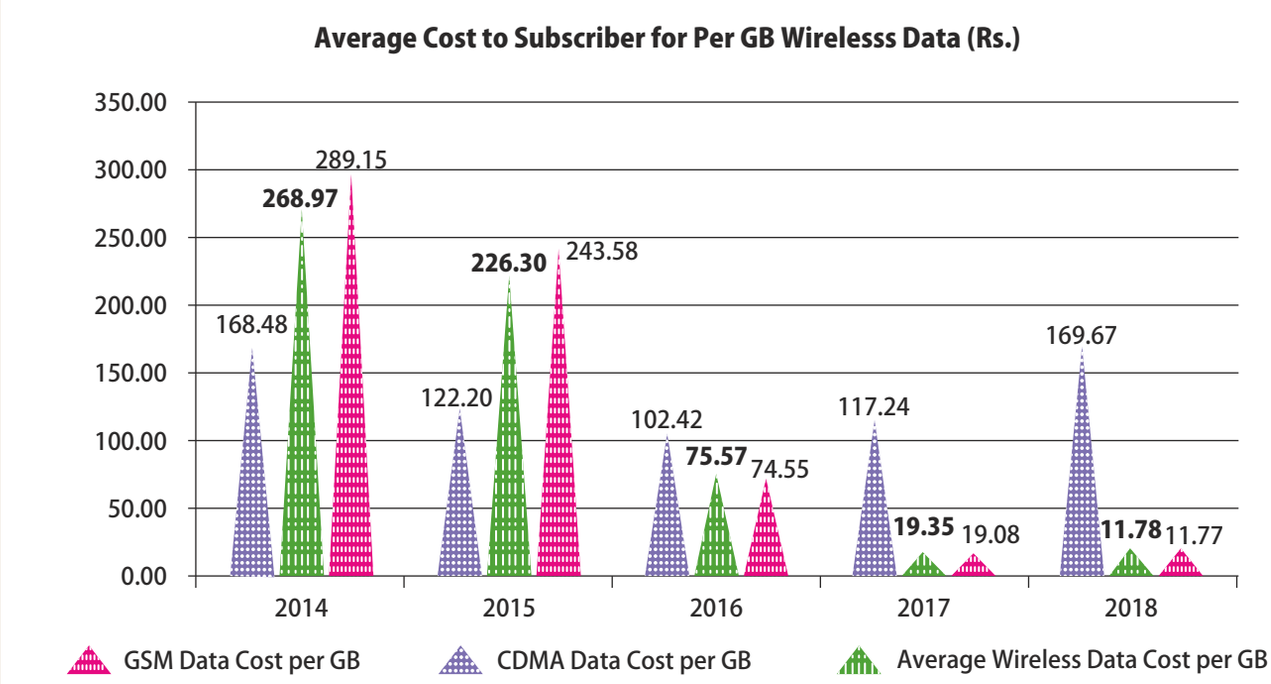
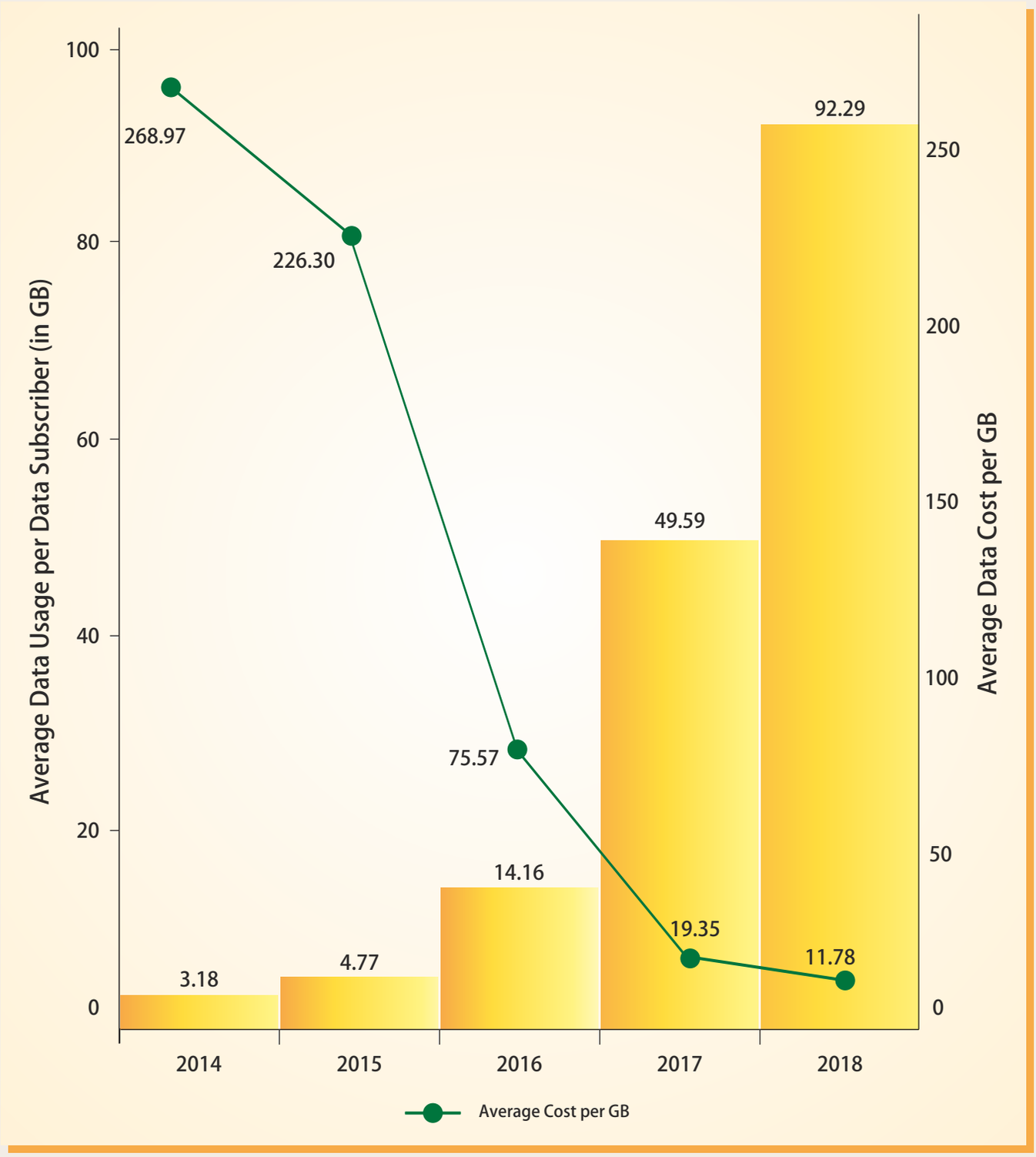


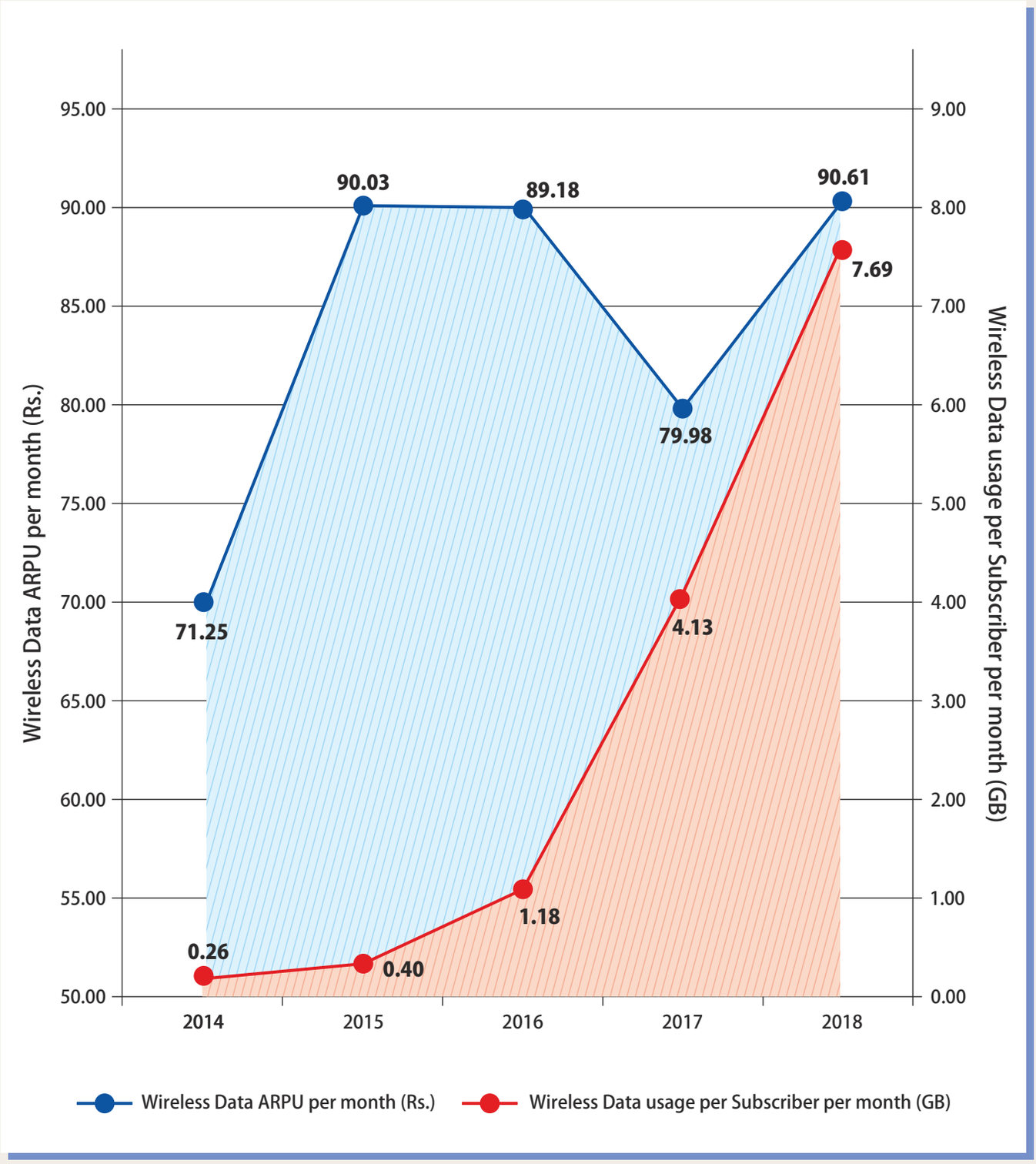
Chart 3.6: Relation between average cost to subscriber for per GB wireless data and average usage of wireless data (GB) per subscriber during the year



As per the statistics, it has been observed that when the average cost to subscriber of wireless data was Rs. 269 per GB in the year 2014, the volume of average usage of wireless data per subscriber during the year was 3.18 GB only. On the other hand, when the average cost to subscriber of wireless data sharply declined to Rs. 11.78 per GB in the year 2018, the average usage of wireless data per subscriber sharply increased to 92.29 GB during the year.

The next Chart 3.7 shows the trends between average revenue per data user (data ARPU) and volume of wireless data usage (GB) per data subscriber per month during the last five years.

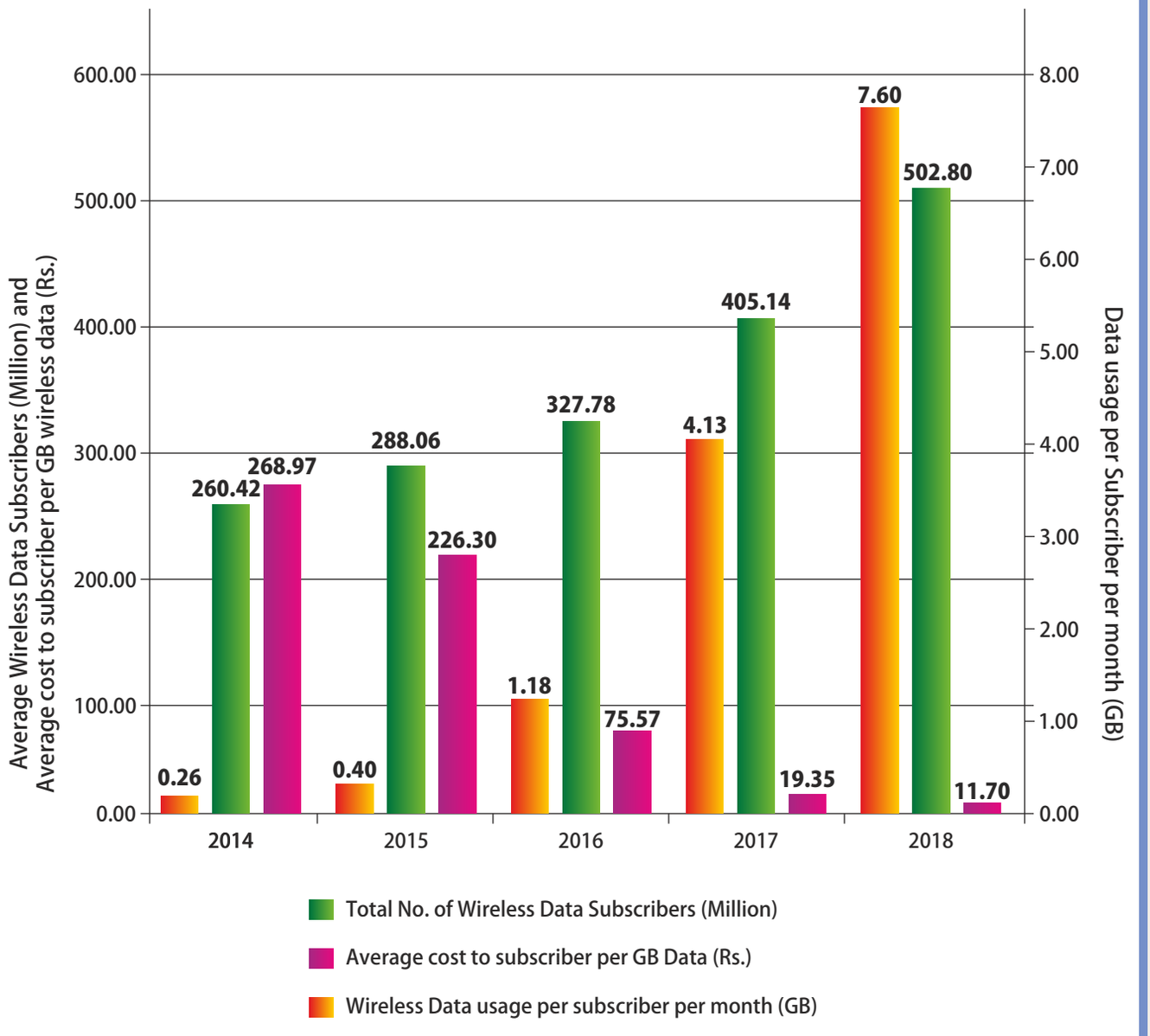
Chart 3.7: Trend of wireless data ARPU and wireless data usage per data subscriber per month



As may be seen in the above Chart, the average wireless data usage per data subscriber increased from 0.26 GB per month during the year 2014 to 7.69 GB per month during the year 2018. However, the data ARPU has not increased in the same ratio due to sharp decline in cost to subscriber for wireless data. Now, in the same amount of money, user gets much more volume of wireless data.

The Chart 3.8 shows the trend of number of wireless data subscribers, average cost to subscriber for per GB wireless data and volume of wireless data usage per wireless data subscriber per month.

Chart 3.8: Trend of number of average wireless data subscribers (million), Average wireless data usage (GB) per data subscriber per month and Average cost to subscriber per GB wireless data (Rs.)



As can be seen in the above Chart, average cost to subscriber for per GB wireless data usage is showing declining trend over the years. On the other hand, the number of wireless data subscribers and volume of wireless data usage increased year-on-year. It may be said that due to sharp decline in data tariff during the last two years, the volume of data usage tremendously increased in the years 2017 and 2018.

Declining trend of cost to subscriber for wireless data shows the intense market competition in data services and data tariff war in the telecom market.

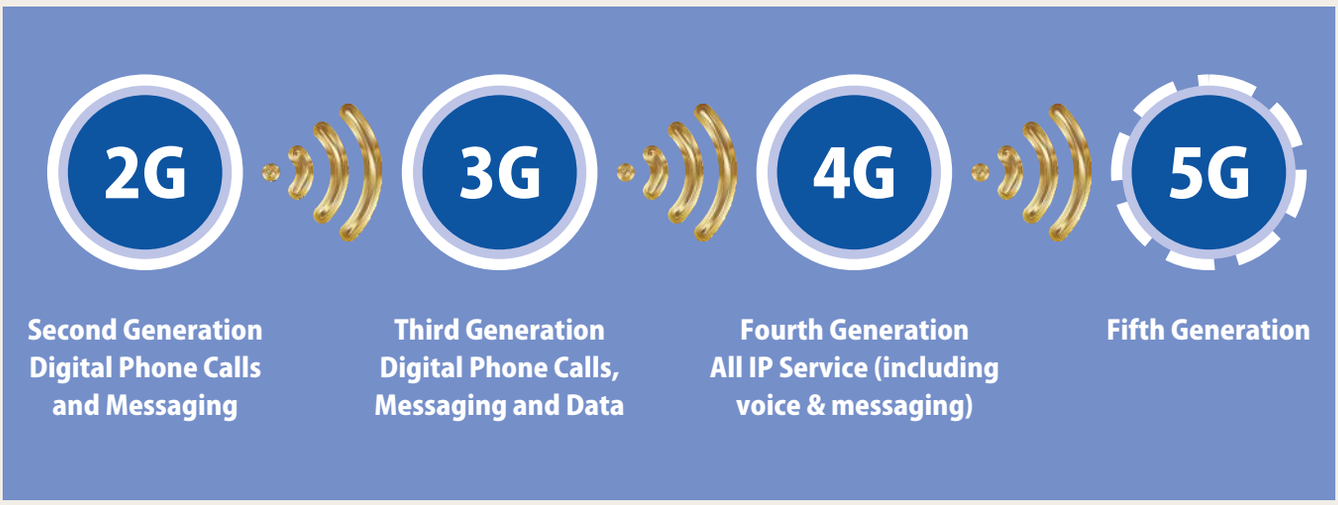
Chapter 4:

Wireless Data Service – Future

The telecom sector is one of the most dynamic sectors in terms of technological breakthroughs resulting in improved consumer experience. The widespread deployment of 4G technology in the year 2016 heralded a revolution in the way Indians use mobile data. As seen in the previous chapters the wireless data usage in India has increased exponentially since 2016 coupled with a significant reduction in the cost of data usage. Even globally, the world is swiftly preparing to move on to bigger things in data usage with the first commercial deployment of lightning fast 5G technologies from 2020 onwards. This will provide enhanced connectivity not only to the individual but will also help in digitalizing various industrial verticals and facilitate the vision of Digital India.

5th generation mobile networks **(5G)** are the proposed next telecommunications standards that aims at higher capacity allowing a higher density of mobile broadband users, and supporting device-to-device, more reliable, and massive machine communications.

Chart 4.1: Development of mobile technology - 2G to 5G



5G is the latest iteration of cellular technology that will provide seamless coverage, enhanced connectivity, high data rate, low latency, and highly reliable communications. It will increase energy efficiency, spectrum efficiency, network efficiency as well as efficiency of other systems. Besides providing faster & reliable access, it will act as an information duct built to connect billions of Internet of Things (IoT) devices. In order to create an enabling environment for timely rollout of 5G in India, TRAI White Paper[3] on 5G highlights various issues related to deployment of 5G technology in India.

As per the white paper, 5G is expected to be launched in India by 2020 and is predicted to create a cumulative economic impact of USD 1 trillion in India by 2035.

Ericsson has estimated that 5G enabled digitalization revenue potential in India will be above USD 27 billion by 2026[4]. Similarly, GSMA projects, after initially launching in 2020, 5G connections in India will grow to almost 70 million by 2025, equivalent to around 5% of total connections (excluding cellular IoT)[5].

There are many industry reports which provide different projections about the advent of 5G technology and data usage over the next few years. The Ericsson mobility report brings out the latest global and regional mobile statistics.

[3]TRAI's White Paper on 'Enabling 5G in India' dated 22nd February, 2019
[4]Ericsson Mobility Report, November, 2018
[5]GSMA Intelligence Report

Table 4.1: Data Traffic Per Smart Phone

Data traffic per smartphone	2017	2018	Forecast 2024	CAGR ** 2018-2024	Unit
North America	6.6	8.6	50	34%	GB/month
Latin America	2.4	3.4	18	32%	GB/month
Western Europe	4.0	6.1	32	32%	GB/month
Central and Eastern Europe	3.6	4.7	19	26%	GB/month
North East Asia	3.0	7.3	21	19%	GB/month
China#	2.7	7.2	19	18%	GB/month
South East Asia and Oceania	2.7	3.8	19	31%	GB/month
India	5.4	6.8	15	14%	GB/month
Middle East and Africa	2.0	2.9	15	32%	GB/month
Sub-Saharan Africa##	1.4	1.8	9.0	31%	GB/month

Source : Ericsson Mobility Report, November 2018

Table 4.2: Total Mobile Data Traffic

Data traffic per smartphone	2017	2018	Forecast 2024	CAGR ** 2018-2024	Unit
North America	2.5	3.2	19	35%	EB/month
Latin America	1.0	1.6	9.5	35%	EB/month
Western Europe	1.8	2.6	14	33%	EB/month
Central and Eastern Europe	1.1	1.5	9.2	35%	EB/month
North East Asia	4.2	11	39	23%	EB/month
China#	2.7	8.6	29	22%	EB/month
South East Asia and Oceania	1.4	2.2	16	39%	EB/month
India	1.8	3.0	12	26%	EB/month
Middle East and Africa	1.1	1.8	17	45%	EB/month
Sub-Saharan Africa##	0.36	0.54	5.2	46%	EB/month

#These figures are also included in the figures for North East Asia

##These figures are also included in the figures for Middle East and Africa

Source : Ericsson Mobility Report, November 2018

** CAGR Compound Annual Growth Rate

'India Mobile Broadband Index 2018' published by NOKIA and 'MBIT Index 2018'[6] , argues that:

5G can support the development of smart cities and improve access to low-latency public services such as healthcare and education in India.

With increasing availability of affordable VoLTE handsets (VoLTE devices expected to reach 70-80% penetration in Metros in the next 2-3 years), operators will look to offload a significant fraction of 2G voice traffic onto VoLTE.

Proliferation of OTT video is further expected to boost data consumption, and OTT players are expected to transition into production houses to develop original vernacular content.

Operators need to consolidate their market position by leveraging global learnings through deployment of LTE-A / LTE-Pro and Cloud-RAN to enhance customer experience.

5G could provide a fillip to the government's role in promoting Smart cities mission, and low-latency use cases for BharatNet fibre network.

The next wave of growth in Indian broadband market could come from the untapped base of 500 million feature phone users, who could potentially leapfrog from 2G to 4G.

[6] 'India Mobile Broadband Index 2018' published by NOKIA and MBIT Index, 2018

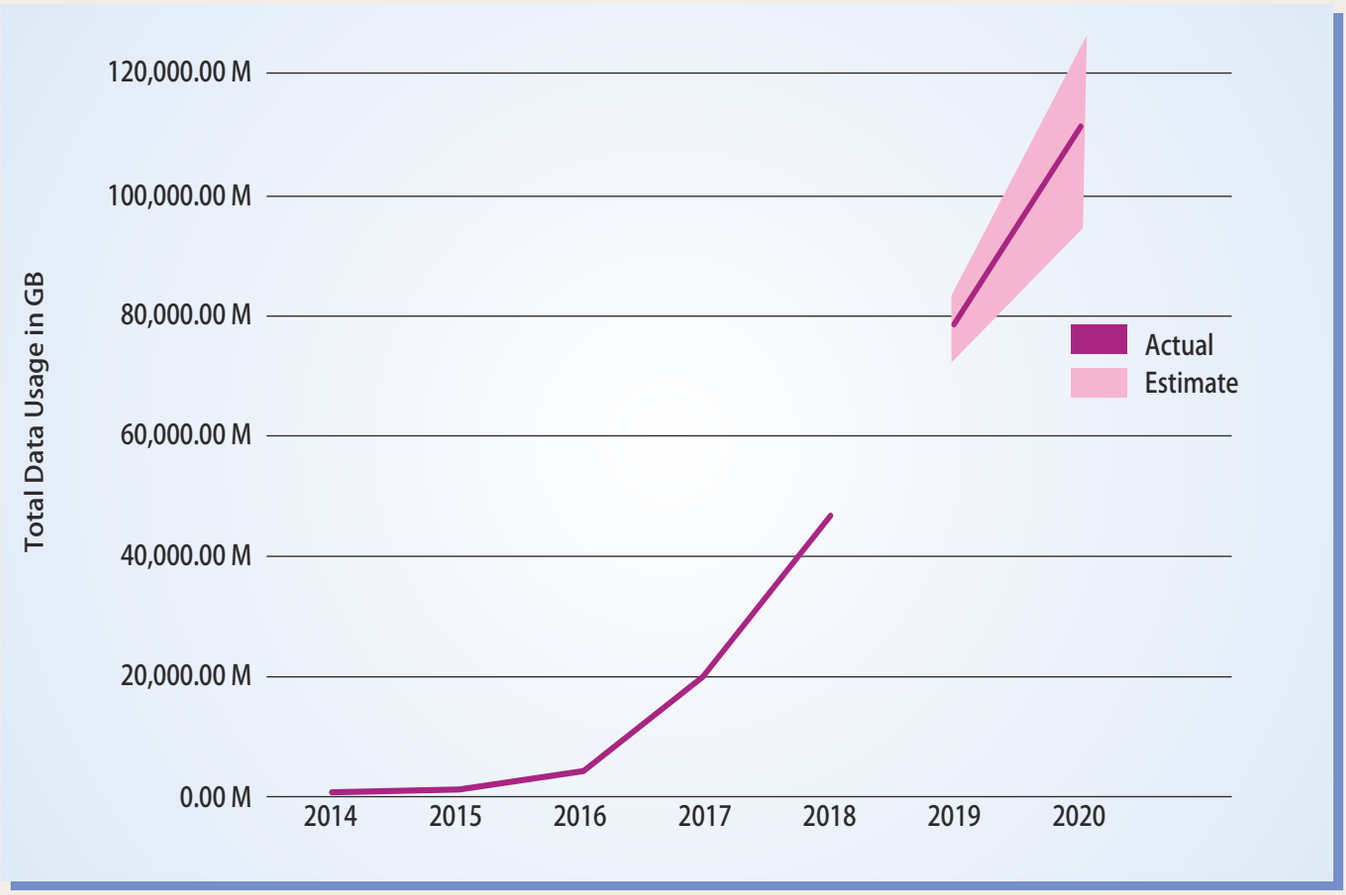
Estimated Data Usage in India by 2020

With the amount of massive data being offered by Telecom Service Providers, mobile data consumption in India is projected to increase by more than 200% in the next two years i.e. by 2020 (see Chart 4.2). The total estimated wireless data usage may reach 100 billion GB per annum by 2020. The data usage was 848 million GB in 2014 and it has increased to 46404 million GB in 2018. This projection is based on the trends in usage growth seen in the past few years. However, telecom being a highly dynamic sector, any new technological advance can upend the projected rate of growth.

As per an estimate[7], 5G technology would offer higher speed for data delivery which is expected to result in increase in data consumption. As per such estimate, an average 5G connection in 2022 will generate about 22 Gbytes of data per month, roughly three times more than the 8 Gbytes per month generated by 4G connections.

[7]https://www.lightreading.com/mobile/5g/nearly-12--of-global-mobile-data-to-ride-5g-networks-by-2022---cisco-study/d/d-id/749524

Chart 4.2: Trend of wireless data usage and Estimated Wireless Data Usage in India by 2020



(Source: TRAI estimation)

Financial inclusion

Financial inclusion for promoting equitable and sustainable development has attracted global attention in the recent past. The main focus of financial inclusion in India is to promote sustainable development and generate employment in rural areas for the rural population.

C. Rangarajan Committee (in 2008) defined financial inclusion as, **"The process of ensuring access to financial services, and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost."** Today, the ability of financial inclusion to empower low-income population worldwide has made it the core sustainable development agenda. Access to telecom services, especially data access, is a key input in achieving 100% financial inclusion.

Accelerating Development

It is a well-known fact that lower tariffs help in penetration of the telecom services in the rural and remote areas of the country. Affordable telecom services and the consumer interest are some of the important aspects. With intense competition amongst operators in the last year 2017-2018, there has been a significant fall in data prices. For example, the price of 1GB (4G) data charged by major Telecom Service Providers was around Rs. 250 in the year 2015. Now, it is as low as Rs. 5 per GB. Thus, there has been a significant rationalization in data tariffs by competitive market forces.

However, **despite significant positive movement in the wireless data usage, number of wireless data subscribers, tariff and other related parameters, there is still substantial room for improvement in various telecom parameters.**

Tele-density

Out of the total population of 1.3 billion, only 578 million people in India, i.e. less than 50%, have subscription to wireless data services. The wireless tele-density in rural areas is still 57.13% only as compared to 155.49% in urban areas (as on 31st March, 2019) which reflects the rural-urban divide in terms of telecom services' penetration. Since, the number of wireless data subscribers are less than 50% of the total wireless access subscribers, the number of wireless data subscribers in rural areas would be much lower.

In addition, there are a few states in India like Bihar, Uttar Pradesh, Assam, etc. where tele density is less than 75%. These states present an excellent opportunity to improve the telecom service penetration.

Digital India

In order to achieve the "Digital India" mission of the Government of India, each and every individual should have access to telecom services at an affordable price. The report of the committee on Medium-term path on Financial Inclusion released by Reserve Bank of India in 2015 recommended "a low-cost solution based on mobile technology can be a good candidate for improving financial inclusion by enhancing the effectiveness of 'last mile' services' delivery". Coupled with the Aadhaar, the Unique Digital Identity Solution of India covering more than 93% of the Indian population, no frills Jandhan bank and mobile accounts and Direct Benefit Transfer to the beneficiaries' bank accounts and increased access and affordability of Data Services has positively contributed to the Government's Goal of Digital and Financial Inclusion.

Affordability

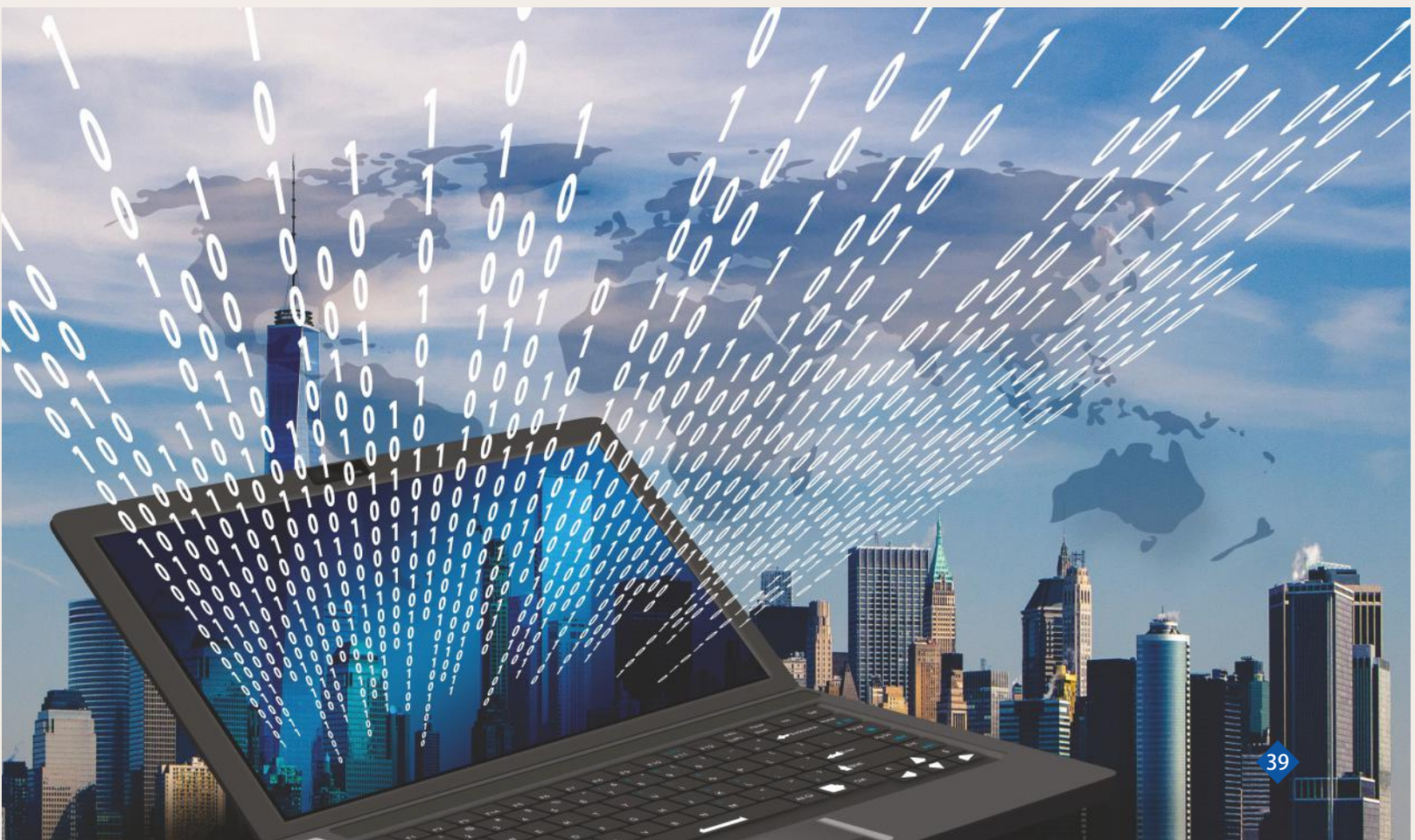
The affordability of telecom services also needs to be seen in the context of income spent by an average person living below poverty line. As per the "Report of The Expert Group to Review the Methodology for Measurement of Poverty" submitted in June, 2014 to the Planning Commission by Dr. C. Rangarajan, the total number of people living Below Poverty Line (BPL) in India is approximately 363 million (36.3 crore). The new poverty line for rural areas is nearly Rs. 32 and for urban areas Rs. 47. Accordingly, the monthly income for 28 days for such citizens for urban areas is Rs. 1,316 and for rural areas Rs. 896. However, to access data, the minimum tariff plan available to customers is around Rs. 49 which includes free voice, SMS and 1 GB data every 28 days. This implies that 4-5% of the monthly income (more than a day's income!) of such consumers may go in accessing data. This is a considerable cost for people living below poverty line. All the stakeholders need to make efforts to reduce the cost of accessing data for this category of consumer, as data access can have a multiplier effect in improving the economic status and quality of life of this segment.

The introduction of 5G technology is likely to change the dynamics of the market altogether. The key features of 5G i.e. ultra high speed and ultra low latency along with the new capabilities will make it possible to use 5G for healthcare (tele-surgery), autonomous vehicles, automated manufacturing so on and so forth. 5G technology will bring in both direct and indirect benefits. It has potential to act as a catalyst for higher overall economic growth of the country.[8]

Growth of data communication systems and services would help in enhancing the economic conditions in rural and remote areas, and spur new businesses by enabling access to markets by a large number of small and medium enterprises (SMEs). Above all, growth of digital communication networks would also boost competitiveness, enabling innovation, and improving productivity. As such, enhanced investments in telecom network infrastructure, which allows fast, reliable, and affordable internet connectivity, would further lead to socio-economic growth and job creation in India. A recent report titled 'Unlocking of Digital for Bharat' by Bains and Co., Google and Omidyar Network projects that if harnessed well, this unprecedented growth in Data Usage has potential of $50+ billion in potential online commerce, unlocked through new users and re-engaging the users who have stopped; further impact manifold.

Increasing access to internet and its affordability has empowered and would continue to empower millions of Indians by giving them real-time information, Government services, marketplaces and social media that will have a positive impact on their quality of life.

[8]White Paper issued by TRAI titled "Enabling 5G in India"



Disclaimer

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Index of Charts and Tables

Charts

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Notes

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