

Evolution Of Indian Telecom Sector*

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Abstract

The Indian telecom sector has witnessed a remarkable transformation since its inception in 1851. In 1985, the Department of Telecommunications (DoT) was established which was the sole service provider for the domestic and long-distance service¹. The journey from the days of telegraph to the current era of 5G technology has been full of challenges and opportunities. In the early days, the sector was dominated by state-owned entities, but liberalization in the 1990s opened up the sector for private players. This resulted in increased competition and rapid growth in the sector. The introduction of mobile telephony in the late 1990s was a game-changer, which led to a surge in mobile phone usage and internet penetration. The sector has seen significant investments in infrastructure, spectrum auctions, and mergers and acquisitions. The government's Digital India program has further accelerated the growth of the sector and provided impetus to the adoption of new technologies. In this article, an attempt will be made to explain the history of telecommunication sector in India and its evolution over a period of time. It will also highlight the current status of internet, wireline, wireless and active subscribers in India.

Keywords: telecom, wireline, wireless, internet

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I. Introduction

The Indian telecommunications sector has undergone a significant transformation over the past few decades. Prior to the 1990s, the sector was dominated by state-owned companies that provided limited services and had a monopoly on telecommunications. In the early 1990s, the Indian government began liberalizing the sector and inviting private investment. This led to the entry of several private players, which increased competition and expanded the range of services offered. Overall, the Indian telecommunications sector has evolved from a state-dominated industry to a vibrant, competitive market with a wide range of services and technologies. In the late 1990s, the introduction of mobile phones brought about a major shift in the sector. The growth of mobile networks has been exponential, and India is now the second-largest market for mobile telephony in the world. The sector has also witnessed significant growth in internet services and data usage, with the introduction of 4G and now 5G networks. The Indian government has also launched several initiatives to increase connectivity, including the National Optical Fiber Network and Digital India. These efforts have helped to bridge the digital divide and bring more people online.

History of Indian Telecom Sector

The history of the Indian telecommunications sector dates to the mid-18th century when the first telegraph line was laid between Calcutta (now Kolkata) and Diamond Harbour in 1851. However, the sector remained largely underdeveloped for several decades due to the lack of infrastructure and resources. Indian postal and telecom is one of the world's oldest departments. In 1881, the Indian Telegraph Act was passed, which gave the government a monopoly on telegraph services. The government established the Department of Posts and Telegraphs in 1854, which later became the Department of Telecommunications (DOT) in 1985.

The sector remained largely stagnant until the 1980s when the Indian government began to invest in modernizing the telecommunications infrastructure. In 1985, the government launched the Rural Telecommunications Program to provide basic telephony services in rural areas. The real transformation of the sector, however, came in the 1990s when the government began liberalizing the sector and inviting private

* The views in the article are personal and do not reflect the views of the Competition Commission of India.

¹ Indian Telecom at a Glance-2019 <https://dot.gov.in/sites/default/files/Telecom%20at%20a%20Glance-2019.pdf?download=1>

investment. Chowdary (1998)² explained the philosophy behind the monopoly of DoT in the initial years of evolution of the Indian telecommunication sector. He further explained how the telecommunication sector gradually moved away from the monopoly from 1986 to 1991 and thereafter, delved into the implementation of the National Telecom Policy in 1994.

In 1994, the National Telecom Policy was introduced, which aimed to promote competition and increase efficiency in the sector. This led to the entry of several private players, including Bharti Airtel, Vodafone, and Idea Cellular. In the late 1990s, the introduction of mobile phones brought about a major shift in the sector. The growth of mobile networks has been exponential, and India is now the second-largest market for smartphones in the world. The sector has also witnessed significant growth in internet services and data usage, with the introduction of 4G and now 5G networks.

Sinha (2002)³ in his case study explained the transition of Indian telecommunication sector from a monopoly model to a more competitive market-driven economy. Gupta (2002)⁴ also stated that after the 1991 economic reform, the Indian economy started shifting from a closed economy to a market-driven economy. The Government of India started liberalizing the entry of private players in the telecommunication sector.

Today, the Indian telecommunications sector is a vibrant, competitive market with a wide range of services and technologies. It has come a long way from its humble beginnings in the mid-19th century to become a key driver of India's economic growth and development. In the journey of robust growth in telecom sector, many policy changes played a very significant role. The subsequent paragraphs discuss the major policy changes in telecom sector.

Policy Changes in Indian Telecom Sector

Over the years, several policy changes have contributed to the growth and evolution of the Indian telecommunications sector. The liberalization of the sector in the 1990s was a significant milestone, which led to the entry of private players and increased competition. Barwah (2014) discussed about the benefits ushered by Globalization, Liberalization and Privatization policy in India, and how that brought about many reforms in multiple sectors, accelerating the pace of economy, especially of a developing economy like India's.

The National Telecom Policy of 1994 was another significant policy change, which aimed to promote competition, increase efficiency, and provide universal access to telecom services. This policy also led to the creation of an independent regulator, the Telecom Regulatory Authority of India (TRAI).

The New Telecom Policy of 1999 ('NTP, 1999') aimed to provide affordable and quality telecom services to all, while the introduction of the Unified Access Service License (UASL) regime in 2003 led to increased transparency and competition in the sector. The UASL regime also led to the allocation of spectrum through a competitive bidding process, and the creation of infrastructure sharing arrangements. The NTP, 1999 recognized the need for privatization in the telecom industry⁵. The NTP in 1999 recommended that legislations like Indian Telegraph Act, 1885 and the Indian Wireless Act, 1933 required substantial changes and were to be replaced with a more forward-looking Act. Thereafter, in light of the changes the Information and Technology Act, of 2000 was enacted to meet the challenges of the growing digital space⁶.

Post-1991, the Indian market was not heavily open to foreign equity investment⁷. Subsequently, in 2005, the FDI limit in the telecom sector was increased from 49% to 74%⁸. This was a positive step as it boosted the investment into the Indian telecom sector. We have also witnessed significant FDI inflow into the telecommunication industries in the last quarter of the financial year 2019-20 and the total FDI inflow was US\$ 37.11 billion.

² Chowdary, T.H. (1998). Politics and Economics of Telecom Liberalization in India. *Telecommunications Policy*, 22(1), 9-22.

³ Sinha, S. (2002). Competition Policy in Telecommunication: The Case of India. *International Telecommunication Union*

⁴ Gupta, R. (2002). Telecommunications Liberalisation: Critical Role of Legal and Regulatory Regime. *Economic and Political Weekly*.

⁵ The NTP 1999, Page 21 Annexure G.

⁶ NTP 1999

⁷ Greene, W. (2004, September. p. 57). The Liberalization of India's Telecommunications Sector: Implications for Trade and Investment (Working Paper). *Office of Economics, U.S. international trade commission*. [file:///C:/Users/win7/Downloads/wp04009b%20\(1\).pdf](file:///C:/Users/win7/Downloads/wp04009b%20(1).pdf)

⁸ Prasad, R.U.S. (2008, July. p. 8). The Impact of Policy and Regulatory Decisions on Telecom Growth in India (Working Paper No.361). *Stanford University*. <https://kingcenter.stanford.edu/sites/default/files/publications/361wp.pdf>

The National Telecom Policy of 2012 was another significant policy change, which aimed to provide affordable and quality telecom services to all and increase broadband penetration in the country. The policy proposed the creation of a unified license regime for telecom services and the introduction of a new framework for spectrum management.

More recently, the Digital India initiative launched in 2015 has been a significant policy change, which aims to transform India into a digitally empowered society and knowledge economy. The initiative focuses on providing digital infrastructure, digital services, and digital literacy to all citizens and aims to increase digital connectivity across the country.

These policy changes have played a crucial role in shaping the Indian telecommunications sector, promoting competition, and increasing access to telecom services. They have contributed to the growth and evolution of the sector, leading to the introduction of new services, increased connectivity, and significant technological advancements.

Looking ahead, continued investments in digital infrastructure, increased innovation, and the adoption of new technologies will continue to shape the future of the Indian telecommunications sector.

Internet Subscriber Base in India

The major services of the Indian telecom industry are telephone, internet and television broadcast industry which are in the process of transforming into the next-generation network, employs an extensive system of modern network elements like digital telephone exchanges, mobile switching centers, media gateways and signaling gateways, interconnected by a wide variety of transmission systems using fiber-optics or microwave radio relay networks⁹. Gupta (2015) intriguingly analyzed the shifts in cellular mobile service providers from voice services to voice-and-data services, and finally, predominantly to data services. The author observed the obstacles faced by the telecommunication sector from the demand and supply side perspective. Such technology and policy driven expansion led to a manifold increase in the subscriber base over the past few decades. The rapid expansion of the telecom network can be attributed to the fast growth of wireless subscriber and the reduction in fixed subscriber can be explained by switching of the subscriber from fixed line to wireless because of its mobile nature and cheaper call rates. Out of total subscribers (wireless and wireline), wireless subscribers attributes around 98% of total subscribers.

Along with telephony, the government of India has also placed extensive emphasis on high-speed internet under the Digital India scheme. Since most of the public services are accessible through internet, the government of India is putting more efforts to address the issue of the digital divide. According to the ITU database, the percentage of individuals using the internet¹⁰ in Kuwait was 100 per cent in 2017, whereas, in the Republic of Korea, UAE and the USA, the said percentages were 95.07, 94.82 and 87.27 respectively.

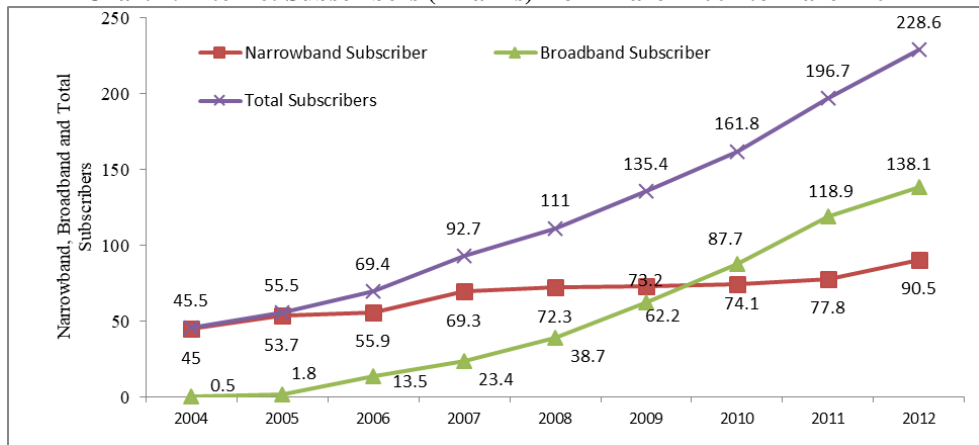
As per the website of the Indian Brand Equity Foundation¹¹, in terms of data usage per smartphone, India was in the first position in 2019. TRAI has classified internet services into two categories. One is narrowband (also known as the internet) and the second is known as broadband. Narrowband (internet) refers to an internet connection with a speed less than 256 kbps and broadband connection means speed more than 256 kbps. Chart 1 illustrates the growth trend of narrowband and broadband from March 2004 to March 2012. In 2004, there were total 45.5 lakh internet subscribers. Out of 45.5 lakh subscribers, 45 lakh subscribers were using narrowband and only 0.5 lakh were using broadband.

⁹ Singh, B. (n. d.). *Contribution of telecommunication Industry towards Indian Economy*.

¹⁰ As per the definition given by ITU, Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used *via* a computer, mobile phone, personal digital assistant, games machine, digital TV etc. (As per the definition given by ITU).

¹¹ India Brand Equity Foundation (n. d.). *Presentation on Indian Telecom Industry Analysis*. <https://www.ibef.org/industry/indian-telecommunications-industry-analysis-presentation>

Chart 1. Internet Subscribers (in lakhs) from March 2004 to March 2012

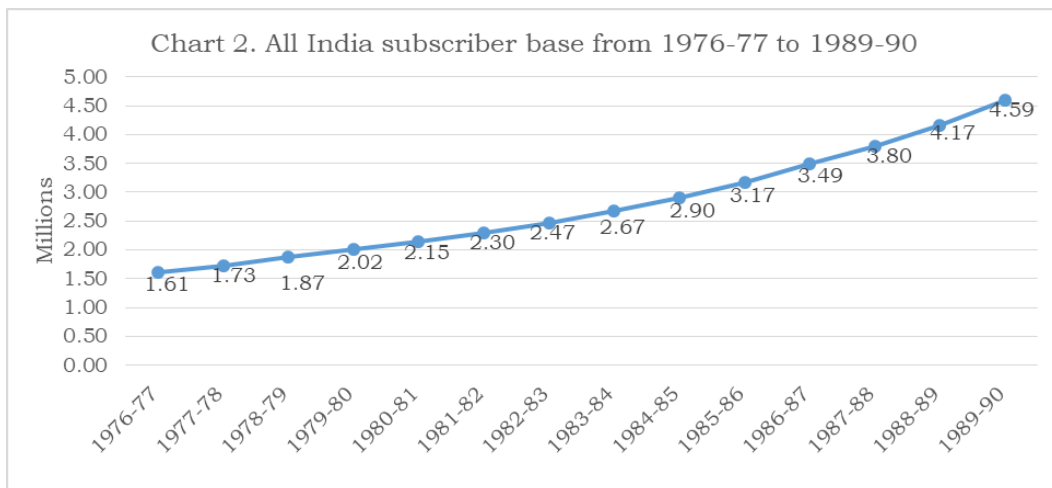


Source: Chart is prepared by researcher using data available at Telecom Regulatory Authority of India (TRAI) website

Total Subscribers (Wireline and Wireless) in India

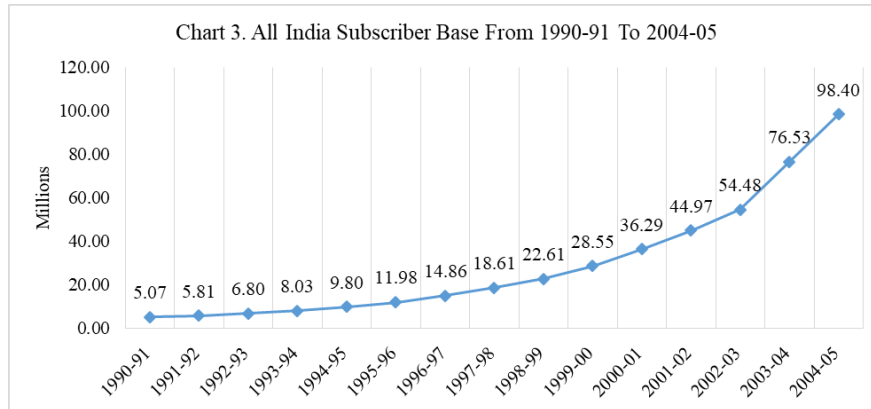
Talking about the historic trend regarding total subscribers, India has experienced rapid growth in the total subscriber base over the years. Here, total subscribers include subscribers of fixed-line telephone and wireless telephone. For better understanding, this entire period can be divided into three different periods ranging from 1976-77 to 1989-90, 1991-92 to 2004-05 and 2005-06 to 2019-20.

Chart 2 shows the trends of all India subscriber base from 1976-77 to 1989-90. It is evident from the trend shown in the chart below that India has experienced a growth in the total subscriber base over the years for the same period, which has increased steadily from 1.61 million subscribers in 1976-77 to 4.59 million subscribers in 1989-90.



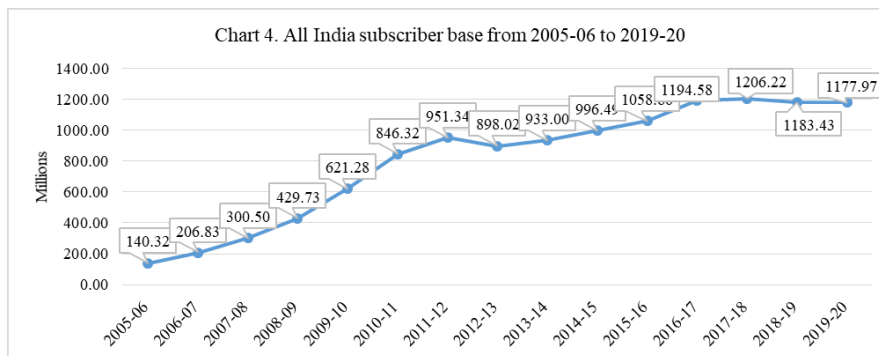
Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

Another Chart reproduced below indicates the trends of all India subscriber base from 1990-91 to 2004-05 which clears that the total subscriber base has increased continuously over the years for the same period. As the data indicates that total subscriber base for the year 1990-91 was only 5.07 million and it jumped to 28.55 million in 200-01 and increased exponentially afterwards. In 2004-05, it reached to 98.40 million in 2004-05.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

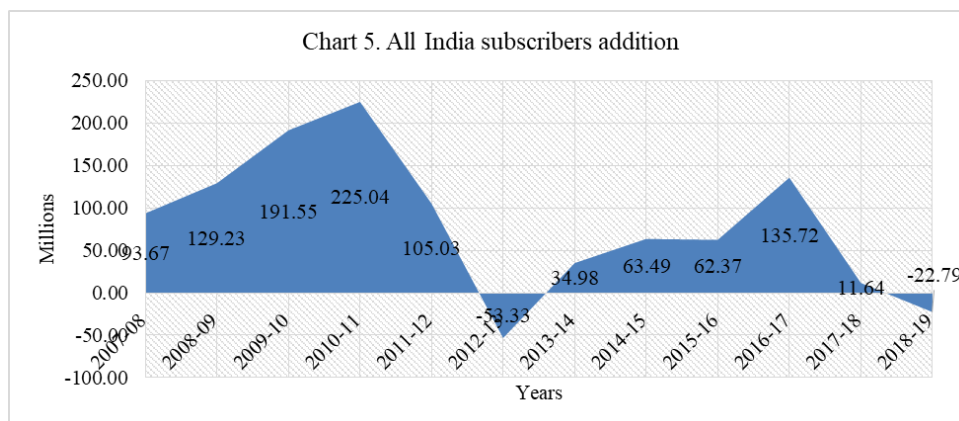
Likewise, as it is evident from the Chart 4 below India has experienced a mixed trend in subscriber base from 2005-06 to 2019-20. The trends show the increment in total subscribers from 140.32 million in 2005-06 to 951.34 million in 2011-12. Total pan-India subscribers declined in 2012-13 and recorded as 898.02 million subscribers for the same year. It accelerated thereafter and reached to all-time highest of 1206.22 million subscribers in 2017-18, then declined in 2018-19 and 2019-20 with 1183.43 million and 1177.97 million subscribers respectively.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

With regard to annual addition to total subscribers, it is observed that the annual addition to the total subscribers has increased from 0.13 million in 1980-81 to 22 million in 2003-04. Thereafter, the annual addition to the total subscribers for the year 2004-05 was 21.9 million which was lower than the previous year. The trend showed the upward shift in new subscribers in the following years as there were 66.5 million new subscribers added in 2006-07.

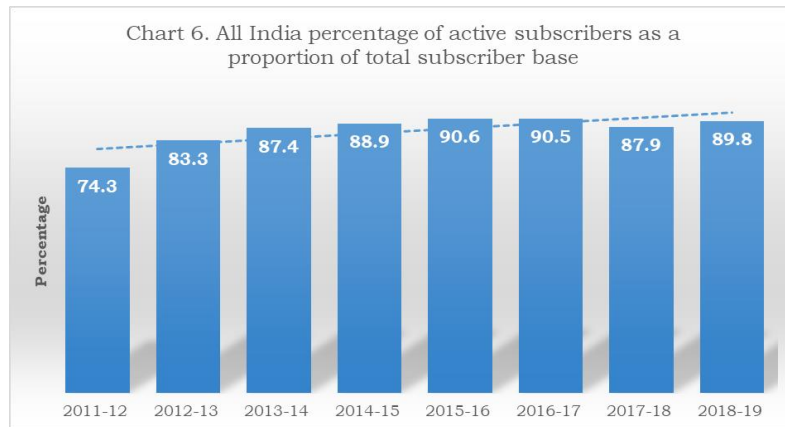
All India trend of subscriber addition has been shown in the Chart 5 below starting from 2007-08 to 2018-19. From the chart, it is clear that the highest addition to the total subscriber base was in 2010-11 (225.04 million) and the second highest was in 2016-17 (135.72 million). Whereas, in 2012-13, India's subscriber addition was at its lowest level of all time when India lost 53.33 million total subscribers.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

Active Subscribers (Percentage-wise analysis) in India

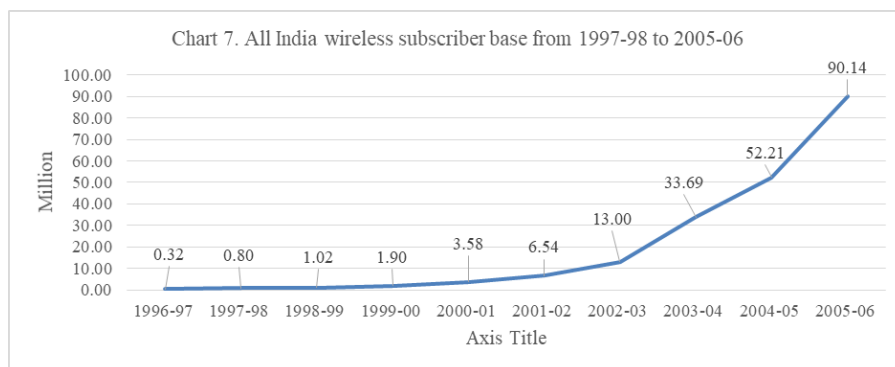
The active subscribers are calculated based on the reported visitor location register (VLR), a key metric reflecting the number of active users on a mobile network¹². Percentage-wise data of active subscribers of various telecom operators as a proportion of total subscriber base has been analyzed from 2011-12 to 2018-19. From the Chart 6 provided below, all India percentage-wise data of active subscribers as a proportion of the total subscriber base can be observed for the same period. It is evident from Chart 6 that the percentage of active subscribers out of total subscribers has increased over the years till 2015-16. As the percentage of active subscribers out of the total subscriber base was merely 74.3% in 2011-12, it increased sharply to become all-time highest to 90.6% active subscribers out of total subscriber base in 2015-16. Ultimately, it becomes 89.8% in 2018-19 after experiencing minor ups and downs in the following years.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

Wireless Subscribers Base in India

Similarly, to make our analysis more convenient, I have divided the entire wireless period into two parts one is from 1996-97 to 2005-06 and 2006-07 to 2019-20. Below is the Chart 7 showing the trends of all India wireless subscriber base from 1996-97 to 2005-06. It is evident from the trend shown in Chart 7 that India has experienced steady growth in the wireless subscriber base over the years for the same period. As the total wireless subscriber base was 0.32 million in 1996-97, it increased steadily for the next 5 years and reached 6.54 million total number of wireless subscribers in 2001-02 across the country. Within the next 3 years, it increased exponentially and jumped to 90.14 million in 2005-06 from only 13 million total wireless subscribers in 2002-03.

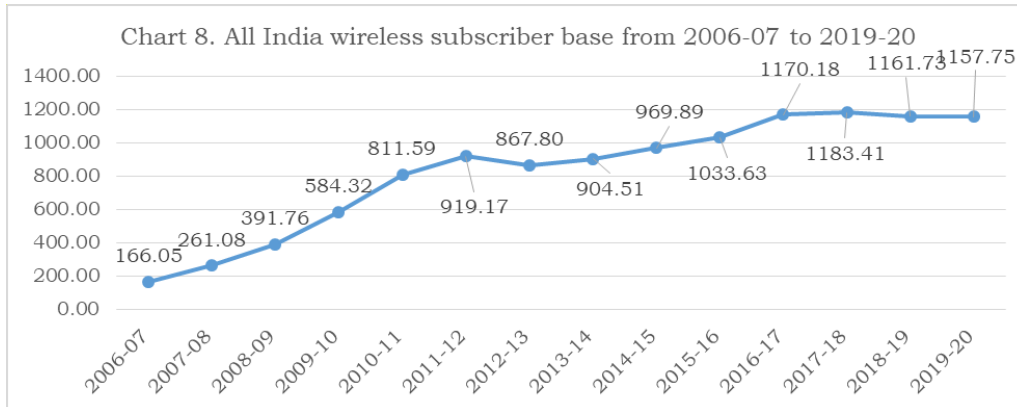


Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

Likewise, as it is evident from the Chart 8 below India has experienced a mixed trend in wireless subscriber base from 2006-07 to 2019-20. The trends show the continuous increment in total wireless subscribers from 166.05 million in 2006-07 to 919.17 million in 2011-12. All India wireless subscribers declined in 2012-13 and recorded as 867.80 million subscribers for the same year. It accelerated thereafter and reached to all-time

¹² https://economictimes.indiatimes.com/industry/telecom/telecom-news/telecom-industrys-active-subscriber-tally-up-by-2-5-million-in-october-report/articleshow/79952981.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

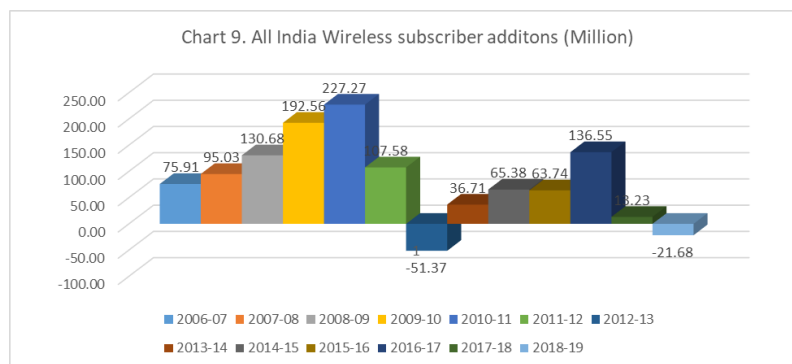
highest of 1183.41 million subscribers in 2017-18, then declined in 2018-19 and 2019-20 with 1161.73 million and 1157.75 million subscribers respectively.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

From the above charts, it is observed that during 1996-97 to 2018-19, the total wireless subscriber base of the country had a rapid growth. In 1996-97, the wireless subscriber base was only 0.03 crores which is an insignificant number compared to the present subscriber base. In 2000-01, the wireless subscriber base was only 0.36 crores which increased to 9.01 crores in 2005-06. Here, the increment in the wireless subscriber base was 8.65 crores. However, in the next five years, the wireless subscriber base reached 58.4 crores in 2009-10 and the increment was 49.39 crores. The wireless subscriber base further increased to 91.9 crores in 2011-12. Thereafter, in 2012-13, the first time, wireless subscriber base reduced to 86.80 crores. As per the Annual Report 2012-13, TRAI, this decline in Wireless connections was mainly due to the deactivation of inactive connections. It can also be seen that since 2012-13, the increment to the wireless subscriber base was not very significant. In 2017-18, the wireless subscriber base increased to 118.3 crores. Again in 2018-19, the wireless subscription base declined to 116.2 crores.

As far as additions to the all-India wireless subscriber are concerned, there has been seen a mixed trend over the years. All India wireless subscriber additions declined from 0.48 million new added wireless subscribers in 1997-98 to only 0.21 million new added wireless subscribers in 1998-99. It jumped to 0.88 million in 1999-00. Following the same trend, it moved to 6.4 million new added wireless subscribers for the year 2002-03. The all-India wireless subscriber additions were only 20.7 million, 18.51 million and 37.93 million in 2003-04, 2004-05 and 2005-06 respectively. The year-wise subscriber additions from 2006-07 to 2018-19 are depicted in Chart 9 below.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

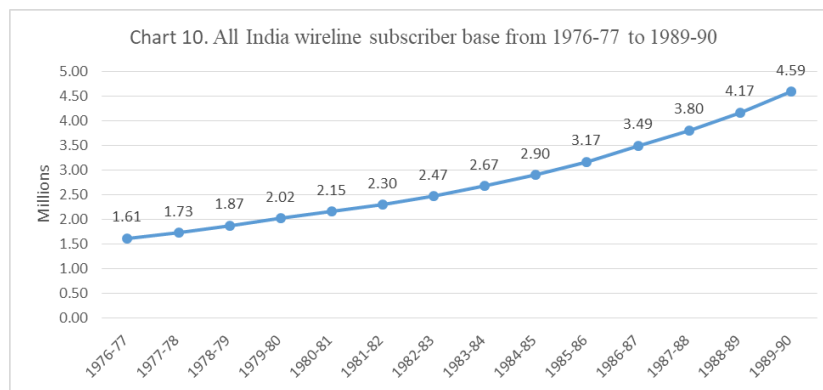
From Chart 9 drawn above, it is evident that the all-time highest number of new added wireless subscribers was in 2010-11 when total wireless subscriber additions were recorded as 227.27 million. On the other hand, in 2012-13, India's wireless subscriber additions were at their lowest level of all time when India lost 51.37 million total wireless subscribers.

As per a news article dated 22.05.2019 published in Economic Times¹³, Ms Megha Manchanda and Ms Sohini Das believed that such reduction in the wireless subscription can be attributed to mainly on account of operators weeding out their low-revenue subscribers to improve the average revenue per user (ARPU). In the same article, they cited the opinion of a Mumbai-based analyst who stated that Bharti Airtel and Vodafone-Idea were cleaning up low-paying subscriber bases and want to focus on the paying subscriber base. They were cleaning up their subscriber bases to improve ARPU and improve their EBITDA margins. They further added that in April 2018, as per the TRAI data, the wireless subscriptions declined by 5.8 crores primarily because of the filing of bankruptcy proceedings by Aircel which resulted in zero customer base from around 7.4 crores subscribers' base.

Wireline Subscribers Base in India

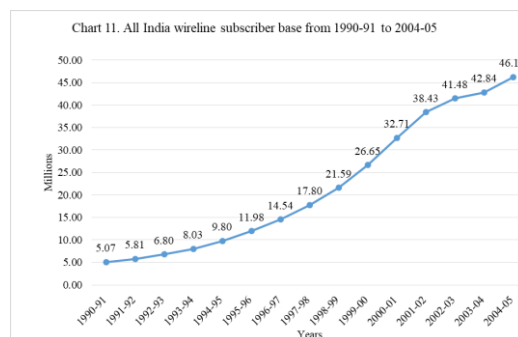
In absence of wireless services, the wireline subscribers showed an impressive growth in its early phase. From the available data, we can also analyze the total wireline subscriber base of the country from 1976-77 to 2019-20. For better understanding, this entire period is divided into three different time segments ranging from 1976-77 to 1989-90, 1990-91 to 2004-05 and 2005-06 to 20019-20.

Below is the Chart 10 showing the trends of all India wireline subscriber base from 1976-77 to 1989-90. It is evident from the trend shown in Chart 10 that India has experienced a growth in the total wireline subscriber base over the years for the same period, which has increased steadily from 1.61 million wireline subscribers in 1976-77 to 4.59 million wireline subscribers in 1989-90. In the absence of mobile telephony, the entire demand for telecom service was catered by the fixed-line.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

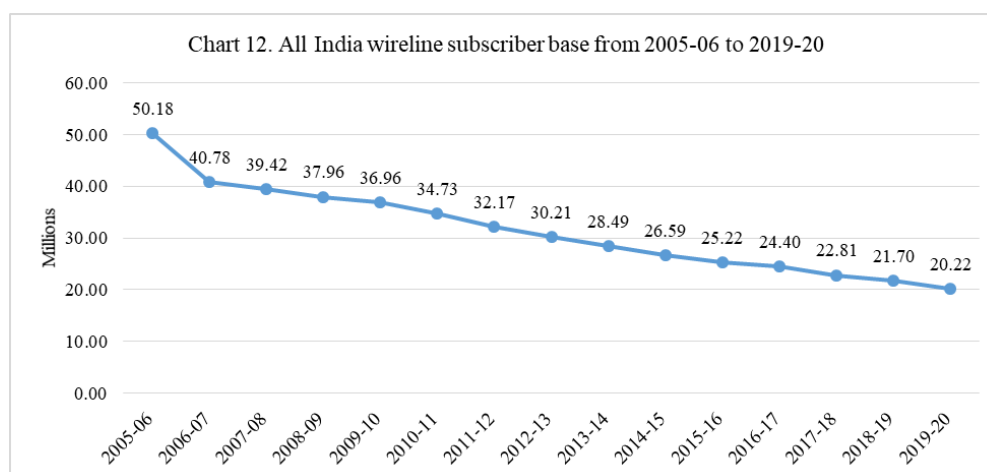
The next Chart 11 indicates the trends of all India wireline subscriber base from 1990-91 to 2004-05. It is clear from the said chart that the total wireline subscriber base has increased continuously over the years for the same period. As the data indicates that total subscriber base for the year 1990-91 was only 5.07 million, it jumped to 21.59 million wireline subscribers in 1998-99 and reached at 46.19 million in 2004-05.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

¹³ Manchanda, M., & Das, S. (2019, May 22). Mobile user base dips 22 mn in March, suffers biggest fall since April 2018. *Business Standard*. https://www.business-standard.com/article/companies/mobile-user-base-dips-22-mn-in-march-suffers-biggest-fall-since-april-2018-119052101593_1.html#:~:text=In%20April%202018%2C%20the%20Trai%20data%20had%20shown%20a%20net,customer%20base%20reduced%20to%20zero

However, as it is evident from the subsequent Chart 12 India started experiencing a decreasing trend in total wireline subscriber base from 2005-06 to 2019-20. The diagram shows that all India wireline subscribers reached an all-time highest of 50.18 million subscribers in 2005-06 and reached to 40.78 million in 2006-07 by declining sharply. The all-India wireline subscriber base kept on declining thereafter in the coming years and recorded as 20.22 million wireline subscribers in total in 2019-20. This was mainly attributed to the penetration of mobile telephony which offered many advantages compared to fixed-line telephony.



Source: Chart is prepared by the researcher using data available at the website of Industrial Outlook, CMIE

Given the above discussion, it has been observed that India has experienced a mixed trend of wireline subscribers over the years. From 1976-77 to 2005-06, India has experienced positive growth in wireline subscriber base. It reached its highest point of 50.2 million in 2005-06 from just 1.6 million in 1976-77. Thereafter, total wireline subscribers started declining from 2006-07 onwards in the country. From the Chart 12 above, it can be seen that the total number of wireline subscribers were 40.8 million in 2006-07 and declined to its lowest to 21.7 million in 2018-19. About all India wireline subscriber additions, 0.13 million subscribers were added in 1980-81 and it moved with an increasing rate until the year 2000-01 when the highest number of newly added wireline subscribers of all time was recorded as 6.06 million. However, India has lost the highest number of wireline subscribers in 2006-07 when it had lost a total of 9.4 million subscribers.

II. Conclusion

The Indian telecommunication sector has come a long way since its inception in the 1850s. The sector has undergone significant changes and transformations over the years, driven by technological advancements and policy changes. From a time when telephones were a luxury to the present-day era of high-speed internet and mobile devices, the sector has made remarkable progress. The liberalization of the sector in the 1990s and the subsequent entry of private players led to increased competition and the rapid expansion of services across the country. The sector has seen significant investments in infrastructure, spectrum auctions, and mergers and acquisitions. India has one of the largest wireless subscriber bases in the world. The wireless subscriber base in India has grown rapidly over the years, driven mainly by the affordability and availability of mobile phones and mobile data services. The launch of 4G networks in India in 2016 has also been a major factor in the growth of wireless subscribers, as it has enabled faster data speeds and better connectivity. Despite challenges such as regulatory issues, high debt, and intense competition, the Indian telecom sector has emerged as one of the most dynamic and fast-growing telecom markets in the world. The future of the sector looks promising with the advent of 5G technology, the Internet of Things (IoT), and artificial intelligence (AI), which will further drive innovation and growth in the sector.

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