
MARKET STRUCTURE AND CONCENTRATION OF THE INDIAN TELECOM SECTOR DURING 2010-2020

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INTRODUCTION

The telecom industry in India is one of the fastest growing in the world, with over 1.18 billion subscribers as of 2021. This growth is due to several factors, including the widespread availability of mobile phones, the expansion of mobile networks, and the growth of the Indian economy. The industry is dominated by a few major players, including Bharti Airtel, Vodafone Idea, and Jio, with Reliance-Jio holding the largest market share (2020). The industry is highly competitive, with aggressive pricing and marketing strategies to gain new subscribers and retain existing ones. So, here we take a look at the market concentration of this Industry in India, especially from 2010 to 2020.

LITERATURE REVIEW

The literature review of the Indian telecom industry from 2007 to 2020 (Agarwal et al., 2021) covers the growth and development of the industry, the impact of new technologies and services, and the role of the regulatory environment. The growth and development of the industry have been highlighted in studies, including an increase in the number of mobile subscribers, growth in data services, and expansion of rural coverage. Introducing new technologies and services like 4G and digital services have enabled faster internet speeds, better call quality, and increased access to digital content. The regulatory environment has played a crucial role in the growth and development of the industry through the policies and regulations of the Telecom Regulatory Authority of India. However, the industry faces challenges such as high spectrum prices and the need for more investment. The field of research on the Indian telecom industry is constantly evolving, and up-to-date information can be found in recent research papers and reports from reliable sources.

The article "Case Study Telecom industry and competitive landscape in India" provides a review of the Indian telecom industry focusing on public sector undertakings MTNL and BSNL. It evaluates the industry's competitive landscape, the current state of MTNL and BSNL, and the potential for their recovery. The article concludes that the companies face significant challenges but have the potential to recover with government support and structural reforms. The authors suggest that the government should play a role in supporting the recovery of these companies through financial assistance and public-private partnerships.

Again, the article "Disruption of the telecom industry with the entry of Reliance Jio"(Sharma, 2019) reviews the impact of Reliance Jio's entry into the Indian telecom industry. The article argues that Reliance Jio's entry has caused significant disruption, quickly gaining market share and changing the competitive landscape. The entry of Reliance Jio has had a positive impact on consumers, with increased competition, lower prices, and improved services. However, it has also posed challenges for traditional telecom operators, who have had to adapt to the new competitive landscape. The article concludes that Reliance Jio's entry has profoundly impacted the Indian telecom industry.

Now, the study (Raghu, 2013) on the Indian telecommunications industry with a particular reference to Airtel examines the industry's competition and market structure and assesses Airtel's performance in the market. The study covers key themes such as market structure, contest, regulatory environment, market performance, and the impact of technological advancements. It analyses the number of players, market share, barriers to entry, measures of concentration, and intensity of the rivalry between firms. Additionally, the study looks at government regulations, prices, quality of service, innovation, and the influence of new technologies on the industry and Airtel's performance. The study's objective is to provide insights into the Indian telecommunications industry with a focus on Airtel and its position in the market.

Telecommunications have recently grown to play a significant role in every global economy. Similar things apply to the Indian economy. Based on fixed and mobile phone usage, India's telecommunications network ranks second in the world. With the lowest call rates on the planet simultaneously, MNCs could compete fiercely. Its internet user base is the second largest in the world. According to data from the internet world base, 462 million people in the nation used the internet in 2016. Internet, television broadcasting, and telephony are India's three primary forms of communication. In this study paper, the development of the Indian telecommunications industry is highlighted. It also reveals the significance of the Indian telecom industry as well as the several variables that have greatly aided its expansion. Numerous sources, such as books, journals, websites, newspapers, etc., were used to gather the data. The current state of the Indian telecom sector is also discussed in the study (Jatav, 2016).

In India, the telecommunications sector is expanding quickly and undergoing numerous changes (Borah, 2013). It has undergone several changes, which have intensified its competitiveness in the market. The significant policy changes in the Indian telecommunications industry are described in this article. The article also analyses Vodafone and Airtel's techniques to adapt to changing market conditions. The report will give readers a thorough understanding of current market trends and assist in highlighting changes in the telecommunications sector.

Over time, India's telecom industry expanded and is now the second largest in the world. The introduction of 5G by Reliance Jio is anticipated for the second half of 2021. Since Jio's launch, India has experienced a rapid uptake of Internet services. India's second-largest telecom sector offers its citizens the cheapest internet service. Currently, there are 500 million active data users. According to (Bhattacharya & Sachdev, 2021). By 2024, it is predicted that there will be more than 800 million active users, and 1 billion smartphones will be produced. India is likewise attempting to give individuals more digital power. During the epidemic, we observed an increase in the usage of digital platforms, and India is also moving closer to a digital economy. The unfortunate truth behind this is that the 5G service in India is soon to be launched. In India, just 8% of the population has access to a laptop or computer, while 90% of the population needs more basic digital literacy. India's cyber security system is likewise weak, making user data susceptible. Only 25% of the internet is connected by fibre; thus, we also need stronger tower connections in many places. Given that the Internet will rule the future, India needs to modernize its telecom sector and offer internet access to every citizen. The telecom sector in India makes up about 6.5% of the country's GDP.

This paper (Agarwal & Ramakrishnan, 2010) focuses on the telecom sector in India, covering its history, current state, and prospects. It likely includes an analysis of the growth and development of the industry, the impact of new technologies and services, and the regulatory environment. The review might also highlight the challenges faced by the industry and the role played by the government in shaping the sector. The research is likely to be dynamic and constantly evolving, with the most accurate and up-to-date information coming from recent studies and reports.

A review of the analysis of churn behaviour (Geetha & Abitha Kumari, 2012) of consumers in the Indian telecom sector covers various topics, such as the factors influencing customer churn, the impact of customer churn on the telecom industry, and the strategies employed by companies to reduce churn rates. Research has shown that poor network quality, high tariffs, and poor customer service are the main reasons for customer churn in the Indian telecom sector. The impact of customer churn on the industry includes increased competition, reduced revenue, and loss of market share. Companies have employed strategies such as improving network quality, offering competitive tariffs, and enhancing customer service to reduce churn rates. The field of research on the analysis of churn behaviour in the Indian telecom sector is constantly evolving, and up-to-date information can be obtained by looking at recent research papers and reports from reliable sources.

A literature review of customer loyalty analysis in the Indian telecom sector (John, 2021), with a particular reference to Bharat Sanchar Nigam Limited, covers topics such as customer satisfaction, customer retention, and factors that influence customer loyalty. Research has shown that customer loyalty is a critical factor for the success of telecom

companies and that it can be affected by various factors such as network quality, customer service, pricing, and brand image. The literature may also discuss the measures Bharat Sanchar Nigam Limited took to improve customer loyalty, including implementing customer relationship management (CRM) programs and introducing new products and services.

The research paper by Zaraq Zahoor (Zahoor, 2015) focuses on the history and development of the telecommunication sector in India. The author highlights that India has the second-largest telecommunication network in the world and the third-largest Internet user base. The paper emphasizes the importance of the telecom sector in India and the factors that have facilitated its growth, including low call tariffs and the development of the Internet user base. The author has collected data from various sources to provide an overview of the current scenario of the Indian telecom sector. The paper concludes by summarizing the state of the industry, highlighting its significance and growth potential in the future.

RESEARCH OBJECTIVE:

The objective behind conducting research on India's telecom industry during the period 2010-2020 is to get a comprehensive study on the market structure and concentration of the telecom industry and analyse the degree of competition and distribution of market power among the firms in the industry. The analysis would provide us with insights regarding the level of market power, the presence of dominant players, and the level of market concentration. The findings from this research report can form various regulatory policies which are aimed at promoting competition, preventing anti-competitive practices and ensuring a level playing field for all the players in the market. It could also help in forming investment decisions.

METHODOLOGY

This particular research report will analyse the market structure and concentration of the telecom industry in India for 2010-2020. In this report, we will be using two indicators of competition; Herfindahl-Hirschman Index (HHI) and the four-firm (C4) Concentration Ratio. HHI is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers, which is denoted by:

$$HHI = \sum_{i=1}^n S_i^2 \text{ for } i = 1, 2, 3, \dots, n$$

Where S = the market share and n number of firms in the market. The HHI considers the relative size distribution of the firms in a market. When a market is occupied by a large number of firms of relatively equal size, then the HHI approaches 0, and HHI reaches a maximum of 10,000 points when a single firm controls the market. Therefore, HHI and the number of firms have an inverse relationship; when HHI increases, the number of firms in the market decreases. The HHI also increases as the disparity in size between those

firms increases. In the table given below, we have the value of HHI defining different market structures.

Table 1: Range and degree of market concentration

HHI	Range
Un-concentrated	<1000
Moderately Concentrated	1000-1800
Highly Concentrated	>1800

Source: (Ukav, 2017)

When it comes to oligopoly market structure, HHI is considered much more relevant in this situation as it measures changes in market share and adds to all the companies in the market. The HHI is widely used in antitrust analysis and can help regulators in making informed decisions about competition and market structure. Since the telecom industry in India is an oligopoly market, we would be using HHI to measure the market concentration of this particular industry under concentration.

While the four-firm concentration ratio (CR4) can be defined as the sum of the market shares of the largest four firms in the relevant market. Concentration ratios show the extent of the largest firms' market shares in a given industry. A concentration ratio close to 0% indicates a low-concentration industry, while a ratio near 100% implies an industry having a high concentration. The CR4 can be denoted as

$$CR4 = \sum_{i=1}^4 S_i \text{ for } i = 1,2,3,4,$$

Where S = market share. Below is the table that explains the possible market structure corresponding to the different levels of CR4.

Table 21: Concentration Ratio and Market Structure

Level of CR4	Market Structure
CR4=0	Perfect Competition
0<CR4<40	Monopolistic Competition
40<CR4<60	Loose Oligopoly
60<CR4<90	Tight Oligopoly
90<CR4	Near Monopoly

Source: (Ukav, 2017)

Concentration ratio finds its importance in indicating the monopolistic power existing in the industry without prioritizing the development of the firms' size distribution in the analysis. Therefore four-firm (CR4) concentration ratio is ideal for analyzing the market structure and concentration of the telecom industry in India.

ANALYSIS & RESULTS

The Indian telecom industry is one of the fastest-growing industries globally. The number of telecom-service users has grown exponentially in recent years, including in the country's rural economy. The industry has also gone through some significant changes. The most prominent ones are the entry of a superpower- Jio, the merger of Idea and Vodafone into VI, the acquisition of Tata Teleservices and Telenor by Bharti Airtel and the exit of a few enterprises like Reliance Communications and Aircel (Parsheera & Trehan, 2022). The industry has also experienced some positive developments, right from the introduction of 3G, 4G and 5G in the last decade to witnessing an above-normal growth rate in the Covid years. Given this scenario, the study of the market concentration of the Indian Telecom Industry becomes crucial. Thus, the following tools are used to analyse the market concentration.

Herfindahl-Hirschman Index

The HHI index is obtained by the summation of the squares of the market shares of every firm in the industry. Each firm's market share is squared to give more weightage to the larger firms. The index's value classifies the firm's market structure as highly competitive with a 20% ratio, moderately competitive for the ratio between 20% to 70% and highly concentrated when the ratio falls above 70%. Accordingly, the market structure can be defined as perfect competition, oligopoly and monopoly.

The market share of each firm is calculated by dividing the sales or output produced by a firm by the total sales or the total output produced by the entire industry. In the case of the telecom sector, the total number of subscribers of a particular firm is taken as a proxy to the sales value, as here, the services are consumed instead of product consumption. Hence, we obtain each firm's market share by dividing each firm's subscribers by the total number of subscribers in the industry in the given year. The value of HHI is generated thereon by adding the sum of every firm's market share. Following is the list of HHI for the period 2010 to 2020.

Table 3: Herfindahl-Hirschman Index of the telecom industry for the period 2010 to 2020

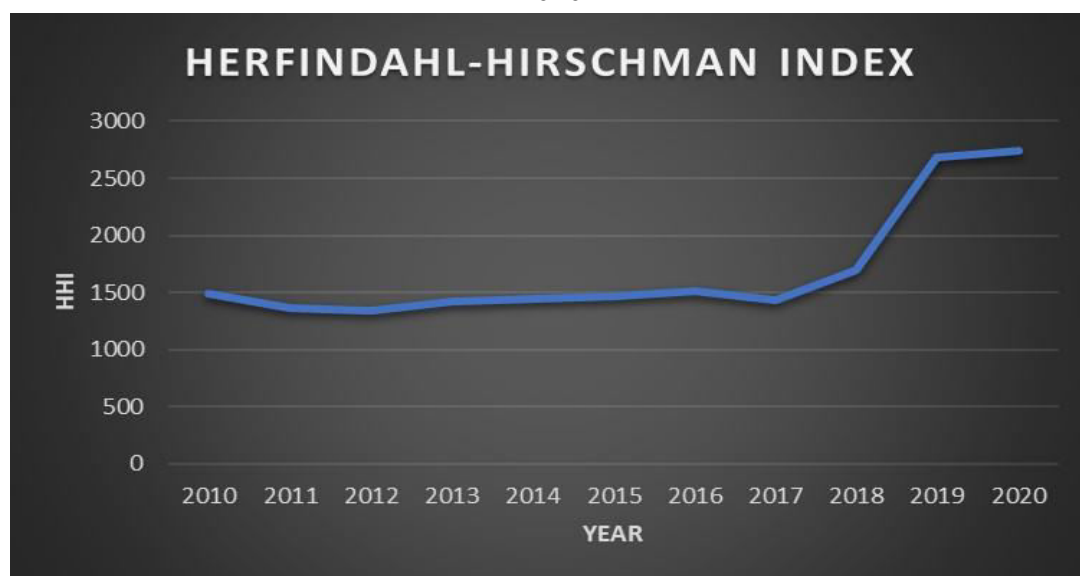
YEAR	HHI
2010	1489.6519
2011	1367.1324
2012	1335.7442
2013	1418.0960
2014	1443.6864
2015	1469.4561

2016	1516.8037
2017	1433.0190
2018	1691.7153
2019	2678.7881
2020	2738.6273

Source: (Department of Telecommunications, 2020)

According to the general rule of market concentration, the telecom industry in India, from 2010 to 2018 is characterised with a medium level of concentration with the HHI value falling between 1000 and 1800. Post 2018, the industry is a market with high concentration with an HHI value greater than 1800. This means that the telecom industry has moved from an oligopolistic market structure to a more concentrated monopoly structure. Here, by monopoly structure, we mean the existence of a few firms that are influencing and controlling the market to a large extent. This trend can be better portrayed with the following graph:

Figure 1: Herfindahl-Hirschman Index of the telecom industry for the period 2010 to 2020



Source: (Department of Telecommunications, 2020)

The graph clearly shows the transformation of the industry with an increasing trend around 2018. Thus, the industry has shifted from a moderate concentration market structure to a highly concentrated market structure in recent years. This trend is primarily a result of a strong entrant Jio, and the merger of two prominent players- Idea and Vodafone. Along with this, the Covid pandemic has resulted in an increased demand for telecom services with the world being digitised. Constant developments and innovations like the introduction of 5G services have also paved the way for this trend.

The government has also supported the industry through its reforms and incentives, boosting it further.

The 4-Firm Concentration Ratio

Concentration Ratio (CR) is a widely accepted tool for the measurement of the market concentration of an industry. Although the tool's aim remains the same as the HHI, the measurement method differs. The CR is calculated by adding up the market shares of the top four performing firms in an industry. Alternatively, a concentration ratio with the top 6 firms is also in use. Here, we use the CR4 method as the telecom industry in India has been driven majorly by four firms lately. In order to get the market share of each firm, the total number of subscribers of a given firm in a given year is divided by the total number of subscribers in the entire industry. The following table shows the CR4 of the top four firms every year: Reliance Communications, Reliance-Jio, Bharti Airtel, VI (Vodafone-Idea) and Bharat Sanchar Nigam Ltd. (BSNL).

Table 4: Concentration Ratio of top 4 telecom industry firms for the period 2010 to 2020

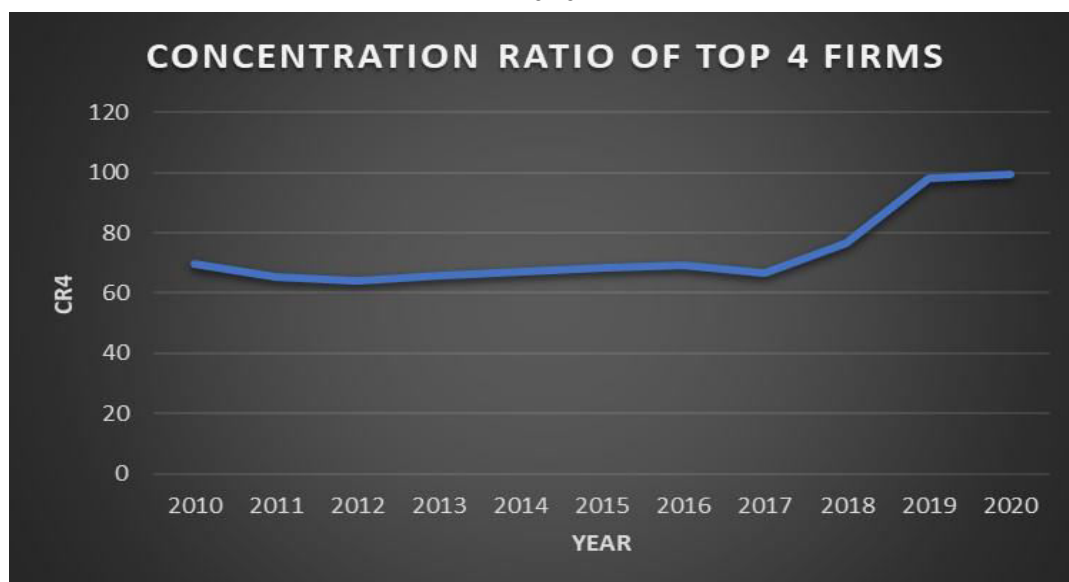
YEAR	CR4
2010	69.6031
2011	65.4686
2012	64.1541
2013	65.6711
2014	66.9117
2015	68.4419
2016	69.0616
2017	66.7093
2018	76.6471
2019	97.8579
2020	99.2420

Source: (Department of Telecommunications, 2020)

The Concentration Ratio of the top four firms of every year has consistently been between 60% to 70% for the period 2010 to 2017. The year 2018 is marked as the transitional year, which has witnessed a hike in the concentration ratio by around 10%. The concentration ratio has increased considerably after that; its value is over 97%. According to the generally accepted rule, a concentration ratio lower than 40% indicates a competitive market, whereas a monopoly market would have a ratio of more than 90% (Ukav, 2017). The CR4 of the Indian telecom industry indicates a tight oligopoly market with a moderate level of market concentration until 2018. The trends after that indicate a very high concentration of market power with the top four firms:

Reliance-Jio, Vodafone-Idea, Bharti Airtel and BSNL. The following graph explains this trend:

Figure 2: Concentration Ratio of top 4 telecom industry firms for the period 2010 to 2020



Source: (Department of Telecommunications, 2020)

The above graph shows the high concentration of the firms in recent years after a stable, moderate concentration of power for around eight years. The reasons for the same have been discussed in the previous section.

The HHI and CR4, in the case of the Indian Telecom industry, provide the same trends and results with respect to the market concentration of the industry. Both tools show a transition from a tight oligopolistic market to a monopoly market with a very high concentration of market power. Thus, it is safe to conclude the results of the HHI and CR4 for the Indian Telecommunication Industry.

CONCLUSION

In conclusion, the telecom industry in India has experienced rapid growth in recent years and is a crucial component of the country's economy. While the industry is highly competitive, with several significant players vying for market share, it is also highly concentrated, with just a few companies holding most of the market share. The Indian government has taken steps to promote competition and attract investment in the industry, but further efforts are needed to ensure greater market openness and competitiveness. This will benefit both consumers and the industry as a whole by promoting lower prices, increased choice, and more significant innovation.

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