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An Analysis of the Indian Telecom Industry

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Abstract: *The Telecommunications Industry of India is one of the vast and leading industries in the world connecting different parts of the country through various modes like telephone, radio, television, satellite and internet. The Telecom Regulatory Authority of India governs this industry by providing a regulatory framework and favourable environment for its efficient operation. The Indian telecom industry stands as the second- largest in the world due to its rapid advancement and is in cut-throat competition with the telecom industries of the other developed countries. The telecommunication services offered by this industry are easily accessible at affordable prices to the customers of urban and rural areas of India. India's telecom network encompasses a highly developed and unique technology in the world. The present study has therefore been undertaken to analyze the history and evolution of Indian Telecom Industry while emphasizing upon its major segments, the Government Telecom policies followed for its systematic functioning and its growth and development in the present scenario along with the future opportunities for advancement.*

Keywords: *Development, Government Telecom Policies, Growth, Indian Telecom Industry, Market Share, Service Providers.*

I. Introduction:

The Indian Telecom Industry is considered to be a vital tool for the development of the country on the whole by contributing towards the immense growth, quick expansion and upgradation of various sectors of the nation. This industry increases the GDP of India, earns profit for the Indian Government and creates employment opportunities for a great number of people. The Indian Telecom Industry is very huge consisting of companies that make hardware and also produce software. Presently, it contributes to a revenue of USD 33, 500 million [2].

Along with the Government owned telecom units, the Indian Telecom market has also attracted many private operators to enter here who started offering their telecom services as fixed communication, mobile communication and data services to the customers at the most reasonable prices(see Table IV). The Government of India has adopted several measures to provide a business friendly environment for companies in the Indian Telecom market while competing with each other. Due to the rapid advancement in technologies, the telecom operators of India are working actively in order to adapt themselves to the changing technology to continue existing in the market.

The Indian Telecom Industry has grown tremendously during the past few years owing to the unprecedented growth of wireless telephony in India and infrastructure which not only is beneficial for the telecom industry but has positive effects on the entire economy of India [3]-[5]. The industry has the world's third highest number of internet users. The Indian Telecom Industry has undergone a considerable transformation from being a Government owned enterprise to that of a competitive environment after its liberalization in 1991. The rapid escalation in the telecom sector of India has been made possible due to the active participation of private service providers, revenue generated through Foreign Direct Investment (FDI), series of reforms instigated by the Government and through the adoption of latest technologies.

II. Objectives :

The objectives of the research study are:-

- To analyze the history and evolution of Indian Telecom Industry.
- To review the Government Telecom policies.
- To identify the present trends in the Indian Telecom Industry and its growth.
- To study the future growth opportunities in the Indian Telecom Industry.

III. Methodology:

The present study is based on secondary data obtained from the Telecom Regulatory Authority of India (TRAI), Department of Telecommunication (DoT) and the reports from Government of India and other sources. Different telecom magazines, newspapers and journals were consulted for gathering of information. Information was also collected by holding discussions and interviews with knowledgeable persons employed at different

levels in various telecom companies of India. In order to achieve the objectives of the study, year- wise annual growth of the industry in its various segments, percentage share of different service providers per year were calculated (see Table I, Table IV).

IV. Discussion:

This study has been conducted to depict the history and evolution, present trends and future opportunities in the Telecom Industry of India. Here, the researcher has also discussed about the various Government Telecom Policies that govern this industry. The various milestones of the Indian Telecom industry like the Growth of Telephones (fixed and mobile), Tele-density in rural and urban areas, Wireless and Wireline Communication, Public and Private Sector Telecom operators, their market share has also been presented in detail in this study [7]-[9].

4.1 History of Indian Telecom Industry

The history of Indian Telecom Industry can be dated back to the year 1850 when postal was the only source of communication in India. During the year 1850, the first experimental electric telegraph line was commenced between Calcutta (now Kolkata) and Diamond Harbour. In 1851, this telegraph line was made open for the use of British East India Company. Subsequently, the telegraph lines were extended throughout India. During the year 1881, the Oriental Telephone Company Ltd. of England launched the telephone services in India by setting up telephone exchanges at Calcutta, Bombay, Madras and Ahmadabad. The telephone services were combined with the postal system in 1883. The capital of India got shifted to New Delhi in 1911 up till when Calcutta remained the Indian capital. The Public Works Department was then the in charge for administering the telecom operations in India. From the year 1902 to 1930, there had been a lot of progress in the Indian Telecom Industry in the form of cable telegraph, wireless telegraph, radio telegraph and radio telephone system. Radio Broadcasting was introduced in India in 1927 which was given the name All India Radio in 1937.

After the year 1947, when India attained independence all foreign telecommunication companies were nationalised to form the Posts, Telephone and Telegraph (PTT), a body governed by the Ministry of Communication. The Indian Telecom Industry was completely owned by the Government till 1984, during which year private sector was allowed to manufacture telecom equipment in this industry. The actual progression of the Telecom Industry started after the year 1985 when the Government separated the Department of Posts and Telegraph by setting up the Department of Posts and Department of Telecommunications (DoT). DoT managed the planning, engineering, installation, maintenance, management and operations of telecom services for the whole of India. In order to make the operations of DoT easier, two new Public Sector corporations, namely Mahanagar Telephone Nigam Limited (MTNL) and Videsh Sanchar Nigam Limited (VSNL) were set up under the DoT in 1986. MTNL looked after the operation of basic telephone services in Delhi and Mumbai whereas VSNL provided international telecom services to subscribers in India. DoT looked after the basic telephone operations in areas other than Delhi and Mumbai.

The demand for telephones was rapidly increasing in the 1990s and the Government was under increasing pressure to allow the private sector to invest in the Indian Telecom Industry as a part of Liberalisation- Privatisation- Globalisation Policies. Thus, the private investment in the sector of Value Added Services (VAS) was allowed by the Government and cellular telecom sector was opened up for competition from private investments. After this period, the Government announced the National Telecommunications Policy (NTP) in 1994 which defined certain objectives, including availability of telephones on demand, provision of world class services at reasonable prices, improving India's competitiveness in global market and promoting exports, attracting FDI and stimulating domestic investments, ensuring India's emergence as a major manufacturer of telecom equipment and universal availability of basic telecom services to all villages.

The entry of private service providers in the telecom industry created an indispensable need for independent regulation. The Telecom Regulatory Authority of India (TRAI) was thus, established on 20th Feb 1997 to regulate the telecom services of India including fixation of tariffs for telecom services which were earlier regulated by the Central Govt. TRAI's mission was to create conditions for the growth of telecommunications in the country in a manner that would enable India to play a leading role in the global information society. In order to carry out the above objectives, TRAI has issued a large number of regulations, orders and directives from time to time to deal with issues coming before it and has helped the Indian Telecom Industry to evolve from a Govt. owned sector to a multi-operator multi-service open competitive market [7]-[9].

Further in 1998, the Government declared the policy for Internet Service Provision (ISP) by private operators and the licensing for the same had begun from then. Consequently, the Global Mobile Personal Communications by Satellite (GMPCS) was also opened up for the private operators. Although the private players had been allowed participation in many telecom service segments, the results of privatisation were not satisfactory. Therefore, a New Telecom Policy (NTP-99) came into existence from 1st Apr 1999. The NTP-99

emphasized upon the opening of all the segments of the telecom industry for private sector participation. It recognized the need for resolving the prevalent problems of the operators to restore their confidence and improve the investment climate. This policy provided the much needed relief to private players who were earlier burdened with huge debts that they had to pay owing to the license fee.

After this, two new departments, viz. Department of Telecom Services (DTS) and the Department of Telecom Operations were carved out of the Department of Telecommunication (DoT) to separate the service provision and operational functions of DoT. Later in 2000, DTS was corporatized and renamed as Bharat Sanchar Nigam Limited (BSNL). DoT is now responsible for policy- making, licensing and promoting private investments in both telecom equipment manufacturing and in telecom services. Subsequently in 2002, even VSNL was privatized and its monopoly in International Long Distance (ILD) services was terminated from 31st March, 2002.

4.2 Major Milestones of The Indian Telecom Industry

The Indian Telecom Industry comprises of various segments that are an indicator of its growth and development. It is broadly divided into two segments, Fixed Communication and Mobile Communication. Nowadays, there is a rapid growth in the field of mobile communication as compared to fixed communication due to an increasing demand for cellular phones [2]. The technologies like GSM and CDMA are adopted by the Indian Telecom Industry [6]. Different service providers offer both fixed as well as mobile communication while operating in various service areas of India.

4.2.1 Wireless Communication and Wireline Communication

The Wireless Communication is the fastest growing segment of the Indian Telecom Industry. Through the development of wireless communication, it has become easier to transmit information between two or more points that cannot be connected by an electrical conductor. The wireless technologies being employed presently by the Indian Telecom Industry are Cellular (mobile) phones, Television, Radio etc. The private telecom operators now dominate the wireless market (see Table IV). However, this was not the case in the beginning. The changes in the market structure were mainly due to the changes in the National Telecom Policy of 1999. The Government of India is providing benefits to private players to grow in this sector. Mobile phone communication is one of the best known examples of wireless technology and is also known as cellular phone communication. The major operators in the wireless field are Bharti Airtel, Vodafone, Reliance Communications, Idea Cellular, Tata Indicom and BSNL/MTNL [1].

The Wireline Communication focuses mainly on landlines. Fixed telephones are facing stiff competition from mobile phones. The fixed telephones network quality has presently improved a lot and these phones are now available even in high density urban areas on demand. The public telecom operators like BSNL and MTNL dominate the wireline market followed by the private operators (see Table IV).

India has the world's second- largest telecom network after China in terms of both fixed as well as mobile communication. India had a subscriber base of 999.71 million till the end of March'15 in terms of fixed and mobile communication [2].

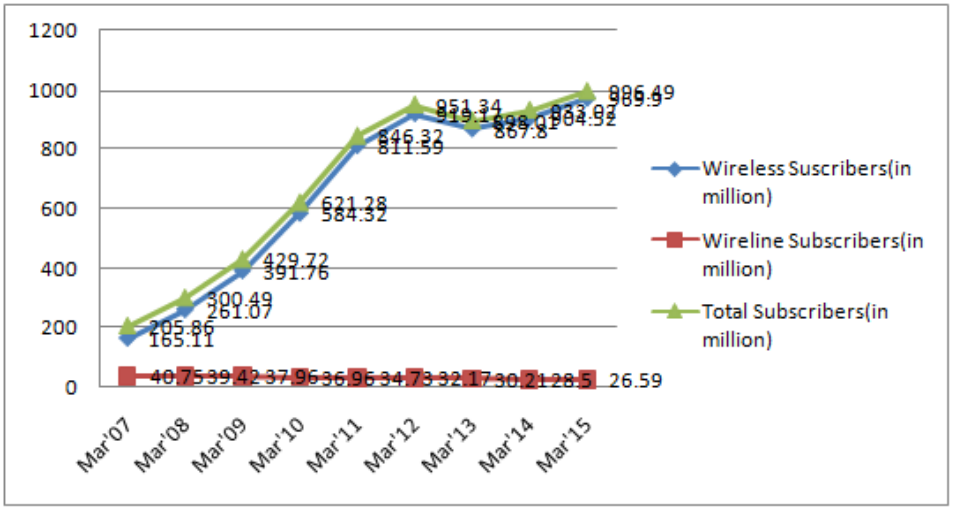
Table 1: Growth of telephones over the years (in million)

YEAR	WIRELESS SUBSCRIBERS	WIRELINE SUBSCRIBERS	TOTAL SUBSCRIBERS	ANNUAL GROWTH %
Mar'07	165.11	40.75	205.86	45
Mar'08	261.07	39.42	300.49	46
Mar'09	391.76	37.96	429.72	43
Mar'10	584.32	36.96	621.28	45
Mar'11	811.59	34.73	846.32	36
Mar'12	919.17	32.17	951.34	12
Mar'13	867.80	30.21	898.01	-6
Mar'14	904.52	28.50	933.02	4
Mar'15	969.90	26.59	996.49	7

Source: TRAI Annual Reports from 2012- 2015, Press Releases of TRAI

The above table indicates that over the years, the number of wireless subscribers has increased whereas there has been a decline in the number of wireline subscribers due to an increasing demand for wireless phones as compared to fixed telephones.

Graph 1: Growth of telephones (fixed and mobile) from 2007 to 2015



Source: TRAI Press Releases and Annual Reports from 2012-2015

The above line graph clearly depicts that there has been a positive percentage growth in the number of total telephones during the previous years, except in the year 2012-13 which had been due to the removal of inactive mobile phone connections by the service providers. TRAI's annual reports indicate that the total number of wireless subscribers have reached 969.90 million at the end of Mar'15 from 165.11 million at the end of Mar'07 [3]-[5].

The wireless segment of the Indian Telecom Industry comprises of both GSM and CDMA subscribers.

- **GSM** is a wireless digital phone technology that stands for Global System for Mobile Communication developed in 1982. GSM network operates in the 900 MHz and 1800 MHz frequency bands. One of the key features of GSM is the **Subscriber Identity Module,** commonly known as a SIM card. This allows the users to retain their information even after they switch handsets. In the GSM technology, the frequency channel is divided into time slots through which the data packets travel without any interference from other calls. The mobile operators can be changed in GSM technology. GSM enjoys a larger share of the telecom market in India of about 80%.

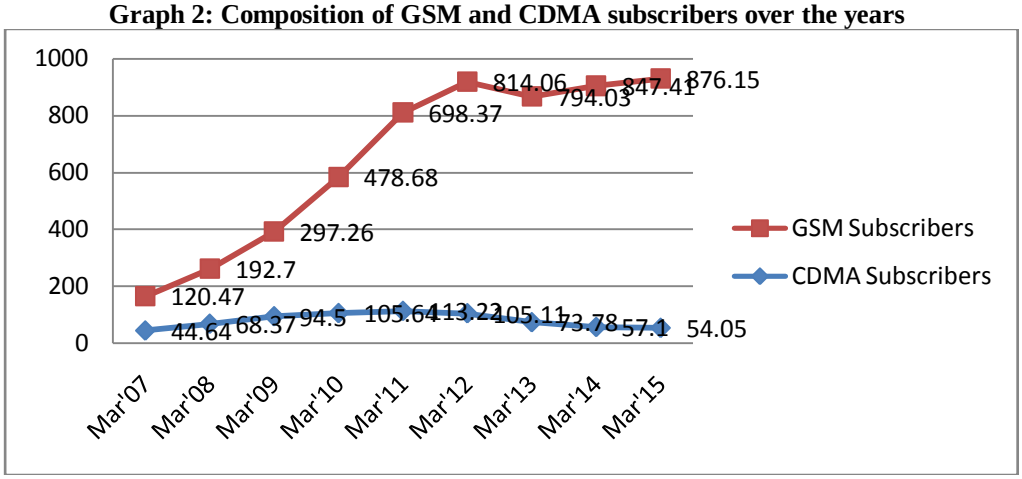
- **CDMA** technology was developed in 1995. It stands for Code Division Multiple Access. CDMA is a form of multiplexing which allows numerous signals to occupy a single transmission channel. This technology is used for transmitting data or voice over radio frequencies (800 MHz and 1.9 GHz frequency bands). CDMA technology provides excellent voice capacity and data capability for mobile and fixed wireless networks. It is not possible to change operators while using CDMA technology. Only a single operator can be used in CDMA technology. In today's era of smart phones where people look for advanced technologies, very few options are available in CDMA network. CDMA occupies only about 20% of the telecom market share. CDMA phones are more focussed in rural regions, where people look for affordable schemes and low priced phones rather than smart phones. In rural areas, the purchasing power and users demands aren't very high [6]. The number of CDMA operators in India is limited to just Reliance, Tata Teleservices and BSNL [1].

Table 2: GSM and CDMA subscribers from 2007 to 2015

YEAR	GSM Subscribers	CDMA Subscribers
2007	120.47	44.64
2008	192.70	68.37
2009	297.26	94.50
2010	478.68	105.64
2011	698.37	113.22
2012	814.06	105.11
2013	794.03	73.78
2014	847.41	57.10
2015	876.15	54.05

Source : TRAI Annual Reports from 2012 to 2015

Graph 2: Composition of GSM and CDMA subscribers over the years



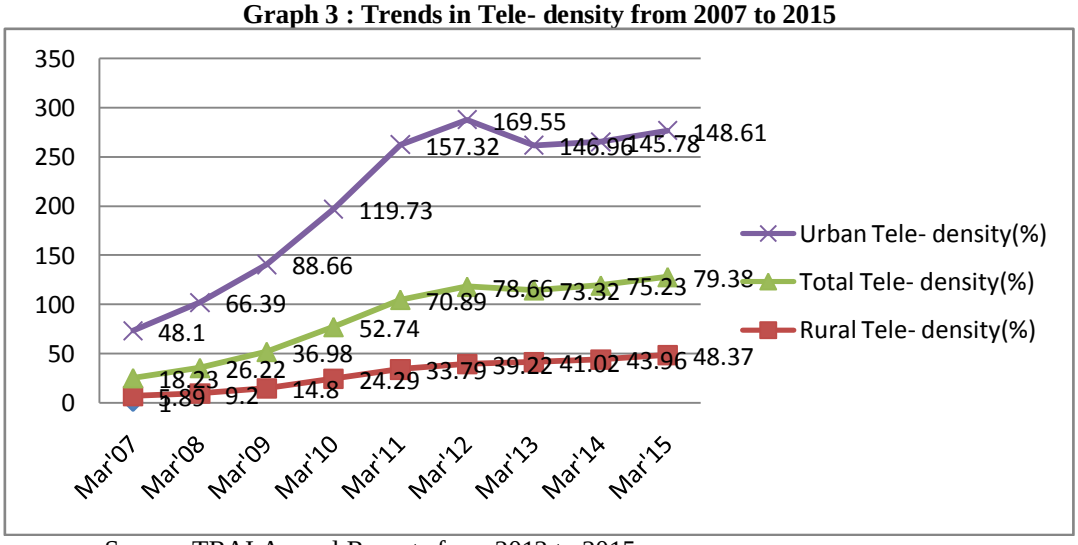
Source: TRAI Annual Reports from 2012 to 2015

The above graph clearly reflects that the number of GSM wireless subscribers have increased from the year 2007 to 2015. There was an increase in the number of CDMA subscribers till Mar'12. After Mar'12, the CDMA subscribers gradually decreased due to an increased demand for GSM phones by customers owing to the advanced technologies being used in these phones [7]-[9].

4.2.2 Tele- density

Tele- density indicates the number of telephone connections per hundred people. It is a significant indicator of telecom penetration in the country. There is an exponential growth of tele-density in India due to the evolution of hi-tech wireless technologies.

Graph 3 : Trends in Tele- density from 2007 to 2015



Source: TRAI Annual Reports from 2012 to 2015

According to TRAI's annual reports of various years, India's tele- density has increased from 18.23% at the end of March 2007 to 78.66% at the end of March 2012. However, tele- density declined from 78.66% at the end of March 2012 to 73.32% at the end of March 2013. This is also indicated in the above graph. The graph also depicts that the Urban Tele- density has decreased from 169.55% at the end of March 2012 to 146.96% at the end of March 2013. But Rural Tele- density has increased during this interval [7]-[9].

There is a large disparity between the urban tele-density and rural tele-density. The slow growth in tele-density in the rural areas is due to these areas being less attractive for the telecom service providers to invest in. Furthermore, providing telecom services in the remote and rural areas also requires massive investment. Rapid increase in rural tele- density is very important for the economic and social development of rural areas, which will help in the overall development of the whole country. The Government of India has employed several measures for spreading up of mobile network in distant rural areas[6]. Private telecom operators are trying their best to expand their services in rural areas by providing them good services.

Table 3: Overall Tele- density in various service areas at the end of March 2015

S.No.	Service Area	Tele- density(%)
1.	Delhi	237.94
2.	Kolkata	146.86
3.	Mumbai	145.86
4.	Tamil Nadu	117.52
5.	Himachal Pradesh	114.52
6.	Punjab	103.13
7.	Karnataka	97.50
8.	Gujarat	95.61
9.	Kerala	95.21
10.	Maharashtra	93.41
11.	Andhra Pradesh	84.15
12.	Haryana	82.00
13.	Rajasthan	77.76
14.	North East	76.18
15.	West Bengal	76.05
16.	Jammu & Kashmir	76.03
17.	Orissa	66.85
18.	Madhya Pradesh	60.77
19.	Uttar Pradesh	60.51
20.	Assam	53.95
21.	Bihar	51.17

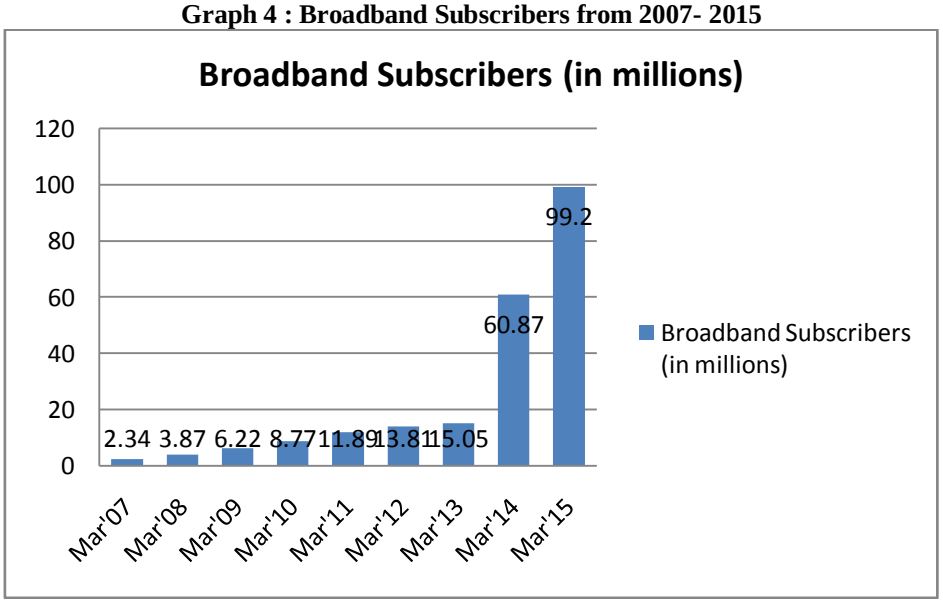
Source: TRAI Press Release 2015

As depicted in the table, the Metro cities have high tele-density as compared to other service areas [9].

4.2.3 Broadband Services

Broadband services were started by the Government of India in 2004. Broadband is a data connection that is able to support interactive services including Internet access and has the capability of the minimum download speed of 512 Kbps to an individual subscriber. Increase in broadband connectivity is seen as a key driver of improved socioeconomic performance of the country. Broadband services allow individuals to access new career and educational opportunities, help businesses reach new markets and improve efficiency and enhance the Government's capacity to deliver services like health, banking and commerce to all the citizens of India [6]. Provision of broadband connectivity in rural and remote areas will help in improving productivity, infrastructure and the quality of life in these areas. Various schemes have been launched by the Government for providing broadband services in rural areas along with the creation of National Optical Fibre Network. From the time when the broadband services were started by the Government till now, the number of Broadband subscribers have significantly increased. The broadband connections used by the subscribers here are Fixed Line Broadband and Wireless Broadband.

Graph 4 : Broadband Subscribers from 2007- 2015



Source: TRAI Annual Reports from 2012-2015

The above graph clearly reflects that the number of broadband subscribers have increased considerably from 2007 to 2015 owing to an increased demand for broadband connectivity [9].

4.2.4 Telecom Service Providers

The Indian Telecom Industry comprises of both public and private sector service providers. The public sector telecom operators occupy a major share in the wireline segment as compared to the wireless segment. The private telecom operators dominate the wireless market. Their share is very less in the fixed line segment. BSNL and MTNL are the two major public sector service providers. The major private sector service providers are Bharti Airtel, Vodafone, Reliance Communications, Idea Cellular, Tata Indicom [1].

Table 4: Market share of different service providers in the wireless and wireline segment (%) from 2012 to 2015

YEAR/ SERVICE PROVIDERS	MAR'12		MAR'13		MAR'14		MAR'15	
	Wireless	Wireline	Wireless	Wireline	Wireless	Wireline	Wireless	Wireline
BSNL	10.72	69.84	11.66	67.67	10.46	64.87	7.96	61.71
MTNL	-	10.75	-	11.45	-	12.43	0.36	13.35
Bharti Airtel	19.72	10.16	21.69	10.87	22.71	11.78	23.30	12.83
Vodafone	16.37	0.06	17.56	0.12	18.41	0.19	18.95	0.30
Reliance Commn.	16.65	3.95	14.17	4.11	12.26	0.75	11.29	4.45
Idea Cellular	12.26	-	14.01	-	15.01	-	16.27	-
Tata Indicom	8.89	4.48	7.65	4.98	6.97	0.19	6.81	6.29

Source: TRAI Annual Reports from 2012-2015

As depicted in the table above, the public sector operators BSNL and MTNL have a larger share in the wireline segment as compared to the wireless segment. BSNL's share is much larger in the wireline sector in comparison to MTNL because it covers whole India whereas MTNL operates only in Delhi and Mumbai [6]. Over the years, the wireline market share has declined due to an increased demand for wireless phones by subscribers. Amongst all the private sector operators, Bharti's share is higher in the wireless as well as wireline segment. Till March'13, the share of Idea Cellular was less in the wireless segment as compared to Reliance Communications but its share increased at the end of March'14 and March'15 as compared to Reliance thereby securing a higher rank [3]-[5]. Therefore, the private service providers namely Bharti Airtel, Vodafone, Idea, Reliance Communications and Tata Indicom secured 1st, 2nd, 3rd, 4th and 5th rank respectively according to their market share at the end of March'15.

4.2.5 Foreign Direct Investments

Foreign Direct Investment has been one of the major contributors in the growth of the Indian economy and therefore, the need for higher FDI is felt across sectors in the Indian economy. The telecom sector has played a crucial role in attracting FDI in India. The telecom industry of India requires huge investments for its expansion as it is capital- intensive and FDI plays a vital role in meeting the fund requirements for its expansion. The relaxation in FDI norms has attracted many foreign telecom majors to this industry. The presence of foreign players has not only encouraged faster infrastructure development and up gradation but also has opened up the telecom industry to foreign competition. The rise in FDI has also enabled technology transfer, market access and has improved organizational skills. FDI is also used for providing telecom services to rural areas, where tele-density is still very low [6].

During August 2013, the Telecom Commission raised the FDI cap from 74% to 100% in order to encourage foreign investors to invest in the Indian Telecom industry. This has made telecom one of the major sectors attracting FDI inflows in India. According to the data released by the Department of Industrial Policy and Promotion (DIPP), the industry has received FDI of US$ 16, 994.68 million from April 2000 to January 2015 which contributes to 7% of overall FDI inflow [2].

4.2.6 Mobile Number Portability

Mobile Number Portability requests have been increasing day by day. The MNP requests were 117.01 million at the end of March 2014 which increased to 153.85 million at the end of March 2015 [2]. In MNP Zone-I (Northern and Western India), the highest number of porting requests till March 2015 have been received in Rajasthan (about 14.89 million) followed by Gujarat (about 12.75 million). In MNP Zone-II (Southern and Eastern India), the highest number of porting requests have been received in Karnataka(18.09 million) followed by Andhra Pradesh(14.97 million) at the end of March 2015 [9].

4.3 Future Growth Opportunities in The Indian Telecom Industry

The Indian Telecom Industry has been considered as an essential tool for the socio- economic development and for growth of GDP in the country. The Indian mobile economy is growing rapidly. The Government had raised the FDI limit from 74% to 100% during August 2013 which has made the telecom

industry one of the fastest growing and a top five employment opportunity generator in the country. The increase in FDI has been done to ensure continuous flow of investments in the industry to expand the reach of mobile operators. The Indian Telecom industry has undergone a progressive shift from voice services to data services, thereby creating a new direction for the future of this industry. The Ministry of Communication and IT is planning to extend basic mobile coverage, including voice calling, in far flung areas of eight north eastern states, creating a more inclusive telecom network across the country. This industry is expected to provide more than 4.1 million jobs in the coming five years. Therefore, this will be favourable to professionals who aspire to pursue their career in this industry. The Indian Government has also decided to expand the basic telecom services in the rural areas for increasing rural tele-density in future [6].

The Indian Telecom industry has been growing at an average of 35% a year for close to two decades which is beneficial to the country. The industry has touched the lives of millions of Indians and will continue to remain a significant growth driver in the future also.

V. Conclusion

It can be concluded that the Indian Telecom Industry contributes significantly to the overall socio-economic development of India. It is an essential tool for the growth of the nation. The various telecom service providers offer voice and data services to the customers across different regions of the country including both urban and rural areas thereby facilitating the growth of this industry.

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