Chapter -I

General Introduction

1.1 Context of the Research

World’s second largest population of 1.3 billion resides in India. It’s a young nation with 63% of its population below the age of 35 years. It has speedy growing mobile/data users with 1.19 billion mobile connections and over 400 million internet users as on 31.03.17. Today’s world is being governed by; bringing countries together, economic liberalization and privatization. Such revolutionary initiatives offers way for total reforms, in particular in developing economies, like ours. These developing countries felt the importance of communications and information technology to travel onto the path of progress. During post-liberalization, the growth of the telecom sector in India has been unexpected. This study aims to throw light on the factors that are responsible for customer satisfaction and quality of service for sustaining growth in the segment and presents an insight on the present status of the industry.

The word “telecommunication” is a mixture of the Greek word prefix “tele” meaning ‘far off’, and the Latin word “communicare”, meaning ‘to share’. In its current usage, it refers to put on air of signals over a distance for the function of communication. Previously, communication took place by means of drums, smoke signals, and ribbons type conventional mediums. From such old early stages, the means of communication
now engage complicated high-speed, optical fiber cables laid through ocean beds and non-natural satellites in space. Due to growing domestic and commercial requirement for signal broadcast, the pace of transmission has also augmented. Mobile services are now known as a key to the fast development and modernization of the economy and an important mechanism for socio-economic progress for a country. The telegraph network is the first where latest system of transmission in India deployed. Various telecom statutes were enacted by the Government of India in order to make sure telegraph network’s individuality and establishment of administration control over electronic infrastructure, which laid the base of the present regulatory support governing telecommunications. Previously for a long period, our country has shown rising number of land line connections. Earlier when GSM (Global System for Mobile Telecom) technology was introduced in the form of cellular phones, it was not instantly accepted by the Indian subscribers, mainly due to high price of mobile phones as well as high calling charges. Slowly and steadily, the price of mobile handset as well as mobile tariff dropped which turn give rise to wireless communication and now a day, it is already witnessing the cheapest telecom tariff globally.

The advancement of the telecom sector has experienced a major process of revolution in terms of its growth, technological content, and market structure in the last decade through policy reforms introduced by the Indian Government. The sending these signals at distance end at a much faster speed an reproduction of the same at far end.

The study tries to analyze that with the cut thought competition in mobile telecom sector, enhanced levels of customer satisfaction with reasonable prices and better quality of services is being delivered or not. As union of telecommunications, broadcasting, and
information technology progresses, wireless telecom and the Internet (Data) are anticipated to be the favored means of communication

During this period of rapid growth and transformation, this study also shows the helpful policy structure needs to be in present in present scenario. The Government of India has undertaken the work of execution telecom policy with utmost earnestness, in letter and spirit to shepherd in competition in almost telecom sectors. In growth of the mobile and basic service sectors, opting to revenue sharing in place of a fixed license fee, has led to a virtual ‘take off”.

Through private sector participation, liberalization of telecom sector of the Indian economy aims at improving connectivity, accessibility, availability and reliability to bring about much looked-for improvement in the Quality of Service (Q.o.S.). Due to increased competition, the mobile service providers are anticipated to become more responsive and sensitive to the subscriber’s needs and hopefully they will give greater satisfaction to their esteemed subscriber. The Telecom Regulatory Authority of India (T.R.A.I.) has the directed to safeguard the subscriber’s interests and to set the standards of Q.o.S. The speedy technological changes have brought about significant improvements in the quality of service provided to customers which have taken place in the telecom sector. With the installation of new generation exchanges, and up gradation of external outdoor network, the fault rate has come drastically down.

In the present status of digital communications and globalization, telecommunications service market is offering complex varieties of products and services to subscribers who are being invited to switch to other service telecom providers. There is neck to neck competition in this sector. Telecom operators are now aggressive for one another’s
customers and more concentration is being given to cost calculating and low pricing techniques. Current telecommunications market is being developed by new universally imperatives technologies resulting in forceful competition. Hence, due to the high competition caused by the rising penetration rate and the unstable telecom environment and also because of the fact that the telecommunications sector which falls under service marketing has its own set of difficulties since its offered services which are intangible in nature. Telecommunication service providers are facing increasing challenges in retaining their current subscribers. Consumers have more alternatives in the intense competition market. The power in the GSM communications market has certainly shifted to the subscribers, irrespective of market conditions; it truly implies that the service providers should create long term and fruitful relationships with their subscribers. This research focuses the attention towards necessary actions and relationships which can create and deliver value instead of the core product-orientation plantings. As per (F. P. Reichheld & Sasser, 1990), current customers are more economical to maintain and less price sensitive than new customers. In a similar study (F. F. Reichheld & Schefter, 2000) found that new customers cost from 20% to 40% more than old customers, and in many cases the expenditure of acquiring a new customer is more than five to six times the cost of retaining an existing one (Alsemgeest & Smit, 2013) (F. F. Reichheld, 1996).

In telecommunications market, the operator-subscriber relationship is the main issue. Once a subscriber chooses a special telecom service provider, this “long-term relationship with the particular telecom operator is of bigger importance to the success of the company in competitive markets than it is in other industry sectors” (Gerpott, Rams, & Schindler, 2001 p 250). Hence, to achieve the desired marketing performance in such an
aggressive and vibrant telecom environment, service providers may need to change their marketing strategies from a relationship perception. In the meantime, the applications of value-based relationship marketing i.e. customer satisfaction and customer retention both together represent the two primary concerns of telecommunications service providers. Both parameters imitate telecommunications providers’ preferred performance with regard to guarantee the common value generation for parties (Berry, 1995) and to keep active customers base, it is required to generate repeat purchase and creation of churn barriers (Andaleeb, 1996). The roads by which telecom service providers arrange their relevance to provide customer satisfaction and customer retention are being influenced by their adopted strategic visions and orientations (Day, Weitz, & Wensley, 1990) (Day & Wensley, 1988). Research on customer satisfaction in the provision of the telecommunications service in India is a valuable research area; since different aspects of customer satisfaction within the context of developing countries have not been given the due attention they warrant particularly in the services framework. It is worth noting that, in such a market place, in the face of the noticeable silence or lack of cooperation in research which is caused by competition, comparison to other regional countries, a feature which has been considered by both; private and public sectors in India. Moreover, Indian cellular operators’ attitudes towards research are affected also by their planned partnerships with the international cellular operators who promoted their image as partners for the local communities and sponsors for social responsibility activities and research. As a result, telecom provision in India represents an appropriate field for conducting research as it has an more advantage compared to other sectors in which research is highly honoured and supported.
On the whole, it is seen that maximum of the customer satisfaction researches focuses on big cities considering only some aspects. However, the mechanisms that underlie the links between customer satisfaction and industries organizational performance remain unclear and not properly investigated, particularly in cellular mobile markets. As a case study conducted in Indian cellular market, this work evaluates the interrelationships and mechanisms linking customer satisfaction with both quality of services delivered and customer loyalty. Thus, it represents an endeavour to accomplish a big picture of the different patterns that cellular service providers take on in order to manage the two essential organizational objectives in the cellular market (i.e. customer satisfaction and customer loyalty) in India as a developing and highly competitive market.

1.2 A Justification of the Research Theoretical Framework

A lot of researches have been carried out keeping the importance of the subject to examine the relationship between customer satisfaction and the network quality but the driver that connects customer satisfaction and network quality have not been studied sufficiently and remain a overlooked area that requires further quality investigations to uncover insides. One of the basic assumptions in marketing tactic is that a customer satisfaction is positively related to cellular operator’s performance. Therefore this research can be conducted in this direction. The fundamental framework of this study considered mainly two main aspects;

- The effect of quality of service, perceived value, customer care services and tariff on customer satisfaction
- Its effect on customer loyalty.
Therefore, the research fundamental framework follows the perceptions of (White & Yanamandram, 2007) which indicated the combination of behavioural and attitudinal proportions of performance when evaluating aspects of a firm’s organizational performance such as satisfaction/dissatisfaction repurchase intentions, retention and loyalty.

It is vital to note that the planned conclusion of applying the research structure is to allow for building a big picture regarding the behaviours and attitudes of telecom operator’s managers towards those marketing actions thrusting on customer satisfaction and retention. This research is not proposed to examine the marketing practices of these cellular operators in depth. But it focuses to achieve further insight into the relationship between customer satisfaction and quality of service; customer satisfaction and customer loyalty, which constitute the base of the theoretical framework of the research. The construct of service quality has stimulated rational debate with current literature revealing deficiency of consensus on the measurement of service quality, keeping in view service intangibility, multidimensionality and heterogeneity (Marzo Navarro, Pedraja Iglesias, & Rivera Torres, 2005). In a typical review by (Kang & James, 2004) and (Tan & Pawitra, 2001) points during discussions in thought that the Service Quality (SERVQUAL) model discussed by (Parasuraman, Zeithaml, & Berry, 1985) is broadly acceptable in the measurement of service quality. Regardless of its widespread use, researchers continue to argue its complexity, practical working and conceptualization (Sureshchandar, Rajendran, & Anantharaman, 2002). Researcher’s interest in measurement and development of service quality measures is attributed to the relationship between service quality and costs (tariffs), profitability, customer satisfaction and retention. Analysis of
the Profit Impact of Marketing Strategy data by (Buzzell & Gale, 1987) shown a positive relationship between perceived quality and organization’s financial performance. In this regard, (Alves & Raposo, 2010) hypothesize that service quality has come out as an impetus to competitiveness and managerial strength.

1.3 Statement of the Problem

For quality in service and manufacturing sector, analyzing Customer Satisfaction is a new approach and enables the growth of a customer-focused management and society. Measurement of Customer satisfaction offers an important and focused feedback about customer’s options and needs. In present scenario, Customer Satisfaction research is very attractive growing segments of the marketing of service sector. Nowadays, Marketing and management science are focusing on the harmonization of all the institutional activities in order to offer goods/services that can satisfy best specific needs of existing customers. To strengthen customer orientation, an increasing number of companies choose customer satisfaction as their major performance parameter. However, it is almost impractical to keep all company permanently motivated by a notion as abstract and indefinable as customer satisfaction. Therefore, customer satisfaction must be converted into a number of quantifiable abstracts, directly related to people’s satisfaction outcome. The very purpose of this thesis is to study what parameters/attributes contribute customer satisfaction and its association on various attributes of four major telecom operators in West Central India. Three states Rajasthan, Madhya Pradesh & Gujarat were chosen for this study. The relationship between service quality-customer satisfaction, service quality-customer care services, service quality-perceived value, service quality-loyalty based attributes were studied. The three
fundamentals of service quality and loyalty towards services represent constant challenges for the industrial financial performance. Now a day’s customer intention analysis has also become chief factors in the business decision making and strategic planning processes. Present practice shows that by improving service quality one can expect better customer satisfaction levels. As a result, enhanced satisfaction levels should increase the likelihood of customer retention and degree of loyalty.

1.4 Objectives of the Study

The main objective of this thesis was to identify service quality attributes that were important to telecom service provider’s practitioners. To achieve main goal, firstly researcher studied the relevant literature available and then used survey method to explore a variety of service quality items seem to be important to judge service quality. Subsequently, researcher developed a survey questionnaire tool to generate service quality perceptions, from customers of four major telecom operators (i.e. BSNL, Airtel, Idea and Vodafone) in West Central Indian region. Three states Rajasthan, Madhya Pradesh and Gujarat were selected randomly to conduct the research. Finally, a variety of suitable statistical tests were applied to analyze the data gathered. Outputs from this research would enable to the understanding of the service quality construct in relation to practicing telecom managers and planners of various telecom operators. The research objectives were broadly set as below:

**Objective 1:** To Understand the Mobile Telecommunication Market of India

**Objective 2:** To understand the Service Quality Delivery Models

**Objective 3:** To understand the Relationship of Customer Satisfaction with:

a. Network Quality
b. Perceived Value

c. Customer Care Services

d. Customer Loyalty

**Objective 4:** To study, service quality delivery level, being delivered by GSM service providers to customers and their comparisons on four constructs mentioned in objective 3.

**Objective 5:** To Measure the Overall Satisfaction with the help of constructs mentioned in objective 3.

**Objective 6:** Proposed Measures to be taken by service operators based on the study.

**1.5 Research Hypotheses**

From above discussion, following hypotheses were proposed to test various aspects undertaken in this research because a hypothesis is a proposition that can be accepted or rejected through empirical testing:

**H$_{01}$** There is no significant relationship between Network Quality and Customer Satisfaction among customers of different Mobile Telecommunication service providers in India.

**H$_{02}$** There is no significant relationship between Perceived Value (Value for Money) and Customer Satisfaction among customers of different Mobile Telecommunication service providers in India.
**H03** There is no significant relationship between Customer Care Services & Customer Satisfaction among customers of different Mobile Telecommunication service providers in India.

**H04** There is no significant relationship between Customer Loyalty & Customer Satisfaction among customers of different Mobile Telecommunication service providers in India.

**H05** There is no difference in Network Quality being provided by different Mobile Telecommunication service providers in India.

**H06** There is no difference in Perceived Value (Value for Money) being experienced by customers of different Mobile Telecommunication service providers in India.

**H07** There is no difference in Customer Care Services being experienced by customers of different Mobile Telecommunication service providers in India.

**H08** There is no difference in Customer Loyalty among different Mobile Telecommunication service providers in India.

**H09** There is no difference in overall customers Satisfaction being experienced by customers of different Mobile Telecom Service Providers in India.

### 1.6 Scope, Significance and Limitations of the Study

A lot of research work has been devoted to explain the importance of customer satisfaction measurement for industries. Though, there are very few studies have been done on an overall integrating empirical research that relates the various elements of satisfaction with respect to service quality attributes in mobile sector.
Another reason behind conducting this research is declining profits of telecom companies may be arrested by analyzing reasons. Experiential data were collected from subscribers of these three states of West Central region of India (i.e. Rajasthan, Madhya Pradesh and Gujarat states) to conduct this quantitative research. Researchers showed that such an objective model is capable of capturing three dimensional relationships which will contribute towards more robust decision making and better strategic planning for practicing managers. The proposed thesis extracted the data about key service attributes from a combination of literature review, surveys, and interviews from the Indian mobile telecommunication industry. Responses were analyzed using SPSS V 22 by applying various statistical tests like Spearman’s Correlation Analysis, Statistical Analysis (Summary of Statistics), F-Test (ANOVA), Post-hoc test etc.

This study tried to contribute to the body of knowledge in following ways:

(a) It Highlights the role of service quality parameters towards customer satisfaction, as a result identifies attributes that affect customer loyalty, retention and displeasure of customers,

(b) It identifies best mobile service provider in the states under study.

(c) It compares customer’s satisfaction level interstate and intrastate and interstate.

(d) Proposes measures to Telecom operators, TRAI (Telecom Regulatory Authority of India) and D.o.T.( Department of Telecommunications)

(e) Describes the relationship between each of Service Deliver, Perceived Value, Customer Care Services, Customer Loyalty and Customer Satisfaction.

This thesis presents a new methodology using constructs for customer satisfaction and various service qualities constructs. It is important to note that in this research work,
Customer Retention shows as chances of switching between service providers. Customer Loyalty is taken as a word-of-mouth activity by present customers. In present era, customers have to face the situations in which they have to choose the suitable (availability of network) and cheaper mobile service which are being claimed by various mobile telecommunications service operators across the country. Additionally, the mobile service operators also come across the situations that to meet the customer satisfaction in order to improve the market share. Hence, strategic planners of telecom service providers should be conscious of the factors affecting customer satisfaction and quality parameters in building these significant relationships.

In past, only a few studies on the service quality parameters, affecting customer satisfaction and loyalty in the Indian mobile telecom industry have been conducted. That’s why; this study tries to find out, which parameters affect customer satisfaction in respect of mobile services. Besides, this research also tries to inspect the relationship between customer satisfaction and various quality parameters in cellular mobile communications service. This study was based on the customer’s perspectives and their experiences with mobile communications service in three states of West Central India as mentioned above. As a data collection tool, “Questionnaire” was used in the present study. The conclusion indicated the quality of service, customer loyalty and perceived value play the key role in customer satisfaction. The study also indicated that customer care services do not lead to customer satisfaction.

The study remained focused on subscribers of West Central India. Only four major mobile operators of three states studied. The study didn’t considered Landline and broadband subscribers due to resources and time constraints.
1.7 Telecommunication Sector of India

Telecom industry is one of the major fastest-developing industries in India. Presently India is the second-largest telecommunications market world-wide and has the 3rd utmost number of internet users. Its telephone subscriber base has grown at a CAGR of 19.96 per cent, reaching 1019 million during the year 2007–2017. In March 2017, total telephone subscription stood at 1019 million, while Tele-density was at 92 percent.

1.7.1 Brief History of Indian Telecommunication Sector

In our country, telephone service was commenced in Kolkata in 1881-82, just six years after the discovery of telephone. By the 1900, telephone had started contributing Indian Railways industry. The very first auto-telephone exchange was deployed at Simla in 1913-14 with a line capacity of 700. Though, in spite of huge efforts, the numbers of telephones were only 36.28 million till 2001 in the country. This resulted into approx. four telephones for every 100 persons. The telecommunication sector, thus, has exposed into remarkable industry and energy in the last one decade (2005 – 2015). The Indian telecom network has stretched from 44.96 million phones in March, 2002 to 1.19 billion connections (both fixed & wireless) as on 31st March, 2017. The Indian telecom network today is the second biggest in the world, next only to China. The sector of mobile telephone has shown a compound annual growth rate (CAGR) of 64 per cent per annum during 2002-2012.

The extraordinary increase in telephone network and rapid decline in tariffs in the Indian telecom sector have contributed considerably to the country’s economic growth. It would not be decoration if remarkable growth, in the telephones, is termed as “Telecom
revolution in India”. Main achievements in Indian telecom history are summarized in

Table: 1.1

<table>
<thead>
<tr>
<th>Year</th>
<th>Achievement</th>
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<tbody>
<tr>
<td>1902</td>
<td>First wireless telegraph station established Between Sagar Island and Sandhead</td>
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<tr>
<td>1907</td>
<td>First Central Battery operated telephones exchange introduced in Kanpur</td>
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<tr>
<td>1913-1914</td>
<td>First Automatic Exchange was inaugurated and commissioned In Simla.</td>
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<td>1927</td>
<td>Between the UK and India, Radio-telegraph system with beam stations at Khadki and Daund, started by Lord Irwin by exchanging greetings with the King of England on 23 July 1927</td>
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<tr>
<td>1933</td>
<td>First Radio telephone system installed Between the UK and India.</td>
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<tr>
<td>1953</td>
<td>12 Channels Carrier system installed which facilitated real-time calls on single pair.</td>
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<td>1960</td>
<td>First subscriber trunk dialling (STD) route commissioned Between Lucknow and Kanpur</td>
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<td>1975</td>
<td>New Telephone exchanges first PCM system commissioned. On single PCM, 30 simultaneous call traffic can be handled tested Between Mumbai City and Andheri</td>
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<td>1976</td>
<td>First digital microwave junction was installed</td>
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<td>1979</td>
<td>The very first optical fibre system for local junction was introduced at Pune</td>
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<tr>
<td>1980</td>
<td>Ist satellite earth station for domestic communications installed At Sikandarabad</td>
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<td>1983</td>
<td>First analogue Stored Programmed Control exchange for trunk lines installed and commissioned At Mumbai</td>
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<td>1995</td>
<td>Cellular Mobile Telecom service were commercially launched in India by issuing licenses to private operator. Mobile licenses issued for 19 more states</td>
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<tr>
<td>1995</td>
<td>At Laxmi Nagar, Delhi Internet services Introduced in India On 15 August 1995</td>
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<tr>
<td>1997</td>
<td>Govt. of India formed Telecom Regulatory Authority</td>
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<td>1999</td>
<td>Govt. of India introduces new telecom policy (NTP) The fixed annual license fee with revenue share policy was replaced by Indian government</td>
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<tr>
<td>2000</td>
<td>A new method was introduced for subscriber linked spectrum allotment for real allocation of important resource. USO fund established to compensate operators. To improve the telecom services in the rural sector</td>
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<td>2000</td>
<td>International Long Distance (ILD) services were offered for private sector without any limitations on the number of players.</td>
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<td>2000</td>
<td>Bharati Airtel got listed In BSE &amp; NSE in share market</td>
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<td>2003</td>
<td>Access deficit charges (deficit) was introduced to facilitate BSNL</td>
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<tr>
<td>Year</td>
<td>Event</td>
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<td>------</td>
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<tr>
<td>2000</td>
<td>Incoming calls were offered free.</td>
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<tr>
<td>2000</td>
<td>Unified Access License (UASL) Regime was brought. Operators were allowed to offer fixed landline / cellular mobile services using any technology.</td>
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<tr>
<td>2000</td>
<td>Reliance Communications started CDMA services which started tariff war</td>
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<td>2000</td>
<td>Internet (Data Service) was allowed through cellular service providers</td>
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<tr>
<td>2004</td>
<td>National Broadband policy 2004 was announced.</td>
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<tr>
<td>2004</td>
<td>Govt. announced the FDI limit in telecom from 49% to 74%</td>
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<td>2004</td>
<td>Manufacturing of mobile phone was started by Motorola.</td>
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<td>2004</td>
<td>Infrastructure Provider tower companies entered the tower market.</td>
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<td>2004</td>
<td>Different operators started the trend of recharge coupons with value ranging from Rs 10 to Rs 500 for low end prepaid users.</td>
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<td>2004</td>
<td>Intelligent Network prepaid services lifetime validity scheme was introduced</td>
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<td>2005</td>
<td>Maxis was taken over by Aircel</td>
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<td>2005</td>
<td>Government launched ‘Project Most’ to promote passive infrastructure sharing</td>
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<tr>
<td>2005</td>
<td>Reliance Communications into Reliance Infra-Tel was demergered.</td>
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<tr>
<td>2005</td>
<td>Calls anywhere in the country were charged at a flat rate of Rs One by launching ‘One India Tariff’</td>
</tr>
<tr>
<td>2005</td>
<td>India became the 5th country in the world. Entered in 100 million mobile subscribers’ club.</td>
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<td>2006</td>
<td>India further added 5 million subscribers in Aug-06 and overtook China to become the fastest telecom market in the world.</td>
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<td>2007</td>
<td>Roaming Services were offered free</td>
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<td>2007</td>
<td>Dual technology was permitted enabling service providers to offer both GSM and CDMA under the same license subject to entry fee of 1651 Cr</td>
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<td>2007</td>
<td>Vodafone acquired 67% stake in Hutchison Essar paying US $10.9 billion</td>
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<td>2007</td>
<td>Indus Towers was created by Vodafone, Airtel and Idea.</td>
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<tr>
<td>2007</td>
<td>For telecom UASL license and spectrum allocation 570 applications received DoT detached spectrum from the telecom license and introduced first come first served basis.</td>
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<tr>
<td>2008</td>
<td>DoT allotted 121 LOI for UAS( Universal Access) licenses.</td>
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<tr>
<td>2008</td>
<td>Government issued license to Six new players –Sistema, Datacom ,Loop Telecom, Shyam S-Tel, Unitech Wireless and Swan Telecom.</td>
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<tr>
<td>2008</td>
<td>Active infrastructure sharing allowed, whereby the operators are permitted access to feeder cables, common antenna, radio access network.</td>
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<tr>
<td>2008</td>
<td>Tele-density crossed 26%</td>
</tr>
<tr>
<td>2009</td>
<td>Bharti Airtel touched 100 million subscriber mark</td>
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<tr>
<td>2009</td>
<td>Mobile subscribers in India touched 500 million mark</td>
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<td>2010</td>
<td>Aircel sold its stake of 17500 towers to M/s GTL</td>
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<tr>
<td>2010</td>
<td>3G and BWA spectrum sold through a open auction process. Government got Rs 67719 Cr for 3G spectrum and Rs 38543 for BWA spectrum</td>
</tr>
<tr>
<td>2010</td>
<td>Mobile subscriber base crossed 650 million</td>
</tr>
<tr>
<td>2010</td>
<td>3G spectrum given to Bharti Airtel, RCom, Idea, Aircel Vodafone, Tata tele services, and S.Tel.</td>
</tr>
</tbody>
</table>
2011 | Nation-wide Mobile Number Portability (MNP) service launched  
2012 | National Telecom Policy announced  
       | 2G Spectrum Auctioned in GSM and CDMA-S band. Earned Rs. 94.07  
2013 | No one participated in Spectrum Auction in 1800 MHz band.  
2014 | Spectrum Auction 2G in 900 and 1800 MHz Band. DoT Earned 612 billion  
2015 | Spectrum Auction 2G in 800, 900 and 1800 MHz Band. Govt. earned Rs. 109874  
2016 | Spectrum Auction in 700 MHz. Free Night Calling facility was introduced by BSNL  
2017 | Reliance Jio Launched its 4G services on Pan India basis and acquired 100 million customers just in few months.

1.7.2 Growth of Indian Telecommunication Sector

A study by GSMA revealed that, smart phones are expected to contribute 66% mobile connections world wide by 2020 making India the fourth biggest Smartphone market. India is expected to lead in the growth of Smartphone acceptance globally with an predictable net adding up of 350 million by year 2020.

1.7.2.1 Relationship between Growth of Mobile and GDP:

The mobile telecommunication sector constantly to offer unprecedented chances for economic growth in both increasing and developed markets and mobile services have become an crucial part of how economic work and function.

The Impact of 3G Penetration on 3G Growth

As technology develops mobile services have probable impact financial development further through the provision of high value 3G and 4G data services retrieved accessed through smart phones, Tabs and dongles that deliver mobile data services to commerce and consumers. For a given level of total mobile penetration, 10% substitution from 2G to 3G increases GDP per capita growth by 0.15% points.

The Impact of Data Growth on 3G Expansion

The increase in 3G connections which has been supported by the rise of data enabled devices allowed mobile internet connectivity, has led to a huge growth in the use of
mobile data traffic. Till now, examination of the economic impact of this transformation has been restricted by data availability. A double mobile data use enables an increase in GDP per capita growth rate of 0.5 % point.

Studies have revealed that there is a sufficient and positive co-relation between increase in penetration of internet including telecom services and growth of GDP. The study carried out by World Bank in 2009 using data of 120 developed and developing countries showed that a 10 % point boost in broadband penetration tends to a 1.3 % point boost in GDP per capita. In our country, the telecom sector has started leading to considerably to the overall economy of the country. The share of telecom as a percentage of GDP has gone from 0.96 % in 2001 to about 3.78 % at this time (Telecom Sector in India: A Decadal Profile, TRAI, Page 3). Furthermore, a recent case study undertaken by DOIT, Government of India, has shown that 10% addition in internet subscribers delivers, on an average, 1.08% rise in GDP. On the other hand, the growth was much higher at 2.36%, on an average, in states which had higher access of internet. Year wise growth rate with contribution in GDP is shown in Table: 1.2
Table: 1.2  Growth Rate (Over Previous Year) : Mobile and GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Mobile (Million)</th>
<th>Growth (%)</th>
<th>GDP (Cr)</th>
<th>Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>0.34</td>
<td>1876319</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>1.2</td>
<td>2087828</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>3.58</td>
<td>2342774</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>59.95</td>
<td>2971464</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>391.76</td>
<td>4158676</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>811.6</td>
<td>4937006</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>867.81</td>
<td>5503476</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Parameter | Compound Annual Growth Rate (CAGR) in %
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>2002-12</td>
</tr>
<tr>
<td>Mobile</td>
<td>63.65</td>
</tr>
<tr>
<td>Gross Domestic Product at Constant Price 2004-05</td>
<td>7.81</td>
</tr>
</tbody>
</table>

(Source: Economic Survey, Govt. of India)

The first-time increase in mobiles during 2002 to 2012, which saw a CAGR of 64% per year and sharp decline in tariffs in the Indian telecom sector have contributed significantly to the country’s financial growth. GDP amplified by CAGR of 7.59% during 2002-07. This improved to 8.03% during the Eleventh Plan (2007-12). CAGR during the 10th and 11th Plan was much higher when compared to the CAGR of 6.6% and 5.7% during the 8th (1992-97) and 9th Plan (1997-2002) respectively.

In the light of above facts it’s clear that the Indian Telecom sector is one of the fastest growing sectors worldwide. These services have been recognized world-over as a major tool for socio-economic progress for a country and play a amazing role in growth and transformation of different sectors of the economy. Over the last some years, Indian telecommunication market has witnessed overwhelming growth, due to policy measures
undertaken by the government and marvellous efforts by the players of the industry and in the process, has accomplished to come forward as one of the youngest and best ever growing economies in the world in present. Various factors like structural betterments, policy relaxation and competition played a very critical part in this speedy change.

The fact that India is one of world’s fastest growing telecommunication markets, has acted as the prime driver for foreign and home telecommunication industries investing into the sector. It is also known as one of the most profitable markets world-wide, resulting in massive investments being made in the sector by the private as well as government sector in the last decade.

1.7.2.2 Growth in Telecom Sector during last Eleven years

The telecom sector of our country has shown a considerable expansion in subscriber base over the last decade, with growing network coverage and a competition-resulted into declining tariffs acting as trigger for the increase in subscriber base. This development phenomena and the future potential have also started to attract newer companies in the telecom sector, with the result that the power of competition has kept raising. The growth trip of Indian telecommunication sector during the last eleven years has been given in

Table: 1.3
## Table: 1.3

**Growth in Telecom Sector during last Seventeen Years**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Year</th>
<th>Telephone Connections in the country (in Millions)</th>
<th>Telephone Connections Provided by BSNL (in Millions)</th>
<th>% Telephone Market Share of BSNL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wired Line</td>
<td>Wireless</td>
<td>Grand Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WLL</td>
<td>GSM</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>31.03.01</td>
<td>32.51</td>
<td>0.07</td>
<td>3.58</td>
</tr>
<tr>
<td>2</td>
<td>31.03.02</td>
<td>38.07</td>
<td>0.46</td>
<td>6.43</td>
</tr>
<tr>
<td>3</td>
<td>31.03.03</td>
<td>40.75</td>
<td>1.14</td>
<td>12.69</td>
</tr>
<tr>
<td>4</td>
<td>31.03.04</td>
<td>40.92</td>
<td>9.47</td>
<td>26.15</td>
</tr>
<tr>
<td>5</td>
<td>31.03.05</td>
<td>41.35</td>
<td>16</td>
<td>41.00</td>
</tr>
<tr>
<td>6</td>
<td>31.03.06</td>
<td>41.56</td>
<td>29.7</td>
<td>69.2</td>
</tr>
<tr>
<td>7</td>
<td>31.03.07</td>
<td>40.77</td>
<td>44.6</td>
<td>121.43</td>
</tr>
<tr>
<td>8</td>
<td>31.03.08</td>
<td>39.42</td>
<td>68.4</td>
<td>192.36</td>
</tr>
<tr>
<td>9</td>
<td>31.03.09</td>
<td>37.91</td>
<td>103</td>
<td>288.39</td>
</tr>
<tr>
<td>10</td>
<td>31.03.10</td>
<td>36.94</td>
<td>163</td>
<td>421.68</td>
</tr>
<tr>
<td>11</td>
<td>31.03.11</td>
<td>34.72</td>
<td>226</td>
<td>585.68</td>
</tr>
<tr>
<td>12</td>
<td>31.03.12</td>
<td>32.15</td>
<td>224</td>
<td>695.76</td>
</tr>
<tr>
<td>13</td>
<td>31.03.13</td>
<td>30.21</td>
<td>171</td>
<td>696.89</td>
</tr>
<tr>
<td>14</td>
<td>31.03.14</td>
<td>28.49</td>
<td>154</td>
<td>750.18</td>
</tr>
<tr>
<td>15</td>
<td>31.03.15</td>
<td>26.56</td>
<td>156</td>
<td>813.7</td>
</tr>
<tr>
<td>16</td>
<td>30.11.15</td>
<td>25.68</td>
<td>148</td>
<td>861.51</td>
</tr>
<tr>
<td>17</td>
<td>30.03.16</td>
<td>25.18</td>
<td>150</td>
<td>883.81</td>
</tr>
<tr>
<td>18</td>
<td>30.03.17</td>
<td>24.38</td>
<td>54</td>
<td>1007.04</td>
</tr>
</tbody>
</table>

Opening of the telecom sector has not only started quick growth but also gave a great deal towards growth of consumer benefits, clear from an enormous fall in tariffs. Telecom sector has witnessed permanent rising trend in the total number of telephone subscribers. From 22.8 million telephone subscribers (wireless plus wire line) in 1999, it has grown to 1.19 billion at the end of March, 2017, reaching Tele-density of 91.92 % in the country with the Delhi license at top (253%) and Bihar License area at the lowest (60%). The total number of urban subscribers stand at 782 Million (67.98 %) and rural subscribers at 368 Million (32.0 %). Wireless telephone connections have contributed to this growth as
the number of wireless connections rose from 35.61 million in 2004 to 119 Million at the end of March, 2017. The broadband (wired) density in the country was 14 % as on 31.03.17. Also, broadband segment has seen significant growth with total internet subscribers reaching 302.35 million in November, 2015, which includes 19.07 broadband wire line subscribers. The industry has touched newer heights with the rollout of newer circles by operators, successful auction of third-generation (3G) and broadband wireless access (BWA) spectrum, network rollout in semi-rural areas and increased focus on the value added services (VAS) market. Meanwhile, the introduction of Mobile Number Portability (MNP) in India has made the Indian Telecom market more competitive, in terms of service offerings and quality.

With decreasing voice tariffs and low ARPUs in India, emergence of new technologies and developments towards 3G amongst others reasons are stimulating operators to shift their focal point on VAS. Above all, last few years have been quite revolutionary for the industry as it shown the appearance of smart phones; GPS enabled sets, and 3G/4G VoLTE handsets. An agenda to connect the rural customers is already marked with service providers’ tie-ups with content providers for services related to farming, cultivation, weather forecasting, and living.

The development of the mobile telecom era has assisted people across all sides of life of everyone. Additionally, it is predictable to play a major role in joining the digital divide between the rich and poor, between nearer and apart, thus in linking the country. It has not only become the major communication means for people, but is also fallout many uses across different disciplines. Now a day, it is being used for business transactions, digital payments, acting as a learning and multimedia tool, and so on.
Although, the need is to provide services that could facilitate efficient day-to-day life for the subscribers’ easiness. It can be proficient mode of partaking governance, and can also be used across different areas such as trade, agriculture, media, weather forecasting, agriculture, healthcare, e-commerce, digital transactions and e-Mandi etc. The quick rise of complicated mobile phones (smart phones) has enabled the customers to use and develop many software applications as utility or for enjoyment, recreations, recreation, leisure etc.

The rapid speed of growth in telecommunications in India makes it necessary to develop India as a Global telecom infra centre. Due to its proven track record in the skill-based sectors and the worldwide trend to make up and source products in low cost countries, India has proven to come out as one of the most important centre for mass-produced exports.

The revenue growth is rising by approximately 15 % per annum. Indian government has given an encouraging environment for all service providers. As a result, the sector has become very attractive and the services are available up to the reach of last mile in every part of country at very realistic and affordable tariff. The mobile services market is diverting from voice services to data (Internet) services rapidly. Latest 3G and 4G/VoLTE technologies are available in different major cities and districts.

There will be huge growth in coming years as the government also established many projects like Digital India campaign, Hot Spots, Smart City program, creation of Wi-Fi zones and E-Mandi around import tourist & commercial places etc. Over 1.1 bilion US$ investment will be done in these programs. As per study of GSMA (GSM Association) 67 % mobile phones will be smart phones by 2020. The overall Tele-density of India is
91 %. Total connections have reached the mark of one Billion (as on 31.03.17). The
detail of operator-wise market share is shown in Table-1.4 and graphically represented in
Chart-1.1 as on 31.03.2017:

Table-1.4

Operator-wise Market Share as on 31.03.17

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of Operator</th>
<th>Telephone Connections (in Millions)</th>
<th>% Telephone Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wired Line</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WLL</td>
<td>GSM</td>
</tr>
<tr>
<td>1</td>
<td>BSNL</td>
<td>13.6</td>
<td>0.96</td>
</tr>
<tr>
<td>2</td>
<td>Bharti Airtel</td>
<td>3.87</td>
<td>273.65</td>
</tr>
<tr>
<td>3</td>
<td>Reliance</td>
<td>1.17</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>Vodaphone</td>
<td>0.14</td>
<td>209.06</td>
</tr>
<tr>
<td>5</td>
<td>Tata Indicom</td>
<td>1.75</td>
<td>48.9</td>
</tr>
<tr>
<td>7</td>
<td>Aircel</td>
<td>90.90</td>
<td>90.90</td>
</tr>
<tr>
<td>8</td>
<td>MTNL</td>
<td>3.44</td>
<td>0.09</td>
</tr>
<tr>
<td>9</td>
<td>Jio</td>
<td></td>
<td>108</td>
</tr>
<tr>
<td>10</td>
<td>Quadrant Telev.</td>
<td>0.26</td>
<td>0.00</td>
</tr>
<tr>
<td>11</td>
<td>Sistema Shyam</td>
<td>0.06</td>
<td>4.91</td>
</tr>
<tr>
<td>12</td>
<td>Uninor</td>
<td>50.49</td>
<td>50.49</td>
</tr>
<tr>
<td>13</td>
<td>Videocon</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>24.38</td>
<td>54.96</td>
</tr>
</tbody>
</table>
Presently only 40% mobile phones contribute smart phone market. As per ongoing trend, by 2020, the penetration smart mobiles phones will boost three times. Due to declining cost, ease of procedure, improved functions, better 3G/4G network coverage, smart mobile phones are becoming choice of all mobile customer in every part of world. Most of the daily routine essential activities are being accomplished through use of smart phones such as education, grocery shopping, health care services, various insurance services, entertainment, insurance, matrimony, learning, recruitment, complaints.
(monitoring, disposal and feedback), banking, personal individuality (Aadhar) and so on uncounted. Presently 30% subscribers are urban and 70% are rural. The requirement of smart phone is increasing in rural areas as per our survey. The mobile Apps market is also growing by the rate of 70%.

All the above mentioned services are data driven. They need an internet connection required. The network quality of services providers plays very important role to use these services. Customer service is another fundamental dimension for a service provider because it is the stage where a customer contacts with a company or vice versa. Consequently, when they have a question or Product/Service issue, they expect a company's customer service department to solve their issues. It is also important for a company because it can help to distinguish a company from its opponents.

The purpose of the study is to evaluate the extent to which the fundamentals of quality management are being accomplished by Telecom operators in India, identify hurdles and to recommend actions for improving their aggressiveness by following best quality practices. This study tried to recognize the gap in customer satisfaction levels, by measuring quality of service being rendered to customers of mobile services in West Central Indian region.

1.7.2.3 Financial Implications

According to research firm IDC, due to increasing data consumption on handheld devices, the total mobile services market revenue in India is predictable to touch US$ 37 billion in 2017, which will result a CAGR of 5.2% between 2014 and 2017. As per data given by Telecom Minister Mr. Ravi Shankar in parliament in Dec,15, revenue generated by the telecom sector during 2014-15 increased to Rs 2,42,900 Crore,
accounting for 1.94% of total GDP. FDI has been one of the major contributors in the
growth of the Indian market, and therefore, the need for higher FDI is felt across sectors
in the Indian economy. The Indian telecom industry has played a vital role in inviting
FDI. India's telecom sector acknowledged US$ 2895 million in foreign direct investment
(FDI) during the financial year 2014-2015. Today, telecom is the third major sector
attracting FDI inflows after services and computer software sector. In the telecom sector,
FDI up to 49% is allowed under automatic route and beyond that up to 74% is permitted
through the Foreign Investment Promotion Board, which is a government body. FDI in
Capital is 100 % allowed. As per the current telecom services policy, the sector has 74%
of equity on basic cellular, unified access services and other value-added telecom
services.

An attractive trade and investment policy and beneficial incentives for foreign
collaborations have made India one of the world’s most attractive markets for the telecom
equipment suppliers and service providers. Few such beneficial policies are:

- There is no need of industrial license for setting up manufacturing units for
telecom equipment.
- Through automatic route 100% FDI is allowed for manufacturing of telecom
equipments/components.
- For use of trademark/brand name on the automatic route, payments for royalty,
onetime fee for transfer of technology and payments.
- For telecom services - basic, cellular mobile, paging, value added services, NLD,
ILD, ISPs - and global mobile personal communications by satellite, foreign
equity of 74% (49 % under automatic route) is allowed
• In the telecom sector, full repatriability of dividend returns and capital invested.

1.7.2.4 Research & Development

As a technology solution leader, India has established its superiority. Extensive efforts are being constantly made to develop inexpensive technology for customers, as also comprehensive security infrastructure for telecommunication system. Research is on for the preparation of tested communications for enabling interoperability in Next Generation Network (NGN). Model projects on the current and forthcoming technologies have been formulated which includes Wi-Max, 3G, 4G (VoLTE) etc. Due importance is being given to technologies having capacity to improve network in rural and last mile areas across the country. Also to expedite R&D infra in the telecommunication sector and link the digital divide, cellular companies, apex educational institutions and the Government of India together set up the Telecom Centres of Excellence. Such seven Centres of Excellences in various field of Telecom have been set up with the affiliation of Government and the involvement of private/public telecom operators as sponsors, at the selected educational institutions in across the country. Following benefits from the R&D initiatives taken by the Government are as under:

• Dominance of India as a knowledge solution hub.

• Absolute security infrastructure for cellular/telecommunication system.

• Weathered network for enabling portability in Next Generation Network (NGN).

To support R & D activities the India and giving boost to start ups focused on novelty and technology, a handsome deduction of 150% of expenses done on in-house R&D activities is introduced under the Income Tax Act. Additionally, the current system for funding different R&D projects has been funded in the course of new scheme like
Multiplier Grants Scheme, Support International Patent Protection in Electronics etc.

The government has taken a number of steps for setting up of an Open Technology Centre through NIC planned at giving efficient direction to the nation on Open Technology in the areas of Open Source Solutions, Open Processes, Open Standard, Open Course-ware and Open Hardware specifications. This proposal will act as a National Knowledge facility providing synergy to the overall mechanism of Open Technology worldwide.

**BBNL (Bharat Broadband Network Limited)**

The Bharat Broadband Network Limited was came in picture on 25 Feb, 2012 with the attempt to perform the business of management, establishment and operation of NFON and with a prospect to give high speed broadband connectivity to all Gram Panchayats across the country by continuing the present and upcoming OF network to give right of entry to bandwidth in a non-bigoted way to all appropriate telecom service providers.

**USOF:** Universal Service Obligation Fund, DoT, Ministry of Communications & IT, is providing the fund. NOFN is the chief rural connectivity system of its kind globally. It is planning to connect each of the 2.5 Lacks GPs across the country through Broadband OF network. After it, NOFN is supposed to assist Broadband connectivity to 600 million rural subscribers of the India. It is predictable that the organization of NOFN would not only have a change affect on the lives of Indians, but it would also open up new ways for ASPs such as Telecom Service providers, Cable TV service Operators, ISPs, Content Service Providers and so on. To launch New Generation services and recommend creation of local employment chances surrounding IT outsourcing, e-commerce, rural
business process outsourcing etc. as well as services such as e-Mandi, e-banking, e-health and e-education for total growth. This will also facilitate delivery of various services such as local banking development, management, monitoring, facility management and payments under Government plans at Gram Panchayat level.

Currently the project under NOFN is being carried out by three CPSUs namely BSNL, PGCIL and Railtel under the Phase-One. The GPON is the Main feature of the project. This is the equipment used in the project has been designed in our country and developed and supported by C-DOT and manufactured. This project is being organised by BBNL using a high potential NMS being deputed by C-DOT. Knowing the importance of Bharat Net project, exclusively with respect to connecting the huge digital divide, important point is being put on timely and effective commencement of the project. Since the time, the Govt. has come to authority; the speed of completion of the project has been considerably boosted. Three motivated Pilot Projects have also been finished to cover 59 Gram Panchayats in North Tripura District, in Ajmer District in Rajasthan, and in Vishakhapatnam District in A.P.

1.8 Regulations

The Indian telecom sector is largely accomplished by following acts/regulations:

1. The Indian Telegraph Act, 1885: This Act is one of the oldest acts, which is still in effect and is an Act to alter the law relating to telegraphs in India.

2. The Indian Wireless Telegraphy Act, 1933: This Act was introduced to regulate the possession of wireless telegraphy equipments. As per this Act, the possession of wireless telegraphy equipments by any individual can only be permitted in concurrence with a license issued by the telecom authority. Additionally, the Act also imposes
penalties if any wireless telegraphy equipment is held without a valid license.

3. **The Telecom Regulatory Authority of India Act, 1997**: This Act, 1997 gives rise to the establishment of the TRAI. The workings and role of the TRAI have already been explained. The 1997 Act gives power to TRAI with quasi-judicial authority to give a ruling upon and resolve telecom disputes. Afterwards this Act was transformed by the TRAI -Amendment- Act, 2000 to obtain in better clarity and difference between the regulatory and recommendatory functions of TRAI.

4. **The Information Technology Act, 2000**: The Indian Parliament passed the Information Technology Act-2000 in the 2000, mainly to promote e-commerce/trade and give legal recognition to electronic documents and digital signatures as means to validate electronic papers. Thereafter, the Information Technology Act, 2008 was passed which gave supplementary focus on information security as well as added some novel sections on offences together with cyber terrorism and data security.

5. **Communication Convergence Bill**: The Government of India introduced a planned Communication Convergence Bill, in the year 2000. The purpose of the Convergence Bill is to set up a new “converged” regulatory structure to support and develop the telecommunications sector (including telecommunications, broadcasting, internet, data and “multimedia) in an environment of rising junction of technologies, services and service providers.

Provider-(UASP)”. As per this act, Each Service Provider will set up a Customer Preference Registration capability, both for wire-less and wire-line technologies, for activation/ deactivation of their favourite regarding receipt of commercial communication, in the Provider Customer Preference Register.

1.9 National Telecom Policies

In the last decade, The Indian telecommunication sector shown a whole transformation determined by various policy initiatives from NTP-94 and NTP-99, but, since then there has been a speedy progression of technology, and many makeovers have taken place in the telecom sector globally, thus, giving rise a need for reconsidering the current telecom policy. NTP- 2012 is likely to ensure that India’s growth doesn’t slow down and it plays a guidance role powerfully.

Challenges

Although the Indian telecom industry has journeyed a long way since the time of globalization and promises growth, there are a lot of identifiable factors which still presents a challenge to its development. Two grave issues are as under:

● **Sharp Declining Average Revenue / User:** The Indian telecom industry is a very high aggressive and competitive sector. A constant price war in the industry has given rise in downing ARPU's. As a result, cellular service providers are pin pointing more on internet data and VAS to meet the revenue shortfall caused by fall in revenue by their main business.

● **Need of Upgradation Telecom Infrastructure:** Cellular Operators have to experience huge capital costs to offer telecom services in the rural/tribal areas across the country. Furthermore, additional to these spending is the fundamental challenge posed by
the lack of beneath infrastructure such as lack of transportation and electricity system.

With entry of new players in telecom sector, the potency of competition in the industry has augmented, principally over the last 5-7 years. The market share of the telecommunication companies shows the uneven nature of the sector, with as many as 14 players.

**Future prospects of India Telecom Industry:**

Indian telecommunication industry may be an example for countries growth story over the last 10 years period. In last four-six years, this sector grew by 20% CAGR and the cellular subscriber base touched 1000 million, second to China only. Telecommunication sector contributes approx. 3% to India’s GDP. More prominently Telecommunications, along with Information Technology, has offered the platform for speeding up of the economic and social growth of the country across all sectors. It has enabled the small industrialist, whether it is a daily worker, a carpenter or an electrician/washer man, vegetable merchant; as much as it has given rise to the growth of companies rely on worldwide e-Trade. The country is totally dependent on the immediate voice and data communication given by the telecom networks; this enslavement is permanent.

To drive Indian economy, the DoT is accurately using telecom industry as an successful medium to reach and serve the ‘common man’, particularly BPL families in rural at last mile at cheapest rates. The National Telecom Policy has aimed 100% Tele-density and 600 million broadband connections to be achieved by 2020. It includes linking 250,000 Gram Panchayats by OF core network. This will give rise to the demand for an additional 400,000 BTS (Towers) average holding of 2.3 at an investment of
Rs.50, 000 Crores. In actual fact, the NTP is judging a 200% the present telecom capacity and growing its penetration to 95+ % of Indian households while providing broadband level of internet potential.

This development occasion should have acted as magnetism for significant FDI in the cellular sector. In its place, it is seen, a perfect twister in telecom sector that has boost away investment. Unfortunately the self-confidence of investors in this sector is now at least level. This is understandable from the decreasing FDI. In the year 09-10, telecom sector fascinated USD 2.5bn FDI (10% of total FDI); On the other hand in the year 2012-13, Indian telecom sector inward USD 303 million FDI. The telecom sector has outstanding future prospects, but it can attract investors only if country can build up sustainable long term policies and a favourable impression for Government and this sector to work as partners – not as adversaries. The statement of FDI in last seven years is given in following Table 1.5:

### Table-1.5 Statement on Financial Year Wise FDI Equity Inflows

<table>
<thead>
<tr>
<th>Year</th>
<th>in Rs. (Crore)</th>
<th>in US$ (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-10</td>
<td>12,269.66</td>
<td>2,539.26</td>
</tr>
<tr>
<td>2010-11</td>
<td>7,542.04</td>
<td>1,664.50</td>
</tr>
<tr>
<td>2011-12</td>
<td>9,011.53</td>
<td>1,997.24</td>
</tr>
<tr>
<td>2012-13</td>
<td>1,654.30</td>
<td>303.87</td>
</tr>
<tr>
<td>2013-14</td>
<td>7,987.28</td>
<td>1,306.95</td>
</tr>
<tr>
<td>2014-15</td>
<td>17,372.32</td>
<td>2,895.02</td>
</tr>
<tr>
<td>2015-16 Apr-May</td>
<td>2,320.27</td>
<td>363.75</td>
</tr>
</tbody>
</table>

The 2G scam hard-pressed the country into a hard position with the abrupt cancellation of 122 telecom licenses in 2012. Messy attempts to resolve the disaster have
left the industry even more concerned than ever before. All of this has shaped a huge sum of negative publicity and disheartened investors, both international and domestic. The Vodafone tax case has been tired on since 2007. The state of affairs became dangerous, restrictive terms for the auction of spectrum from the cancelled licenses, and unnaturally high reserve prices led to an ineffective auction as market forces were not allowed to choose the value of the spectrum. As a result, some key Circles like Mumbai, Delhi and Rajasthan had no bids. Only some operators opted out of the business completely, while remaining chose to limit their selection. Additionally, the DoT is approaching forward with changes such as one time license fee for spectrum, offering of the 900 MHz band far along of 2014 when new operators need to renew their licenses. The overwhelming majority of operators feel these makeovers are not fruitful and are being enforced on a sector when it is already harassed to recover from the shocks produced by the earlier decisions. This framework will have significant cost implications for the sector which will inescapably be passed on to the consumer.

The tower infrastructure sector, which has equipped Indian telecom expansion by investing over Rs. 100,000 Cr in the last 15 years, sees a contradictory situation. On one way, the tower sector has been approved infrastructure status in acknowledgment of the major role it plays in increasing telecom/ internet coverage. On the other hand, the TRAI has planned that tower companies that lease infrastructure to Telcos, and no services to the subscribers, be forced to run under the same Unified License that mobile operators, LD operators, and Internet Providers (ISPs) etc. Under the planned unified licensing system, supplementary license fees of 8% will be compulsory and the FDI limit be decreased from 100% to 74%. For a sector which is still under pressure, to meet its cost
of capital, this tax levied form old date on preceding investments may be the last straw that breaks the camel’s back creating it unlikely that tower sector will do further investments in ongoing installation of the 50,000 new towers needed.

In the similar way, the DOT is considering a vision of ‘green telecom’, which is a greeting initiative. However the goals set for Phase-First alone, to convert 50% of urban and 30% of rural towers to renewable energy are impractical in the opinion of experts like TERI (The Energy and Resources Institute).

On line, in this standpoint, this will need 1500 MW of solar power, which exceeds the total current domestic non captive solar capacity of the country to be generated on structure rooftops and village sites with a Rs. 40,000 Crore asset.

For a Telecom industry that is already under pressure, all of these planned measures have grave financial implications for effectiveness. If country wants the Telecom/Broadband Internet growth to achieve the set targets mentioned in the Telecom & Broadband policies, it is needed to pursue an unusual path. It is required that the Government puts in practice its often stated goals of getting voice coverage to every citizen, and broadband data down to every Gram Panchayat level. This is necessary to enable not just cash transfers but e-Mandi, e-Governance, e-Health and e-Education. This goal has to be used as an superseding criterion for approval of all telecom policies and practices. Telecom sector should no longer be taken as a golden goose. In this current situation, the government should think a series of actual steps that are right away required to refurbish the positive sentiment in the market and to draw FDI:
Make sure that all proposals include a cost-benefit analysis from the viewpoint of consumers, investors, cellular service providers and the Government.

Prepare a 5 year roadmap for prospect spectrum availability and timing; conduct transparent auctions for these well before the time limit.

Auction all left over spectrum with reserve prices set at 2001+ inflation, the price should be left on market force; the number of competitors in Telecom sector and the deep feuds between them will make certain that conspiracy is improbable.

Reorganize the idea of spectrum re-farming; there is no model anywhere for migrating 400 million subscribers from one band to the other.

Turn down the proposal of pressuring tower companies to become USO providers and leave them as Infrastructure Industries. Give USO funding for getting telecom infrastructure built in 20% of India that does not have proper coverage; make this in PPP mode with the Government’s NOFN (National Optical Fiber Network) backbone to get Broadband down to the village level up to last mile.

Don’t treat telecom sector as a cash cow and emphasis on what needs to be done to execute ubiquitous wireless broadband as contemplated in the ‘Broadband for All’ plan. Country can pick up from the recent Telecom disaster, and once again become the leading Telecom market in the world. The “last mile man” should be offered with it and will demand this of the bureaucrats, politicians and the cellular operators.
Country offers an matchless chance for telecom service operators, infrastructure vendors, manufacturers and linked services companies. A host of factors are contributing to distended chances for growth and investment in cellular mobile sector:

- A growing up Indian economy with amplified spotlight on the services sector

- Population mix heading positively towards a younger age profile Urbanization with rising incomes

Fund providers can look to capture the gains of the Indian telecom explosion and enlarge their operations outside developed economies that are marked by flooded telecom markets and lower GDP growth rates. A stunning trade and investment policy and lucrative incentives for foreign collaborations have made India one of the world’s most lucrative markets for the telecom equipment suppliers and service providers. Main factors, which will further fuel the growth of this telecom sector include: augmented access to services owing to launch of latest telecom technologies like 3G/4G (VoLTE) and BWA, better devices, changing consumer behavior and the coming out of cloud technologies. Most of the investments will go into the capital expenditure for establishing newer networks like 4G and developing the backhaul/alternate routes. Furthermore, the beginning of Mobile Number Portability in India has made the Indian Telecom market more cutthroat, in terms of service offerings and quality.

With the awareness being spreading out, the world on the Information and Communications Technology, in the afterward part of the 20th century countries, particularly the developing ones, began to understand the importance of an efficient
telecom network for the development of the economy. At the commence of the 21st century, the developing countries started to make complete use of the technology revolution taking place around the world, with a lot of countries liberalizing the existing harsh policies and system. To rise up information and telecommunication technology, 189 countries of the UN met at the Fifty-Fifty General Assembly on September 2000. A millennium statement was made, which says: the countries reaffirmed their commitment to improve the living conditions of poor and browbeaten in the world by adopting intense poverty programs. One of the main targets of this declaration was support to “In cooperation with the private sector make available the benefits of new technologies, particularly information and communication”. The parameters that were to be used for ensuring the improvement were:

- Telephone line and cellular subscribers, per 100 units of population.
- Personal computers (PCs) in use for 100 units of population.
- Internet/Broadband user per 100 units of population.

Even before the statement, many developing countries had started liberalizing their internal regimes to facilitate efficiency as to affordability as and reach ability of telecom system. By 1995, majority of the low income developing countries of the world, made their economies worldwide, by liberalizing the home licensing and important policies on the whole, to make easy inflow of foreign capital into the infrastructure sector, particularly in the telecom sector. This created a telecom revaluation, with countries considering liberalization initiates, viewing a never-before growth in the telephone network, together with the penetration levels. Developing countries today account for
49% of the total telecom network in the world. Whereas in East Asia (including China) the total tele-density grew at a rapid pace to reach 27.4 in 2002 the Tele-density grew at a slower pace in south Asia, to reach 4.5 in 2002. This was due to deficiencies in government licensing system in the 90s in most of the South Asian countries. As there was undue development in ICT among the developing countries in individual growth in telecom sector, country-wise also reveal a partial development, where the development in other areas apart from mobile was snail-paced. This was due to exceptional growth in the cellular segment, whose major part was toward metropolitan telephony.

Like elsewhere, telecom sector in India started as a state monopoly. In the 1980s, telecom services and postal services came under the Department of Posts and Telegraphs. In 1985, the government divided the Department of Post and created the Department of Telecommunications (DoT). As part of early reforms, the government set up two new public sector undertakings: Mahanagar Telephone Nigam Limited (MTNL) and Videsh Sanchar Nigam Limited. MTNL was responsible for telecom operations in two metros, Delhi and Mumbai. VSNL provided international telecommunication services in India. D.o.T. sustained to provide telecommunications operations in all states other than Delhi and Mumbai. It is significant to note that under this system, telecom services were not treated to be a need that should be made available to all people but rather a luxury possible for only select few.

In the early 1990s, the telecom sector in India, which was owned and governed by the Indian government, was relaxed and private sector participation was allowed through a steady process. First, telecom equipment manufacturing sector was totally deregulated.
The government then permitted private players to provide VAS, such as paging services etc. In 1994, the government brought the National Telecom Policy 1994. This recognized that existing government resources would not be sufficient to achieve telecom growth and hence private investment should be permitted to fill the resource gap especially in areas such as basic and internet services. As markets and telecom technologies started converging and the gap between voice and data networks started diminishing, the want for developing the modern telecom network became an instant necessity. Therefore, private sector participation was permitted in basic services.

The government expected that a major part of the growth of the country’s GDP would be dependent on direct and indirect contributions of the telecom sector and therefore the need for a complete and forward looking telecommunications policy was needed. This then created way for New Telecom Policy 1999 which mainly focused on creating an environment for attracting nonstop investment in the telecom sector and allowed creation of communication infrastructure by leveraging on technical development. The key objectives of NTP 1999 were as below:

● Availability of reasonably priced and effective communications for all Indian citizens;

● Try to provide a balance between the provision of universal service to all untouched areas, including the rural areas and the stipulation of high-level services capable of meeting the needs of the country’s economy;
• Generate a modern and competent telecom infrastructure taking into account the convergence of telecom, consumer, IT and media;

• Defend the defense and security interests of the country.

NT Policy 1999 permitted private operators providing mobile and basic services to shift from a fixed license fee policy to a revenue sharing policy which made it economically viable for such operators to function in the market. Most prominently, the government acknowledged the necessity to separate the government’s policy wing from its operations wing so as to create a level playing field for private service providers. Accordingly the NTP 1999 aimed at the separation of the policy and licensing functions of DoT from the service provision functions. The Government corporatized the operations wing of D.o.T. in October 2000 and it was named as Bharat Sanchar Nigam Limited which operates as a public sector undertaking (PSU). After that in 2002, the control of VSNL also came to an end.

As the Government was not capable to meet the demand of telephone connections coupled with the fact that there was a huge waiting list for telephones in India, the Government opted to call the private sector in telecom. Additionally, the Government introduced the Cellular Mobile Telephone Service license and the Basic Telecom Service license permitting private players to offer telecom services in India. The private telecom sector responded positively to this move and the Government gave 39 CMTS licenses and two Basic licenses. After that, the Government simplified the licensing policy and introduced the Unified Access Service License, combining the two licenses, i.e. Basic and CMTS thus allowing UASL to provide both services under the domain of one
license. Different new licenses issued by the Government attached with other measures undertaken to release the Indian telecom market led to an inflow of more than 12 billion dollars of foreign investment from 2000 to 2013 by different international telecom players. The Indian telecom sector story was one of large volumes and low ARPU which offered a huge opportunity for international telecom players who were undergoing saturating in the growth of their subscriber base in other parts of the world.

Due to the saturation of growth of this industry over the past years for various reasons, the D.o.T. brought the National Telecom Policy 2012 in an effort to align efforts of stakeholders, policy makers and law makers to achieve a common goal.

The preamble to the NTP 2012 reads as follows:

“Telecommunication has emerged as a key driver of economic and social development in an increasingly knowledge intensive global scenario, in which India needs to play a leadership role. National Telecom Policy-2012 is designed to ensure that India plays this role effectively and transforms the socio-economic scenario through accelerated equitable and inclusive economic growth by laying special emphasis on providing affordable and quality telecommunication services in rural and remote areas.”

The mission and vision of the NTP 2012 is as follows:

● To build up a strong and secure state-of-the-art telecommunication network providing seamless coverage with special focus on rural and remote areas for linking the digital divide and thereby facilitate socio-economic development.
● To create a comprehensive knowledge society through propagation of affordable and high quality broad band across the nation.

● To relocate the mobile device as a tool of socio-economic empowerment of citizens.

● To enable India a global centre for telecommunication equipment manufacturing and a centre for effective communication services.

● To promote Research and Development, design in critical edge Information and Communications Technology and Electronics technologies, products and services for gathering the infrastructure needs of domestic and international markets with target on safety and eco friendly technologies.

● To promote development of new benchmarks to meet domestic national requirements, generation of IPRs and contribution in international standardization bodies to add in formation of global standards, thereby enabling India a leading nation in the area of telecom standardization

● To pull investment, both from outside and inside.

● To encourage creation of jobs through above.

The NTP 2012 seems to be dynamic in its current status. For example it proposes to work towards One Nation - Free Roaming allowing customers to receive free incoming calls across India without paying additional roaming charges, likewise allowing subscribers to make outgoing calls at local tariffs without paying roaming charges across India along with the introduction of the One Nation-One License policy. It is intended to ensure that India plays an effectual role to change socio-economic scenario by offering affordable
and quality telecomm services in not just urban but rural areas also. NTP-2012 finds that the rapid growth in the telecom industry requires to be assisted by an improved pace of human capital formation and capacity building. Availability of new technologies has posed new challenges in network security, communication security and communication assistance to law enforcement agencies. NTP-2012 provides a planning framework for achieving these goals, however major concerns remain with respect to actual implementation of the NTP 2012 along with timelines for the same.

Following the introduction of the NTP 2012, the government seems to be strong-minded to bring about much needed reforms in the telecom industry. The Unified Licensing system, which has been discussed in detail, has been started in progression of the One Nation-One License policy. In the same way, FDI restrictions have been removed which earlier necessitated having a local associate for all telecom business. Although still there remains one major area that has not yet been looked, i.e. Mergers and Acquisitions. The telecom industry is quite uneven and consolidation is considered vital at this stage and to that extent the sector awaits the government’s policy on Mergers and Acquisitions in the telecom industry.

1.10 Different Mobile Technologies

GSM technologies with 80-90 % market share and Code Division Multiple Access around 10-20 % market share are two most common mobile communication technologies worldwide. Both technologies have same target: to provide the fixed Radio Frequency spectrum among various users. Our country mainly follows the GSM mobile system, in the 900MHz and 1800MHz band. The 900MHz band has superior transmission capabilities, which causes lower CAPEX cost for development of coverage area, as the
number of towers and the base stations required would be smaller than in the 1800MHz band.

**Time Division Multiple Accesses** — underlying technology used in GSM’s, does it by dividing the channel into chronological time slices. Each user of the channel takes turns to send out and receive signals. In fact, only one subscriber is actually using the channel at a specific time slot. This is equivalent to time-sharing on a large computer server.

**Code Division Multiple Access**—This technology used in GSM's 3G and IS-95's 2G, on the other hand, uses a special type of digital modulation called spread spectrum which spreads the voice data over a very wide medium in pseudorandom style. The receiver undoes the randomization to gather the bits together and create the sound. For evaluation, imagine a party, where pairs are interacting to each other in a common room. The room shows the available bandwidth/spectrum. In GSM technique, a speaker takes turns talking to a listener. The speaker talks for a short duration and then stops to let another pair talk. There is never more than one speaker talking in the room, no one has to be anxious about two conversations overlapping. While in CDMA, any speaker can talk at any moment of time; but each uses a different language. Each listener can only understand the language of his/her partner. As more and more couples communicate, the surrounding noise gets louder, but because of the dissimilarity in languages, voices do not mix.
1.11 Indian Telecom Authorities and Architecture:

To run customer friendly, effectively and smoothly telecom services, Govt. of India established following architecture of different telecom authorities in India: (See Fig1.1)

Fig-1.1

Indian Telecom Authorities

Further, we will discuss some important aspects of various Indian telecom authorities in brief.

1.11.1 Telecom Commission

The Indian Telecom Commission is an inter-ministerial higher level government department. The Commission has a Chairman, four full time members, who are ex-officio, Secretary to the Government of India in the Department of Telecommunications and four part time members who are the Secretaries to the Government of India of the
concerned Departments. The crucial functions of the Telecom Commission are stated as under:

- Policy making, issuing licenses and coordinating issues related to telegraphs, telephones, wireless, data, internet/broadband services and other similar forms of communications.
- International cooperation in issues concerned with telecommunications;
- Promotion of standardization, R and D in telecommunications;
- Promotion of private investment in telecom sector;
- Making the DoT budget and managing its operations

1.11.2 Department of Telecommunications (D.o.T.)

According to the Indian Telegraph Act-1885 and the Indian Wireless Telegraphy Act-1933, the Government of India has the special privilege of deploying, maintaining and working telegraph and wireless telegraph equipment and is the power to grant licenses for such type of activities. The Government acts through the D.o.T. Few of the main functions of the DoT are as under:

- Issuing Licenses and forming regulations
- International cooperation in matters connected with telecommunications (ITU related), International Telecommunication Satellite Organization related (INTELSAT) etc;
- Promotion of private investment in the Indian telecommunications sector;
- Promotion of standardization, research and development in telecommunications.
1.11.3 **Telecom Regulatory Authority of India (T.R.A.I.)**

TRAI is an independent autonomous statutory body recognized under Telecom Regulatory Authority of India Act, 1997. Government ensured that there is an independent communications regulator to support liberation. TRAI acts as an independent watchdog of the telecom industry in the country. One of the major objectives of TRAI is to give a fair and crystal clear policy environment which promotes a level playing field and facilitates reasonable competition among different telecom players. TRAI’s powers are recommendatory, compulsory, regulatory and legal.

The key recommendatory powers of TRAI are as below:

- Recommendations about the need and timing for introduction of new telecom service providers.
- Recommendations related to the grant of telecom licenses together with their terms and conditions.
- Recommend revocation of license for disobedience of terms and conditions of license.

TRAI is the only authority empowered to take obligatory decisions on fixation of tariffs for provision of telecom services. Importance needs to be placed on the interaction between the recommendatory powers of TRAI and the policy making powers of D.o.T. Whereas the D.o.T. is the only power for licensing of all telecom services in India, it is compulsory for the DoT to have before it TRAI’s recommendations with regard to issues over which TRAI has recommendatory powers. After accomplishing it, the DoT has the carefulness to either accept or reject the recommendations of TRAI. It has over the years come out with a number of recommendations; D.o.T. has acknowledged some such
recommendations either completely or partially or has rejected such recommendations.

Following is the status of some of the recommendations prepared by TRAI to the DoT:

1.11.4 TRAI Recommendations:

Telecommunications in India can be considered back to the 19th century when the British Company (East India) delivered services in India. The last two decades have been taken as the golden period for the telecom sector in India with exponential development in terms of technology, penetration, as well as policy. All this has accomplished with the liberalization in this sector and massive investment by both domestic and FDIs.

The telecomm sector has impact on each part of our lives, from the normal reality of enabling telecom communication between people in various locations to enabling supply-chains to work seamlessly across.

1.12 Telecommunication Services

In communication, a telecommunications service is a service offered by a service provider or a particular set of user-information transfer capabilities given to a group of users by a telecom system. Fundamentally there are two types of telecom services, one is data and another is voice. Voice services are delivered on very small bandwidth known narrowband. Internet/Data services are provided on broadband (wider) network.

This detail of this service is given in following section:

1.13 Broadband Internet Services in India (≥ 512 Kbps download)

As per the report of World Bank, 10% growth of broadband penetration rate will force 1.4% growth of GDP. Government of India started it’s an important program “Digital India” on 1st June, 15. The accomplishment of this program relies completely upon ubiquity of broadband services in India. In the scientific era of today, the
“Broadband” has become the salvation of internet users. It enables the technology and equipment for the digital delivery of voice, video and data services. It’s very clear that in a small time broadband services has become a driver for all types of industries whether manufacturing or service industry. Certainly within these industries, broadband service as a market driver has reached ubiquity but not up to the last mile user. Broad band’s significance is surely on the rise. It plays a drastically important role in the successful operation of business, transparent and smooth functioning of Government but also day to day life of even a common man is governed by it. The worldwide growth of e-commerce shows that people are becoming more and more dependent on the Internet for communications and all type of services.

The major limitations in ubiquity are restricted availability of spectrum, higher tariff of Internet usages, unavailability of last mile broadband connectivity, unavailability of electricity, unavailability of mobile networks, less awareness about e-Services and quality of services rendered. As on 30th April 2015, the wired broadband density was only 1.33% and wireless internet users were 30 Crore.

Broadband plays a significant role in an economy and contributes considerably to the development and social progress of a country. Broadband network is considered as major infrastructure for national development. Broadband operation is the key driver for worldwide economic growth. It develops not only competitiveness and productivity but also helps the nation to eliminate the social divide and attain inclusive growth. India has seen a multi fold increase in internet users in the last couple of years; India is speedily becoming a digital nation. India has the peak yearly growth rate of 26% and currently has the third largest number of internet users worldwide but the penetration is only 35 %.
The statistics of some major countries have been represented in Chart No.1.2. Iceland is ranked first with 96% penetration.

Chart 1.2

No. of Internet connections v/s Population V/s Penetration V/s One Year growth

As per the latest report of TRAI, total number of internet subscribers has reached to reach 302.35 million in March 2015. Among total internet subscribers, wired internet subscribers were 19.07 million (which registered yoy growth of 2.9%) and wireless internet subscribers were calculated 283.29 million (which registered yoy growth 12.77%). It is apparent that mostly smart phone penetration is
raising the internet usage across the country and internet usage on mobile devices has already exceeded Personal Computer usage. Inexpensive and faster mobile networks, a rise in the number of users of these networks and more affordable 3G and 4G handsets will help to augment mobile data traffic. It is the true fact that the major driver of data growth on a worldwide scale in mobile apps with billions of devices to be connected each other and the online retail and online healthcare spending expected to grow at a higher rate. Internet penetration in India is not only limited to urban areas, approx 35% of internet subscribers are from rural India also. Wireless internet subscribers were 200.49 million at the end of October 2016. Wire line subscribers were 17.93 million (Total 200.49 millions). As per a study by Department of Electronics and Information Technology, the Internet of Things (I.o.T.) industry in India is expected to be a $15 billion market by 2020 and it is expected that India would have a share of 5-6% of the global I.o.T. industry.

The biggest growth will be observed in e-Commerce, which is going to expand almost 5-fold, whereas education and healthcare through mobile internet will increase internet use. Internet growth would certainly inspire entrepreneurship and wealth creation due to the enormous potential of untapped Indian market. Up till now, more than 110 countries have declared their broadband plan. Majority of the developed counties have setup 100 Mbps as their broadband speed target for 2020. The current status of broadband speed in India compared with other major countries is graphically shown in Chart No-1.3:
Chart No-1.3 Comparison of Avg. Speed (in Mbps) of Major Countries


It is very obvious from above graph that internet speed in India is only 7.5 Mbps while the South Korea is at first position with speed of 26.7 Mbps. If we further analyze the data in India with respect to number of users, Maharashtra is at No.1 position with 27.71 million and Himachal Pradesh at last position with 2.84 million users. The state wise number of broadband connections are graphically represented in Chart No-1.4
This status is not satisfactory at all. India formulated its first broadband plan in 2004. Further India launched its broadband plan 2012, in which vision up to 2020 has been considered. To attain the targets, Bharat Broadband Network Limited (BBNL) has been formed.
1.13.1 **Broadband Service**

A high-speed Internet access is normally called “Broadband”. The D.o.T. (Department of Telecom) has revised the definition of Broadband through its notification dated 18.07.2013. The revised definition of Broadband is as follows:

“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 from the point of presence (POP) of the service provider intending to provide Broadband service.”

Speed is one of the major factors which draw potential users to become Broadband subscribers. Speed must be above a definite threshold point to make sure use of preferred application such as video streaming/viewing or gaming. As broadband services have become faster and wider spread, website developers have taken the advantage of the added bandwidth to offer more affluent and more composite websites. A range of tariff plans with various speeds provides better choice to users.

Higher communication speeds are pertinent in knowledge based sector. It is because, spurs of productivity and therefore increases competitiveness, which gives countries GDP the ability to rise. Improved broadband speed leads to grow economy hence more jobs. The major reason is the building of new infrastructure. In the long span, there are indirect effects that create new jobs, triggered by improved innovation resulting in new services.

The following **Table1.6** shows the definition of Broadband as prescribed by regulators in different countries:
Table 1.6 Definition of Broadband

<table>
<thead>
<tr>
<th>Country</th>
<th>Definition of Broadband</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>The federal Communications commission has modified the definition of broadband services, from the previous definition of 4 Mbps down and 1 Mbps up to new standard of 25Mbps down and 3 Mbps up in Jan, 15.</td>
</tr>
<tr>
<td>Brazil</td>
<td>At least 1 Mbps download speed</td>
</tr>
<tr>
<td>Canada</td>
<td>The Canadian national Broadband Task Force decided not to define broadband speed in terms of information transmission rate, but defined it as “a high capacity, two way link between end users and access network suppliers able of supporting complete motion interactive video applications to all Canadians on terms comparable to those available in urban market.” Based on the technology existing at the time. It accomplished that at least symmetrical transmission speed of 1.5 Mbps per individual user was necessary to meet this standard.</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>In a proposal to ensure faster internet services to subscribers the Bangladesh Telecommunication Authority Commission changed the definition of Broadband in April, 13th. As on date internet service over 1 Mbps is called Broadband and below 1 Mbps is called narrowband.</td>
</tr>
</tbody>
</table>

A number of countries have focused on setting determined minimum speed goals. Broadband speed goals in some of these countries include:

- Australia’s objective is to make connections with speeds of 100 Mbps available to 93% of institutions, homes, schools and businesses by 2018
- Finland has aim of delivering speeds of 100 Mbps to all of offices, homes, schools
and businesses by 2016.

- Germany’s target is to provide speeds of 50 Mbps per connection for 75% of institutions/households/offices.

- The European Union “Digital Agenda for Europe” calls for all Europeans to have access to connections with speed of minimum 30 Mbps by 2020 with 50% or more offices/households having access to speed in excess of 100 Mbps.

- In Korea, which is a country where broadband connection speed already almost 50 Mbps, has set the haughty aim of 1 Gbps per connection.

- Sweden targets for 40% of institutions/households and business having access to 100 Mbps by 2015 and 90% by 2020.

According to ITU’s “Working together to connect to world by 2020” paper released during the World Economic Forum Summit 2016, “Relied upon a significant body of research on the economic impact of broadband, it is normally accepted that broadband has its beneficial impact on economic development. Furthermore some research shows that broadband speed matters.” The paper goes on to quote various studies which enables to know that 10% increase in Broadband penetration is probable to have a positive impact, and could move up economic development in between 0.25% to 1.4%. If broadband speed is twofold, GDP may boost, potentially by up to 0.3%.

National Telecom Policy-2012 has the idea “Broadband on Demand” and ensures leveraging telecom infrastructure to enable all customers and businesses, both in urban and rural areas, to take part in the Internet and web economy thereby ensuring impartial and inclusive development across the nation. It provides the enabling framework for rising India’s competitiveness in all spheres of the economy.
NTP-2012 Target:

To provide affordable and reliable broadband-on-demand by the year 2015 and to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps download speed and making available higher speeds of at least 100 Mbps on demand. Provide high speed and high quality broadband access to all village “Panchayats” through a combination of technologies by the year 2014 and progressively to all villages and habitations by 2020.” Further, Point 1.5 of part IV strategies contained in the National Telecom Policy-2012 states that:

“To revise the existing broadband download speed of 256 Kbps to 512 Kbps and subsequently to 2 Mbps by 2015 and higher speeds of at least 100 Mbps thereafter.”

Most of the wired broadband connections are provided in India on DSL (Digital Subscriber Line) technology is taken the most available technology, which is broadly used by leader in delivering broadband services BSNL. Business Institutional and high end users prefer for Internet Leased line services due to uninterrupted and high quality of services. Dedicated bandwidth is delivered in ILL services but tariffs are very high with compared to general broadband plans. Conversely, wireless broadband access is a ordinary element in service-providers’ plans, subscriber have not yet come to terms with wireless as a broadband choice. To know broadband usage may facilitate to explain some of these limitations. Expansion in small business markets, remotely located offices and telecommuting are playing a critical role in boosting broadband demand. The outcome is that the line between institutional needs and customer connectivity is blurring—and broadband is considering both requirements. Broadband technologies are increasingly important to the success of businesses of all sizes. Fundamental trends in the business
market, including development of small businesses, telecommuters and remotely located offices, are increasing the demand for broadband and inducing a link between broadband access in the home as well as in the office. As broadband requirement changes into real customers and as businesses put together broadband into their business processes, the business group of people will speed up its progression to broadband ubiquity.

**Status of Telecommunication Services in India:**

As shown in Table-1.7, total number of telephone and mobile connections has crossed the mark of one billion as on 31st March, 17. Out of these 1.19 billion connections, 1170.68 million connections are based on mobile technology while 24.38 million connections are working on wired line technique. The Tele-density has reached to 91%.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Wireless</th>
<th>Wire line</th>
<th>Total (Wireless + Wire line)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Telephone Subscribers (Million)</td>
<td>1170.68</td>
<td>24.38</td>
<td>1195.06</td>
</tr>
<tr>
<td>Tele density</td>
<td></td>
<td></td>
<td>91</td>
</tr>
<tr>
<td>Broadband Subscribers (Million)</td>
<td>200.49</td>
<td>17.93</td>
<td>218.42</td>
</tr>
</tbody>
</table>

**Table 1.7  Telecom Subscription Data as on 31st March, 2017 (in millions)**

1.13.2 **Internet Service Providers in India:**

Internet Service Providers (ISPs), Unified and Cellular Mobile Service Providers (CMSPs), Access Service Licensees (UASLs) are allowed to provide broadband services under the present licensing framework. Up to 31.05.15, there are 102.49 million Subscribers have been reported by 121 operators. The growth of broadband connections in India, since 2011 has been shown in
Table-1.8 with graphical representation in below Chart No.-1.5

Table-1.8  Growth of broadband connections in India (in millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Wired Internet Subs</th>
<th>Wireless Internet Subs</th>
<th>Total Subs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>13.35</td>
<td>9.04</td>
<td>22.39</td>
</tr>
<tr>
<td>2012</td>
<td>14.98</td>
<td>10.35</td>
<td>25.33</td>
</tr>
<tr>
<td>2013</td>
<td>18.33</td>
<td>36.87</td>
<td>55.2</td>
</tr>
<tr>
<td>2014</td>
<td>18.86</td>
<td>68.88</td>
<td>87.74</td>
</tr>
<tr>
<td>2015</td>
<td>16.86</td>
<td>114.6</td>
<td>131.46</td>
</tr>
<tr>
<td>Up to Oct 16</td>
<td>17.93</td>
<td>200.49</td>
<td>218.42</td>
</tr>
</tbody>
</table>
However, the top ten service providers account for about 97% of subscriber base and the top five service providers alone hold 83% market share. State owned companies BSNL and MTNL both have about 74.9% market share for wired line broadband and 30.5% for overall broadband subscriptions. This enables that even though having a license for providing broadband services, the majority of the service providers
are unable to penetrate and capture the market and the market is still conquered by a few players only. The broadband service providers in India are given in Table-1.9:

Table-1.9  List of Broadband Service Providers in India

<table>
<thead>
<tr>
<th>SN</th>
<th>ISP</th>
<th>SN</th>
<th>ISP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Skydoot Communications</td>
<td>9</td>
<td>Railtel</td>
</tr>
<tr>
<td>2</td>
<td>Excell Media</td>
<td>10</td>
<td>STPI</td>
</tr>
<tr>
<td>3</td>
<td>Tata Communications</td>
<td>11</td>
<td>Powertel</td>
</tr>
<tr>
<td>4</td>
<td>Bharti Airtel</td>
<td>12</td>
<td>Tikona Digital Networks</td>
</tr>
<tr>
<td>5</td>
<td>Bharat Sanchar Nigam</td>
<td>13</td>
<td>Tulip Telecom</td>
</tr>
<tr>
<td>6</td>
<td>Reliance Communications</td>
<td>14</td>
<td>Uclix Infr Ltd</td>
</tr>
<tr>
<td>7</td>
<td>Vodafone India</td>
<td>15</td>
<td>Acws Global - Internet Services</td>
</tr>
<tr>
<td>8</td>
<td>GAILTEL</td>
<td>16</td>
<td>Delta UPS- UPS Service Provider Ezycare</td>
</tr>
</tbody>
</table>

Broadband Market share of various operators in India

Top five service providers cater 80.36% market share of the total broadband subscribers by the end of Oct-16. These service providers were Airtel (48.17 million), Vodafone (40.19 million), Reliance Jio-Infocom Ltd (35.94 million), Idea (29.76 million) and BSNL (21.46 million).

Top ten service providers captured 88.08% market share of total wireless broadband subscribers at the end of Mar-15. The detail is given in Table 1.10 and the graphical representation is shown in Chart-1.6
Table 1.10  Broadband Market shares of various operators in India as on 30.10.16

<table>
<thead>
<tr>
<th>ISP</th>
<th>Subs in Millions</th>
<th>% Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bharti</td>
<td>48.17</td>
<td>22.05</td>
</tr>
<tr>
<td>Vodafone</td>
<td>40.19</td>
<td>18.4</td>
</tr>
<tr>
<td>Reliance Jio</td>
<td>35.94</td>
<td>16.45</td>
</tr>
<tr>
<td>Idea</td>
<td>29.76</td>
<td>13.63</td>
</tr>
<tr>
<td>BSNL</td>
<td>21.46</td>
<td>9.83</td>
</tr>
<tr>
<td>Others</td>
<td>43</td>
<td>19.64</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>218.52</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Chart 1.6 Broadband Market shares of various operators in India as on 30.10.16 (in %)

Foreign Participation

India has welcomed into its telecom sector to FDI up to 100 percent holding in manufacturing of internet services, telecom equipment and infrastructure providers, 74% in radio-paging services, internet and 49% in NLD, basic telephone, cellular mobile, and other VAS. Since beginning of 1991, FDI in the telecom sector is second only to power sector and oil - 858 FDI proposals were received during 1991-2002 adding Rs.
56,279 Cr (DoT Annual Report, 2002). Foreign investors have been vigorous participants in telecom reforms even though there was some frustration due to initial dithering by the government. Up till now, most of the foreign direct investment has come in the mobile sector in part due to the fact that there have been more cellular operators than fixed service operators. For example, during 1991-2001, about 44% of the foreign direct investment was in cellular mobile and about 8% in basic service segment. This total foreign direct investment includes the categories of consultancy, manufacturing and holding companies.

**Tariff-Formation**

A vital ingredient of the transition from a secluded market to competition is the setting of tariffs to cost-recovery prices. In basic telecom, pricing of the kind that suitable in India before reforms, led to a superior degree of cross-subsidization and offered incompetent decision-making by both subscribers and telecom service-providers. Conventionally, D.o.T. tariffs subsidized the costs of access (shown in form of rental charges) with domestic and ILD usage charges. As a result, re-setting of tariffs - falling tariffs that are above costs and increasing those below costs - was a necessary pre-condition to developing competition among various service providers and competence in general. TRAI issued its first instruction concerning tariff-designing in line of NTP 1999 aimed at re-balancing tariffs and to user in an area of aggressive service provision. Afterward, it carried out timely reviews and made changes in the tariff levels, if essential. Re-balancing led to a decline in cross-subsidization in the fixed service telecom sector. Cost based pricing, a major exit from the pre-reform scenario, also enables a basis for making subsidies more crystal clear and better targeted to specific social concern.
Service Quality:

One of the major reasons for entertaining private participation in the stipulation of infrastructure rests on its ability to offer superior quality of service. In India, low Tele-density caused in great importance being laid on rapid expansion frequently at the cost of quality of service. One of the benefits predictable from the private sector's entry into telecom is a development in the quality of service to international standards. Armed with technical and financial resources, and better incentive to make profits, private telecom operators are anticipated to provide consumers value for their money (i.e. Perceived Value).

Pre Reform Period and Telecommunication in India

Prior to 1990's Telecom services in India were under complete Monopoly of government i.e. Department of Telecommunication. Government also kept the rights for manufacturing of Telecom equipments. MTNL and VSNL were formed in the year 1986. In early 1990's initial attempts started to attract private investment. Telecom equipment manufacturing was made free from licensing in 1991. A prominent rebellion has occurred in the telecommunication sector. In the pre-reforms era, this was completely in the hands of the central administration and due to lack of competition; the call tariffs were quite high. Additionally, due to lack of resources with the government, it could never meet the demand for telephones. Actually, a subscriber seeking a telephone connection had to wait for long period before he could get a landline connection. The service delivered by the government department was also very poor. Wrong/Excess billing, telephones lying dead for many days constantly due to laziness on the part of the telecom staff to attend to subscriber complaints, cross talk due to faulty underground cables, old instruments and
equipments in the telephone department were the order of the day in the pre reforms era. Now a day, there are lots of players in the telecom sector. The final beneficiary has been the customer. Prices of services in telecom sector have reduced considerably. Telephone connections are now a day’s reasonably priced to everyone and are also effortlessly available. Gone are the days, when one had to wait for long period to get a telephone connection. The numbers of telephone connection which were only 2.15 million (landlines) in 1981 boosted to 5.07 million (landlines) in 1991. As in 2003, there were 54.62 million telephone connections of which 41.33 million were landline telephone connections, 12.69 million are cellular mobiles and the remaining 0.60 million were WLL telephones as in 2003. Wireless in Local Loop telephones and cellular mobile telephones were unidentified in India a few years ago. Cellular phones charges have come down drastically that today one can see even a common man roaming around with a mobile phone in his hand. The private operators are giving various schemes to attract customers, a condition which is entirely conflicting to the conditions prevailing in the pre reforms era when one had to stay for years together to get a telephone connection. The gateway toward deregulation and beginning of liberalization and private sector contribution was the declaration of National Telecom Policy 1994. In which, for the first time, private/foreign firms allowed to enter the basic and the new cellular mobile section. Foreign Direct Investment up to 49% of total equity was also all allocated in these sectors. The guidelines allowed one private service provider to compete in basic services with the present DoT in each DoT internal circle. It permitted duopoly in cellular mobile telecom services in each circle/state. As part of the completion of the NTP 94, licenses were given license fees through a tendering process. This policy started the setting up of
a self-governing regulator—the Telecom Regulatory Authority of India, which was recognized in 1997. The main object of TRAI is to provide an effective legal framework to make certain fair competition while, at the same time, defend the interest of the consumers.

1.14 Liberalization and Reforms in Telecom Sector Since early 1990's

The telecommunications sector is governed by the telegraph act of 1885. Under this act, the government is in control of policy framing and provision of telecom services. Key changes in telecom sector in India began in the 1980s. Under the 7th plan (1985-90), 3.6 % of total outlay was set aside for communications and since 1991, above 5.5 % is used up on it. The initial phase of telecom reforms began in 1984 with the creation of Centre for Department of Telematics for developing original technologies and private manufacturing of customer premise equipment (CPEs). Later on, the Mahanagar Telephone Nigam Limited and Videsh Sanchar Nigam Limited were set up in 1986. The Telecom Commission was established in 1989. The growth of telecom sector has been presented in sequential order.

1991-92:

• Telecom Manufacturing Equipment license was de-regulated in 1991.
• Automatic foreign collaboration was allowed with 51 % equity by the collaborator.

1992-93:

VAS sector was opened for private and foreign operators on franchise or license basis.
These included mobile phones, voice mail, radio paging, electronic mail audio text services, video text services, data services using VSATs, and video conferencing.

**1994-95:**

The Government declared a NTP- 1994 in September 1994. It opened basic telecom services to private participation including foreign investments.

- Foreign equity participation up to 49% was permitted in basic telecom services, radio paging and cellular mobile. For value added services the foreign equity cap was fixed at 51%.
- Eight cellular licenses for four metros cities were finalized.

**1996-97:**

- TRAI was established as an independent body to separate the regulatory functions from policy formulations and operational functions.
- Coverage of the term "infrastructure" prolonged to include telecom sector to enable the sector to avail of financial incentives such as tax benefits and concessional duties.
- An contract between Department of Telecommunication and financial institutions to make easy funding of cellular and basic telecom projects.
- External Commercial Borrowing limits on telecom projects was made flexible with an enhanced share from 35% to 50% of total project cost.

**1998-99:**

Foreign Direct Investment up to 49% of total equity, subject to license, allowed in
companies providing Global Mobile Personal Communication through satellite services.

1999-2000:

- NTP- 1999 was declared which allowed multiple fixed Services operators and opened LD services to private operators.
- TRAI was reconstituted: clear difference was made between the recommendatory and legal functions of the Authority.
- MTNL/DOT was allowed to start cellular mobile telephone service (CMTS).
- To distinguish service providing functions from policy and licensing functions,
- D.o.T. Services was set up.
- A package was offered for migration from fixed license fee to revenue sharing to exist cellular and basic service providers.
- First phase of re-balancing of tariff structure initiated. STD and ISD charges were cut by 23% on an standard rates
- Voice and data sector was opened to full competition and foreign ownership FDI increased to 100 per cent from 49 per cent previously.

2000-01:

- TRAI Act was changed. The Amendment clarified and strengthened the recommendatory power of TRAI, particularly with respect to the need and timing of offer of new services provider, and in terms of licenses to a services provider.
- Department of Telecom Services and Department of Telecom operations merged by creating Bharat Sanchar Nigam Limited.
- Domestic long distance services opened up without any constraint on the number of operators.
● Second phase of tariff change started with further reductions in the long distance
STD rates by an average of 13% for different distance slabs and ISD rates by 17%.
● ISPs were given authorization for setting up of International Gateways for Internet
using satellite as a medium in March 2000.
● In August 2000, private operators were allowed to set up international gateways via
the submarine cable route.
● The extinction of monopoly of VSNL in ILD services was antedated to 31st March,

2001-02:
● Communication Convergence Bill-2001 was brought in August 2001.
● Competition was started in all services segments. TRAI suggested opening up of
market to complete competition and beginning of new services in the telecom
sector. The licensing terms and conditions for CMTS were made easy to encourage
entry for operators in areas without efficient competition.
● Usage of VoIP permitted for international telephony service.
● The five-year tax holiday and 30% reduction for the next five years available to the
telecommunication sector till 31st March 2000 was again introduced for the units
commencing their operations on or before 31st March 2003. These concessions
were also given to ISPs and broadband networks.
● Thirteen ISP's were given permission for commissioning of international gateways
for Internet using satellite medium
● License conditions for Global Mobile Personal Communications by Satellite
- NLD Service was opened up for clear entry with the announcement of guidelines for licensing NLD operators. Four companies were given Letter of Intent (LOI) for NLD Service of which three licenses have been signed.

- The basic service was also offered for competition. 33 Basic Service licenses were issued.

- Four cellular operators, one each in four metros city and thirteen were permitted with 17 fresh licenses issued to private operators in October 2001. The mobile providers were given liberty to provide, within their area of operation, all types of mobile services equipment, including circuit / package switches that meet the applicable International Telecommunication Union standards.

- Wireless in Local Loop was brought for providing telephone connection in urban and rural areas.

- Disinvestment of PSU’s in the telecom sector was also started during the year. In Feb 2002, the disinvestment of VSNL was completed by bringing down the government equity to 26% and the management of the company was given to Tata Group, during the year, Hindustan teleprompters was also disinvested.

- Government allowed CDMA technology to enter the Indian telecom market.

- Reliance, MTNL and Tata were given licenses to provide the CDMA technology based services in the country.

- TRAI suggested deregulating regulatory intervention in cellular tariffs, which showed that operators need no longer have pre-approval of the regulator for implementing tariff plans.
2002-03;

- ILD business opened for unrestricted entry.
- Telephony on internet allowed in April 2002.
- TRAI completed the System of Accounting Separation (SAS) providing detailed accounting and financial system to be maintained by telecom operators.

2003-04;

- Unified Access Service Licenses (UASL) policy for basic and cellular services was started in October 2003. This policy enabled services providers to offer fixed and mobile services using single license. As a result 27 licenses out of 31 licenses renewed to UASL.
- IUC-Interconnection Usage Charge policy was introduced with the view of providing termination charge for cellular services and allow introduction of Calling Party Pays policy in voice telephony segment.
- The Telecommunication IUC Regulation 2003 was brought in on 29th October 2003 which covered planning among service providers for payment of IUC for Telecommunication Services and covered Basic Service that includes WLL services, CMTS, and Long Distance Services throughout the territory of India.
- The USO fund was introduced as a instrument for transparent cross subsidization of universal access in telecom segment. The fund was to be collected through a 5% levy on the AGR of all telecom operators.

Broadcasting notified as Telecommunication services under Section 2(I) (k) of TRAI Act.
2004-05:

- In the Budget 2004-05 proposed to remove the ceiling from the existing 49% to 74% as an incentive to the cellular operators to fall in line with the new unified licensing norm.
- 'Last Mile' connectivity permitted in April 2004 within the local area for ISP’s for creating their own last mile to their customers.
- Indoor use of less power equipments in 2.4 GHz band de-licensed from August 2004.
- Broadband regime announced on 14th October 2004. In this regime, broadband had been defined as an "always-on" data connection supporting interactive services including internet access with a minimum download speed of 256 kbps per subscriber.
- The Telecommunications Interconnection Regulation 2004 was brought into effect on 10th December 2004.
- BSNL and MTNL started broadband services on 14th January 2005.
- TRAI declared the reduction of Access Deficit Charge by 41% on ISD calls and by 61% on STD calls which were applicable from 1st February 2005.

2005-2006:

- In the Budget 2005-2006 declared a hike in FDI ceiling to 74% from the earlier limit of 49%. Further 100% FDI was permitted in the area of telecom equipment manufacturing and provision of IT enabled services.
- Annual license fee for National Long Distance as well as International Long Distance licenses decreased to 6% of Adjusted Gross Revenue with effect from 1st

- BSNL and MTNL started the 'One-India Plan' with effect from 1st March 2006 which ensure the customers of BSNL and MTNL to call from any part of India to any part @ the cost of Rs. 1 per minute, any time of the day over phone.

- TRAI fixed Ceiling Tariff for International Bandwidth, Ceiling Tariff for higher capacities declined by about 70% and for lower capacity by 35%.


- BSNL declared 33% reduction in call charges for all the countries for international calling.


- **2006-2010**

  - The per minute ADC for domestic calls changed with a revenue share fee of 1.5% of non-rural AGR, coupled with a pointed 60% drop in per minute ADC on international calls.

  - ADC on % revenue share reduced to 0.75% from 1.5% of AGR.

  - Per minute ADC on outgoing international calls lowered to zero, and on incoming international calls lowered to Rs.1, Roaming rental brought to zero.

  - Reduction of roaming tariffs to the extent of 22% -56%, Port charges reduced by 23%-29%

- **2010-2015**

  - Offerings by telecom regulator TRAI on spectrum sharing.
● BSNL started “all India roaming” free scheme.
● BSNL started “Night free calling” from land line during 9 pm to 7 am.

2016-2017

The government’s grand Rs 7,000-crore ‘Smart City’ program is of vital importance in some other areas likely to have a vast impact on the telecom sector in the times to come as well as present new revenue opportunities for Service Providers. In 2016, operators and over-the-top content providers are predictably to invest heavily in city-wide Wi-Fi networks which will be the spine for smart city services. M2M will also have a key role to play in smart cities. According to Deollite Research Indian M2M opportunity is probably to reach 100 million USD by 2016 as ecosystem is quick evolving. With propagation of 3G and 4G services, exponential expansion for M2M transactions is expected in 2016-17.

1.15 An overview of Indian Telecom Service Providers

The telecommunications industry is continuing to change at breakneck speed. Faced with ongoing disruption from every side, operators have recognized — and are taking advantage of — their pivotal enabling role in a digital society. Mounting pressure on the bottom line means the emphasis is still on driving efficiencies into the business, yet many operators are also exploring new opportunities in a rapidly widening digital ecosystem as they look to meet a new wave of customer demands. Operators are well placed to act as catalysts of transformation in a fast-changing digital society. But before they can take advantage of changing customer and industry stakeholder expectations, they must decide where they want to play — and then focus rigorously on developing the strategies, technologies and talent that will be prerequisites for success in that area. The alternative
is to be sidelined as a “jack of all trades, but master of none” at a time when strategic vision and the ability to execute have never been more important.

Indian telecom market consists of both government and private operators. Initially there were only two government players i.e. Department of Telecommunication and MTNL, but after liberalization government opened this field for private players also.

1.15.1 Government Telecom Operators:

Presently only two players with 100% government stake are operating. MTNL is operating in two metros New Delhi and Mumbai, while BSNL is providing telecom services on Pan India basis except these two metros.

1.15.1.1 Bharat Sanchar Nigam Limited (BSNL)

Bharat Sanchar Nigam Ltd. was incorporated on 15th September 2000. It took over the business of providing of telecom services and network management from the erstwhile Central Government Departments of Telecom Services (DTS) and Departments of Telecom Operations (DTO), with effect from 1st October, 2000 on going concern basis. It is one of the largest & leading public sector units providing comprehensive range of telecom services in India.

BSNL has installed Quality Telecom Network in the country & now focusing on improving it, expanding the network, introducing new telecom services with ICT applications in villages & winning customer's confidence. As on 31.03.2017, it has about 36.42 million line basic telephone capacity, 7.13 million WLL capacity, 95.96 million GSM capacity, 34,727 fixed exchanges, 1,17,090 GSM BTSs, 9594 CDMA Towers, 102 Satellite Stations, 7,73,976 R.Km. of OFC, 4751 R.Km. of microwave network connecting 646 districts, 4519cities/towns & 6.25 Lakhs villages.
BSNL is the only service provider, making focused efforts & planned initiatives to bridge the rural-urban digital divide in ICT sector. In fact there is no telecom operator in the country to beat its reach with its wide network giving services in every nook & corner of the country & operates across India except New Delhi & Mumbai. Whether it is inaccessible areas of Siachen glacier or North-Eastern regions of the country, BSNL serves its customers with a wide bouquet of telecom services namely Wire line, CDMA mobile, GSM mobile, Internet, Broadband, Carrier service, MPLS-VPN, VSAT, VoIP, IN Services, FTTH, etc.

BSNL is one of major service provider in its license area. The company offers wide ranging & most transparent tariff schemes designed to suit every customer. BSNL has 94.36 million cellular & 1.02 million WLL customers as on 31.10.2016. 3G Facility has been given to all 2G connections of BSNL. In basic services, BSNL is miles ahead of its rivals, with 13.88 million wire line phone subscribers i.e. 56.96% share of the wire line subscriber base.

BSNL has set up a world class multi-protocol convergent IP infrastructure that delivers convergent services such as voice, data & video through the same Backbone & Broadband AN. Presently there are 32 million broadband customers.

The BSNL has vast experience in planning, installation & maintenance of switching & transmission networks & also has various world class ISO 9000 certified Telecom Training Institute. During the 2015-16, turnover of BSNL was approx. Rs. 32,919 Crores.
VISSION:

- Be the leading telecom service provider in India with global presence.
- Create a customer focused organization with excellence in customer care, sales and marketing.
- Leverage technology to provide affordable and innovative telecom. Services/Products across customer segments.

MISSION:

- Be the leading telecom service provider in India with global presence.
- Generating value for all stakeholders - employees, shareholders, vendors & business associates
- Maximizing return on existing assets with sustained focus on profitability
- Becoming the most trusted, preferred and admired telecom brand to explore International markets for Global presence
- Creating a customer focused organization with excellence in customer care, sales & marketing.
- Developing a marketing and sales culture that is responsive to customer needs customer care, sales& marketing
- Excellence in customer service-”friendly, reliable, time bound, convenient and courteous service”
- Leveraging technology to provide affordable and innovative products/ services across customer segments
- Offering differentiated products/services tailored to different service segments
● Providing reliable telecom services that are value for money
● Providing a conducive work environment with strong focus on performance
● Attracting talent and keeping them motivated
● Enhancing employees skills and utilizing them effectively
● Encouraging and rewarding individual and team/group performance
● Establishing efficient business processes enabled by IT
● Changing policies and processes to enable transparent, quick and efficient decision making
● Building effective IT systems and tools

1.15.1.2 Mahanagar Telephone Nigam Limited

MTNL was started on 1st April, 1986 by the Government of India to improve the quality of telecom services, expansion of the telecom network, and set up new services and to raise revenue for telecom development needs of India’s key metros: Delhi & Mumbai. MTNL is the prime provider of fixed-line telecom service in the two Metro Cities Delhi and Mumbai. It offers mobile services in Delhi including four surrounding towns Noida, Gurgaon, Faridabad & Ghaziabad. Mumbai city provides services along with the areas falling under the BMC, New Mumbai Corporation and Thane Municipal Corporation.

The authorized capital of the Company is Rs. 800 Crores. The Paid up Share Capital is Rs. 630 Crores divided into 63 Crores share of Rs. 10 each. At present, 56.25% equity shares are held by President of India & her nominees and remaining 43.75% shares are held by FIIs, Financial Institutions, Banks, Mutual Funds and others including individual
investors. MTNL has been given Navratna status in 1997 and was listed in New York Stock Exchange in 2001.

In more than last two decades of its operations, there has been overall development & growth and better operational efficiency. Currently, MTNL is providing a host of telecom services that include fixed telephone service, GSM & CDMA based telecom service, Internet, ISDN and Leased Line services, MTNL has been in the heading of offering state of the art technology based telecom services to its customers at most reasonable prices. MTNL has been the first to open some of the latest telecom technologies in the country like ADSL & VDSL in broadband, IPTV on MPEG4 , VOIP and 3G Mobile service.

To fulfil the broadcast and other requirement such as carrying of HD TV stream, security requirements, games data etc the most important features of Telecom infrastructure were specially created by MTNL for Common Wealth Games-2010 in less than a year time frame.

After closing of the games the network elements were used to strengthen the exiting IP - MPLS spine networks of MTNL in Delhi Metro & Mumbai Metro enabling MTNL to fulfil all its present and future requirements as well as to make possible it to provide wholesale bandwidth connectivity to other telecom operators, Banks, Corporate Houses , Institutions and various other Govt. Agencies on lease /rental basis support.

MTNL is providing telecom services beyond limitations through its Joint Ventures and Subsidiaries. MTNL is available in Nepal through its Joint Venture United Telecom
Limited and in Mauritius by its 100% subsidiary Mahanagar Telephone Mauritius Limited.

1.16. **Private Telecom Operators**

1. **Bharti Airtel:**

Bharti Airtel is a leading worldwide telecommunications company with operations in 20 countries throughout Asia and Africa. It has its headquarters in New Delhi. It ranks amongst the top 4 mobile service providers internationally in terms of subscribers. In India, the company's product range include 2G, 3G and 4G wire line services, mobile commerce, fixed line services, high speed ADSL broadband, IPTV, DTH, enterprise services including national & international long distance services to carriers and ILL etc. In the rest of the area, it offers 2G, 3G wireless services and mobile commerce. Bharti Airtel had over 260 million customers across its operations at the end of March 2016. Airtel offers GSM mobile services in all the 22-telecom circles of country and is the largest mobile service provider in the India, based on the number of consumers. The group offers high-speed broadband with the best in its class network. With fixed line services in 87 cities, Airtel help to stay in touch with friends & family and keep updated round the clock. Airtel business delivers a broad portfolio of services to large Institutions/Enterprise, Government, Small & Medium businesses and carrier customers. It is India's most important and most trusted provider of telecom services, contributing services that include data, voice, network integration, data centre & managed services, ILL, enterprise mobile applications and digital media.
Indian mobile operator, Airtel has become the third largest mobile network in the world, calculated on subscriber numbers. The newest data from Ovum’s World Cellular Information Service shows that Bharti’s 303 million subscribers puts it behind only China Mobile (626 million) and UK-based Vodafone (403 million) in terms of subscribers.

According to Bharti chairman, Sunil Bharti Mittal, a low-cost business model based on outsourcing, which permitted it to expand services rapidly. Ovum’s WCIS data tracks worldwide mobile subscriptions, KPIs, financial and operational indicators, among others. These are the top 5 mobile networks, given Table 1.11:

**Table 1.11  World top Six Mobile operators with number of connection as on March, 16**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Connections (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China Mobile</td>
<td>851.2</td>
</tr>
<tr>
<td>Vodafone Group</td>
<td>469.7</td>
</tr>
<tr>
<td>Bharti Airtel</td>
<td>348.1</td>
</tr>
<tr>
<td>America Movil</td>
<td>289.7</td>
</tr>
<tr>
<td>Telefonica</td>
<td>276.5</td>
</tr>
<tr>
<td>China Unicom</td>
<td>265.1</td>
</tr>
</tbody>
</table>


2. **Reliance Telecom:**

Reliance Group, founded by Shri Dhirubhai Ambani ranks among India's leading private sector business houses in terms of valuations. The group has business expansion that
range from telecom (RCL) to financial services (Reliance Capital Ltd) and the production and distribution of power (RPL and RIL).

Reliance Group's flagship company, RCL is India's leading and truly integrated telecom service provider. The Company has a customer base of above 100 millions including over 2.8 million individual abroad retail customers. Its corporate clientele includes over 39,000 Indian and multinational corporations counting small and medium enterprises and over 290 worldwide, regional and domestic carriers.

It has established a across the country next generation, integrated, convergent digital network that is competent of supporting state of the art services spanning the entire communications value chain, covering over 21,000 towns and cities and over 400,000 villages in rural area. It owns and operates the world's largest NGN IP enabled connectivity infrastructure, comprising over 280,000 kilometers of OFC systems in India, Europe, USA, Middle East and the Asia Pacific region.

Other major group companies of this group are - Reliance Power, Reliance Infrastructure and Reliance Capital – which are widely recognized as the market leaders in their respective areas of operation in India

3 Reliance Jio:

It is first LTE (Long term Evolution) mobile network operator in India. It is a entirely owned subsidiary of Reliance Industries headquartered in Mumbai City, which provides wireless 4G LTE service network and is the only 100 % VoLTE operator in the country having coverage across all 22 telecom circles in India.
The services were first offered to Jio's partners and employees on 27 December 2015 on the eve of 83rd birth anniversary occasion of late Sh. Dhirubhai Ambani, who was founder of RIL, and later services were commercially inaugurated on 5th September 2016.

The company launched its 4G mobile services throughout India in the third quarter of 2016-2017.

The company has a network having more than 250,000 km of O.F. cables in the country, over which it will be collaborating with local cable operators to get more connectivity for its broadband services. With its multi-service operator license, it will also serve as a TV service provider and will offer television-on-demand on its network country wide.

In June 2015, it tied up with domestic handset maker Intex to provide 4G handsets enabled with voice over LTE feature. Through this, its policy to offer 4G voice calling as well rolling out high-speed Internet services using a optic fibre network, additionally the 4G network. On the other hand, in October 2015, it announced that it would be introducing its own mobile handset brand named LYF.

On 25th January 2016, the Jio launched its LYF Smartphone series starting with Water 1, using its chain of retail outlets, Reliance Retail. Three more handset models have been released so far, namely Water 2, Earth 1, and Flame.

**Jio-net Wi-Fi:** Earlier to its pan-India launch of 4G data and telephony services, it has started providing free Wi-Fi hotspot services in major cities throughout India including Gujarat, Andhra Pradesh, Madhya Pradesh, selected locations of Mumbai in Maharashtra, Kolkata in West Bengal, Lucknow in Uttar Pradesh, Bhubaneswar in Odisha, in
Uttarakhand, in Meerut in Vijayawada among others.

In March 2016, it started providing free Wi-Fi internet to audience at six cricket stadiums hosting the 2016 ICC World 20-20 matches. Jio-net was provided in Wankhede Stadium, Punjab Cricket Association Mohali, Himachal Pradesh Cricket Association Stadium – Dharamshala-, Chinnaswamy Stadium –Bengaluru-, Feroz Shah Kotla –Delhi-, and Eden Gardens –Kolkata-in India

**Jio apps**

In May 2016, Jio offered a bundle of multimedia apps on internet as part of its future 4G services. While the apps are available for download for all, a user will need a Jio SIM card to use it. In addition, maximum apps are in developing phase Subsequent is a list of te apps:

- My-Jio - Manage Jio Account and Digital Services
- Jio-TV - A live TV channel service
- Jio- Cinema - An online HD video library to use
- Jio -Chat Messenger - An immediate messaging app
- Jio- Music - A music media player
- Jio-4GVoice - A VoLTE phone simulator
- Jio -Mags - Electronic-reader for magazines
- Jio –Xpress-News - A news and magazine service aggregator
- Jio -Security - Security application
- Jio- Drive - Cloud-based backup tool for users
- Jio -Money Wallet - An online payments-wallet application
- Jio -Switch - Transfer contents
Affordable Devices: It has worked with all the principal device manufacturers of the world to ensure availability of 4G LTE smart phones across all POS – from ultra-premium models on one hand, to entry level models on the other.

Digital Currency: It delivers a new India which will use digital currency in its place of paper money for a extra secure and convenient way to transact. Jio Money is digital currency and digital payments business, will play a critical role in this by offering a platform for ubiquitous, affordable and secure digital gateway payments.

Jio Drive: Micro and small businesses will quickly have access to cutting-edge cloud storage technologies which were once reasonable to big companies only, giving them a new boundary to compete on a global landscape. It is an application that brings powerful cloud capabilities to every Smart phone. Using it, anybody can store, sync and share any content between their devices and also with others.

Digital Education: Teachers and students far from remote areas can connect with ont-to-one, crowd-source knowledge and get new age learning techniques and thus raise the level of education to a completely different plane.

Digital Healthcare: Specialist medical advice would be available alltime, everywhere - with medical practitioners will be able to grow their practice without restraint, and provide quality of life to the Crores that make up our country.

Digital Entertainment and social connectivity: Jio Chat is a dominant communication application that joins chat, video calling , voice, conferencing, file sharing, photo sharing and so on. It enables users to watch HD TV always, everywhere on any device, from number of channels, across different categories and languages. It beats is a premier digital music streaming service that delivers instant access to millions of songs and
playlists.

**Jio Mags and Jio News:** It provides right of entry to the most popular collection of magazines and news from chief publishing houses across multiple languages worldwide.

**Digital Entrepreneurship:** It is building a platform on which a range of loaded digital products and services can be offered - digital commerce, digital currency, digital education, digital healthcare, digital Mandies, e-governance, Smart Cities and the IOT. It does not matter whether these services are fashioned by Jio itself, its ecosystem partners or anyone internationally. It is committed to the philosophy of Net Neutrality. Reliance is creating the most widespread and future-proof system in India, and perhaps, in the world. It will offer next generation legacy-free digital services over an end-to-end all-Internet Protocol network, which can be smoothly upgraded even to 5G and beyond. Additionally to the existing across the country 2300 MHz spectrum and 1800 MHz in 14 circles, it put over Rs 10,000 Crore during this year's auction to obtain 800 MHz spectrum in 10 circles/states and 1800 MHz spectrum in 6 circles/states. This brings the total investment in spectrum assets to almost Rs 34,000 Crores. It now has the biggest footprint of liberalized spectrum in the country, acquired in an very cost effective manner.

Reliance Jio has infrastructure of more than 2.5 Lakh kilometres of O.F. cables, covering 18,000 cities and more than Lakh villages, with the aim of covering 100% of the India’s population by 2018. It has an original end-to-end capacity to give out in tune of 100 million wireless broadband and 20 million FTTH. Jio has also built nearly half- million square feet of cloud data centres and a multi capacity international network. The infrastructure is being built in corporation with some of the world’s most technologically
superior companies. FY 2016-17 will be the first full year of commercial operations.

4. **Vodafone**

It is India is 100% stake having Vodafone Group. It started operations in 1994 when its predecessor Hutchison acquired the cellular license for Mumbai. The Vodafone was started operations in India in September 2007, after Vodafone, it acquired a majority stake in Hutchinson Essar. From a single operation base with 31 million subs base, the company has expanded its operations across the India to cover all 22 telecom circles and service 198 million subs. This journey is a strong indication of Vodafone's commitment and success in a highly competitive and price sensitive market.

5. **Idea Cellular**

It is an Aditya Birla Group Company, countries first truly Multinational Corporation. It is a pan-India integrated GSM operator giving 2G and 3G services, and has its own NLD/ILD/ISP license. It has acquired spectrum to launch 4G services across ten key markets in India and has started multiple steps towards introduction of 4G LTE services on 1800 MHz band, in a step-by-step manner from FY 2016 onwards. With revenue in tune of $5 billion; revenue market share of almost 18.2% ; and subscriber base of over 165 million, It is one of the top three mobile operators. It is the 6th largest mobile service operator in the world, based on number of subscribers in single country operations. It carries traffic of over 2 billion minutes/day. It has a deep rooted network across the length and breadth of the country comprising of over 1,49,196 cell sites covering 7,513 towns and 3,63,580 villages as on 2016.

Using the most recent in technology, it provides world-class service delivery through the
most extensive network of POS, comprising of nearly 6,752 Idea POS. Its customer service delivery platform is ISO 9001:2008 certified, enabling it the only operator in the country to have this standard certification for all 22 service areas/states and the corporate office. It has constantly stayed ahead of the industry in VLR reporting. Its thought leadership on Mobile Number Portability, with Net Gain of over 14 million customers as on June 30\textsuperscript{th}, 2015, has brought it to stay as the top gainer among other top telecom players. Every 4\textsuperscript{th} mobile user who applied choice through MNP chooses Idea.

It has been a leader in introducing customized product offerings for segmented customers. It is the first mobile service operator to set up innovative VAS in the Indian telephony market, and has kept itself ahead of the industry in data product offerings. Due to continuous growth of mobile broadband in India, the services have been delivered over 37.2 million data users. Today, data contributes over 17.7 % of its service’s revenue. It has received a number of national and international recognitions for its path-breaking innovations in mobile telecom products and services. It has won the prestigious Voice & Data Telecom Leadership Awards-2014 under the Leadership Recognition class “for various successful initiatives and deployments in the areas of Business Services, Internet & Broadband, Business Analytics, Information Security, and Customer Service”. It was also known as “Most Innovative Telecom Service Provider of the Year” and “Mobile Data Service Provider of the Year” by Frost & Sullivan Asia Pacific ICT Awards 2015. Idea won “Dataquest Business Technology Award” in Analytics category for the “Implementation of end-to-end Campaign Management solution”.

6. **Tata Indicom**

Tata Teleservices Limited is flagship of the Tata Group’s. The Tata Group had revenues
of approximately USD 70.8 billion in Financial Year 2008-09, and includes more than 90 companies, more than 363,039 employees worldwide and more than 3.5 million shareholders. Established in 1996, TTL is the pioneer of the CDMA 1-x technology platform in India. It has started on a growth path since the acquisition of Hughes Telecom Ltd by the Tata Group in 2002. It started mobile operations in January 2005 under the name Tata Indicom and today enjoys a across the country presence through existing operations in all of India's 22 telecom Circles/States. The company is also the market leader in the fixed wireless telephony market. The company's network has been marked as the 'Least Congested' in India for five successive quarters by the Telecom Regulatory Authority of India through independent surveys.

TTL now also has a presence in the GSM space, through its JV with NTT DOCOMO of Japan, and offers various products and services under the TATA DOCOMO brand name. It arises out of the Tata Group's strategic alliance with Japanese telecom major NTT DOCOMO in November 2008. It has received a pan-India license to operate GSM telecommunication services—and has also been allotted spectrum in 18 telecom Circles. The company has rolled out GSM services in 17 of India's 22 telecom Circles/States in less than a year. It marks a significant milestone in the Indian telecom landscape, and has already redefined the very face of telecom in India, being the first to pioneer the per-second tariff option—part of its 'Pay for What You Use' pricing paradigm. Tokyo-based NTT DOCOMO is one of the world's leading mobile operators—in the Japanese market, the company is the clear market leader, used by over 50 per cent of the country's mobile phone users. Today, Tata Teleservices Ltd, along with Tata Teleservices (Maharashtra) Ltd, serves nearly 70 million customers in more than 450,000 towns and villages across
the country, with a bouquet of telephony services encompassing Mobile Services, Wireless Desktop Phones, Public Booth Telephony and Wire line Services.

7. **Sistema**

It was Established in 1993, today it is a large private investor operating in the real sector of the Russian economy. Its investment portfolio comprises stakes in mostly Russian companies from various sectors of economy, including telecommunications, retail, utilities, high tech, pharmaceuticals, pulp and paper healthcare, railway transportation, agriculture, finance, mass media, tourism, etc. It is the controlling shareholder in most of its portfolio companies. It’s focus is on improvement of the operational efficiency of acquired assets through restructuring and gaining industry partners to enhance expertise and reduce financial risks.

8. **Aircel**

Aircel is India’s 5th largest and fastest growing GSM mobile telecom service provider with a customer base of 65.1 million. It is a cross country operator with a presence across 22 circles. The company offers voice & data services ranging from post-paid and prepaid plans, 2G and 3G services, Broadband Wireless Access, Long Term Evolution to Value-Added-Services. Additionally to providing premium internet access solutions to facilitate data intensive live streaming Apps, Aircel has also cemented the way to be amongst the first to offer 3G and 4G LTE services to customers. It has successfully bid for 3G licenses/ spectrum in 13 Circles/states, with BWA spectrum also obtained in eight of these states. Aircel’s 3G rollout has been the best roll out ever in the Indian Telecom Space. Aircel is hopeful about the data bundling in its key markets.

9. **Videocon**
Videocon Telecommunications Limited, a Videocon flagship company offers GSM mobile services GSM service under the brand name Videocon. The services are already up and running in various states. The Videocon Group is a $10 billion, worldwide business conglomerate with a strong presence in Household, Oil & Gas, Consumer Goods, Retail, Telecom, DTH and the Power sector etc.

This group has constantly leveraged a culture of innovation to develop a range of latest market products. The Group has different manufacturing facilities globally and R&D centres spread across Americas, Europe and Australasia that are continually working towards creating worldwide quality products deploying the latest technology. It is one of the largest distribution networks in India with a nation-wide presence. It has a full range of products in Washing Machines, LCD’s and CTV’s, ACs, Refrigerators, Home Theatre systems, food processors, microwave ovens, and sophisticated small home appliances. Just the group also successfully launched a range of Mobile Handsets and NGN D2H television services and world’s first satellite TV.

10. **Telenor India**

The subscriber base of this company is over 48 million. It is part of Telenor Group, one of the world’s main mobile operators with 192 million mobile customers. Since commencing operations in 2009, it has been constantly acknowledged for its best-in-class network, unique distribution and unmatched customer centricity. It operates in Andhra Pradesh, Bihar, Gujarat, Maharashtra, Uttar Pradesh.

11. **Quadrant Tele-Ventures**

Quadrant Tele-ventures Limited is a telecoms services provider based in India. Started operations in 1946, it provides Landline services, Internet services, leased line services,
CDMA wireless services and GSM mobile services in the Punjab telecom circle. It has 1.6 million wireless, of which 27,768 CDMA and 1.3 million GSM subscribers and 0.2 million wire-line subscriptions (July 2012) and 0.1 million broadband subscriptions (March 2012). In March 2010, it had launched its GSM wireless services in Punjab Telecom circle.

In the year ended March 2012, Quadrant Tele-ventures Limited generated INR 2.8 billion in revenue with an annual growth of 21.7% and net profit of 1.7 billion, with an annual decline of 22.7%.

9. **Loop Mobile**

Usually referred to as LOOP and formerly known as BPL Mobile, was an Indian mobile network operator. On 18 February 2014, Bharti Airtel announced that it had agreed to acquire Loop Mobile for ₹700 Crore (US$100 million). At its peak, Loop offered both prepaid and post-paid GSM cellular phone coverage in Assam, Kolkata, North East, Mumbai, Madhya Pradesh, Haryana, Orissa, Punjab and Rajasthan after receiving a license to operate across 21 telecom circles from the Department of Telecommunications.
1.17 Future Growth Opportunities of Indian Telecom Sector

India is currently the worldwide second-largest telecommunications market after China and has registered study growth in the past two decades. The country’s mobile market is growing rapidly enough and will contribute substantially to India’s gross domestic product, according to a report prepared by GSM Association in collaboration with the Boston Consulting Group. It has touched a figure of 120 Crore as on 31.03.17.

The liberal policies of the Indian Government have been instrumental along with strong subscriber demand in the rapid growth in the present telecom sector. The government has making sure easy market access to telecommunication equipment and a fair and proactive policy framework that has ensured availability of telecommunication services to customers at affordable prices. The deregulation of foreign direct investment parameters has made the sector one of the fastest rising and a top five employment opportunity generator in the country. According to a report of TRAI, two other linked aspects for market growth are availability of spectrum and availability of resources for network rollout and expansion. The Indian government is now looking into these two areas. The 79% hike in FDI has been made clear by the government to facilitate continuous flow of investments to expand the reach of the mobile operators.

To appreciate full market potential and achieve the forecasts figures, telecom operators have to work on a segmented policy and spotlight on the following five key strategies given below:

- Mobile in the hands of every urban/rural youth
- Mobile in the hand of every labour/executive/businessman/ worker.
- Mobile in each household
• Mobile penetration in each town/village
• Mobile Phones reasonably priced and available wherever mobile services available

Jio has expanded beyond the speculations of everyone. It has captures approx. 11% market share. As per TRAI reports, presently it is delivering best ever speed among all the operators which is in between 4 Mbps to 10 Mbps. It has changed the market scenario totally. Nobody is speaking about voice but everybody is bothered about data speed.

Airtel, Vodafone and Idea, in that order, are the top three telecom companies in India with combined revenues of Rs 166,000 Crore and net profits of Rs 12,000 Crore. These companies are struggling hard to survive in present neck to neck competition. The first phase of the violent battle will benefit the ultimate consumer the most as the coming -competition will increase range of services, better quality at lower costs. But, as each of these three aspects play out, it is also probably to expand the market, as it did in year 2002, and finally also benefit competitors in the long run.

The heart of the fight will be to retain and attract finest customers of data services, which will be the foundation of the telecom industry's growth going forward with revenue from voice calling maturing at best. Pressure of competition could well bring back the 2009-2010 period that saw telecom operators drop rates up to 50%. Even with comparatively stable pricing, service providers have been counting on data to compensate the slowdown in voice, but those rates are under pressure.
Many are speculating that Jio's entry will accompany in free calling and halve data rates. At the recent AGM of RIL, chairman Mr. Ambani indicated at data being available at Rs 80 per GB, compared to the average of Rs 150 offered by other operators. Furthermore, the Jio platform over time delivers to convert VoIP. It means that the cost of a call to a consumer will be the nominal POI charge of 14 paisa per minute, instead of the average of 50 paisa.

Jio estimates the hypothetical cost/MB for a data-only operator like Jio to decline from Rs 0.24/MB in FY18 to Rs 0.11/MB in FY25. This may cause the price-point going to Rs 0.10/MB with operator looking to propose Rs 300 per 3GB (Current Rs 300 for 1GB), as per Bank of America Merrill Lynch said in a recent report.

Before Jio can entirely adopt the data-based voice service, its venture with R.Com and probable spectrum trading and sharing deals will help with a back-up customary voice network, the costs for which the company will soak up for up to 18 months. In the meantime, the first stage of telecom consolidation seems to have already started with R.Com announcing a planned merger with Aircel, a merger that will take a powerful 4th place after Idea Cellular.

Telecom Industry experts say that declining prices may not mean lower monthly bills; customers may step up consumption of image and video sharing/streaming.

It has happened in the past years. In 2002, Reliance offered bundled phone instruments, with free incoming calls and lowered calling rates to half. Competitors matched the offer, pushing the industry into an nuance point; India became the fastest growing telecom market for seven years. The industry situation is different this time around with well
well-established incumbents and deep mobile penetration, especially in urban areas as well as in rural areas after entry of Jio.
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