CHAPTER V

Telecommunication Services Market in Kerala: A Case Study

The first attempt to open up the telecommunication services market in India is found in the partial corporatization of DoT geographically (MTNL for Mumbai and Delhi) and product wise (VSNL for international calls) in 1986. Rest of the telecommunication services sector was vested with the Government under DoT. DoT continued to undertake policy formulation, implementation, framing of rules and regulations and providing telecommunication services and at the same time played the role of licensor in spite of conflict of interest. During the same time Uruguay Round of WTO progressed and ITU discussion of telecommunication for development and missing link of underdeveloped /developing countries intensified. While the Uruguay Round negotiations were in progress, India took its 'U' turn in its Economic policy (from Mixed Economy to liberalization) under the strings of World Bank and IMF. Economic liberalization, the developing social realities of the country and the need of the government to prove before the international community of its intention to take off the country in the path of liberalization, required the government to 'progressively liberalize' the telecommunication services sector. Progressive liberalization of service sectors including telecommunication was the aim of GATS and its protocol on telecommunication. Government of India undertook several measures including bringing private sector operators and permitting increased levels of competition in the sector. Thus, the market structure underwent changes from pure governmental monopoly to open competition with no cap on the number of operators in a service area. Government completely withdrew from service provisioning, set up a regulatory body and an appellate tribunal, and introduced other forms of telecommunication like pager, technology that includes wireless/mobile - GSM/CDMA- and various Value Added Services.

In this Chapter, an attempt is made to analyze the changes that took place in the telecommunication services sector and the effect of such changes, taking Kerala Telecommunication Services Circle as a case study. Kerala is chosen as a true representative of telecom market in India for several reasons.

1. Urbanization and formation of Urban Agglomerations are faster in Kerala. It underwent the highest level of urbanization during 2001-2011 with an increase of 83.82 percent above the previous decade. As per the 2001 census, Kerala was placed in the 19th rank in the level of urbanization among the Indian states. The state was ranked 9th, as per date of census 2011. Over concentration of population in the existing cities, especially in metropolitan cities, generally leads to increase in the rate of urban population. But, for Kerala, the main reason for the growth of urban population density is the increase in the number of urban areas and also the increased urbanization of the outskirts of the existing major urban centers. More people in Tamil Nadu have moved from rural to urban areas the last 10 years compared to other Indian states, as per the 2011 census data. Tamil Nadu comes on top of the list of urbanized Indian states as 48.45 percent of its population live in urban areas, followed by Kerala, Maharashtra and Gujarat.

2. Teledensity in Kerala was always higher than most other Indian states. Kerala has also a higher population density compared to many other states. Top 5 Highest Tele-Density States in India in 2013 as Updated on June 15, 2014 by TRAI with data as on 30th September, 2013 is given below:

S.No.	**State in India**	**Tele-Density**
(1)	Delhi	220.10
(2)	Tamil Nadu	108.75
(3)	Himachal Pradesh	105.90
(4)	Punjab	104.52
(5)	Kerala	96.43

3. Considering the topographical peculiarities, Kerala has a diversified topography with coastal region, hilly tracts and midlands, forests and riverside territories. Further, all these areas are inhabited and population density is higher.

4. The Kerala society is prone to high consumption attitude (luxury oriented life) and ready to accept new products / services for improving the conveniences of life. It is a well known fact that Kerala is chosen as the test market for many products because of its inclination to imitate life styles of developed economies and adopt products & services even as its novelty prevails. For instance, Kerala was chosen by Vodafone India to roll out its 4G services in 2015 along with Delhi, Mumbai, Bengaluru , and Kolkata in the first lap of the roll-out of 4G connectivity.

5. Often, the living standard of the people of Kerala is compared with that of the developed western countries. The HDI (Human Development Index) is higher for the Kerala society[1]. Most of the parameters considered for measuring the living standards of the people show higher values for the State. Better Education facilities and the General Social Acceptance of the need for education, Per capita expenditure on education, Per Capita Income, Health facilities, higher literacy level, Lower death rate, Lower infant mortality rate, Lower maternal mortality rate, and Land reforms etc. show better prospects of the state of Kerala and the reasons for the higher rating in the Human Development Index (HDI). The Kerala society is significant for the study for these reasons. The Per Capita Income of the people of Kerala is higher compared to other Indian states when remittance money is also taken into account. The Per Capita Expenditure for securing comforts for life stands higher for the State.

Kerala: History, Geography and Population

Kerala state in its present status was formed under the Linguistic Reorganization Act1956, where language was considered as the basis for determining the

political extent of a state in the Federal System of governance in India. Kerala State was formed out of the erstwhile princely states of Travancore and Cochin States and the Malabar region of the erstwhile Madras Presidency and Kasargod taluk of the South Canara District of the former Mysore State where most of the population spoke Malayalam.

Kerala telecommunication circle is 38904 Sq.Km[2] in geographical area. Its unique geographical position and peculiar physical features have endowed a distinct individuality to Kerala. It is located at the south western tip of the Indian Peninsula and it is situated between 8' to 12' North and 74.82' to 77.24' east. The geographical territory constituting Kerala is a narrow strip of land engulfed in the Western Ghats in the east and the Arabian Sea in the west. It has a lengthy coastal line of about 580KMs while the width of the state varies from a minimum of 11 km to a maximum of 121 KM. The diversified topography of the State, with three main natural regions forms parallel belts running across the entire length of the State. They are the high land, midland and lowland regions.

Population of Kerala is about 33.38 million as per the Census 2011. Its population density[3] is 859. The demographic distribution of the population of Kerala also shows features of a developed society. The social development achieved by the people of Kerala is acclaimed great.

Telecommunication in Kerala

Kerala[4] had its first telegraph offices at Thiruvananthapuram, Kollam and Alappuzha in 1864. Telegraph came to Kerala immediately after it was introduced in other parts of the country in 1851. All these three prime locations were under the princely state of Travancore. Almost all the District Head Quarters in Travancore and Cochin states and the Malabar District of the erstwhile Madras Presidency had Post and Telegraph offices, by 1947. In the era of the electrical telegraph, post offices, railway stations, important governmental centers (ministries), stock exchanges, very few nationally distributed

newspapers, larger internationally famous corporations and affluent individuals were the principal users of such telegraphs[5].

Kerala had its first voice communication in 1923, from Cochin, with a 100 line Manual exchange [6] installed at Mattancherry [7], followed by Calicut. The foreigners (especially the Portuguese and the British) landed in India through the sea route, established a strong market place in Mattancherry and later developed as the business hub for tea and spices. Thiruvananthapuram had a 10-line magneto telephone exchange[8] in 1930 and was managed by Travancore State Electricity Department. By 1947, the State had 2500 telephones. By 1950, new Auto Exchanges were installed in Kottayam, Kollam and Alappuzha. In 1950-51, the Travancore Telephone System was integrated with the Indian Post and telegraph department.

In 1974, Kerala telecommunications was detached from the postal department and a Kerala Telecommunications Circle was formed with Head Quarters at Thiruvananthapuram. Kerala Telecommunications circle which had been first formed as a combined Postal and Telecom Circle in 1961, provided services to a population of 31 millions in Kerala, the Union territory of Lakshadweep islands[9] and parts of Pondicherry[10]. The Circle comprises 11 Major secondary switching areas, and 1 Minor Secondary Switching Area in Lakshadweep. Thereafter, number of exchanges increased gradually and automation[11] was also effected. Initially the exchanges were heavily manned and calls were to be manually connected. Each attempt to make a call might take even more than 15 minutes for just getting connected, even if attempted forthwith. No call could be established without operator assistance[12]. From such a scenario, modernization[13] moved to such an extent that a subscriber could directly make even an international call and establish the call, within seconds, through the central office [14].Kerala Telecommunications shows it had an impressive record of growth and modernization, especially in recent years.

Teledensity in Kerala: Growth of Telephone Exchanges – Capacity and Working connections

A telephone exchange is a telephone system located at service centers responsible for a specified geographic area providing the switching or interconnection of two or more individual subscriber lines for calls made between them, instead of requiring several direct lines between subscriber points. In 1947, there were only about 2500 telephones in Kerala and there was not even one telephone exchange in each district headquarters. Burden of bulky infrastructure was done away with the help of exchanges. But, the earlier exchanges could help only the local customers call each other directly. Persons living under two exchanges in a state could connect to each other only with operator assistance. Various operators had to assist in coordination for realizing a single call, if the call had to go to a long distance like Kochi – Kolkota. And such situations could take even more than 15 minutes to get connected to each other. In India, the public switched telephone networks (PSTN) and the overseas communication links were under the monopoly control of the government. These were run by a government department and its employees enjoyed the status of government servants. Being a government department, its budget was part of the annual Government budget, unlike having a separate budget for the railways, resulting in low investment and poor service in the telecommunication services sector. In 1982 there was a waiting time of over 2 years to get a land line telephone connection and the waiting time was increasing year by year reaching to almost ten years in 1990s. Even though, the rest of the world showed rapid improvement in providing inexpensive communication facilities, the telecommunication service infrastructure in India remained primitive (Rajaraman, 2012)'. This was true of the state of affairs in Kerala as well. From such state of affairs, the telecommunication scenario of Kerala improved rapidly by increasing the number of exchanges and by automating the exchanges. Further, connectivity between and among the exchanges was ensured through optical fiber cables. Kerala was far ahead of several states and many firsts were there to the credit of Kerala. It became the first state in the country to fully automate all telephone exchanges in the circle[15]. It was

the first state in India to link all the exchanges through STD[16] facility. Kerala was the first state in India to provide public telephone facilities in every Panchayat Head Quarter in the state. Further, it was the first state to provide public telephones in every village. Kerala Telecommunications has a well equipped and large network with modern digital switches[17] linked through reliable and high capacity optical fibre media (OFC). In nineties, Kerala had a telephone exchange at every 6.8 km distance. All district headquarters of the state got connected to the capital city of the state by STD facility. Kerala was the first state to achieve this. Teledensity in Kerala then reached4.5 per sq.km as against 1.05 per sq.km for the country as a whole[18].

Table 5.1

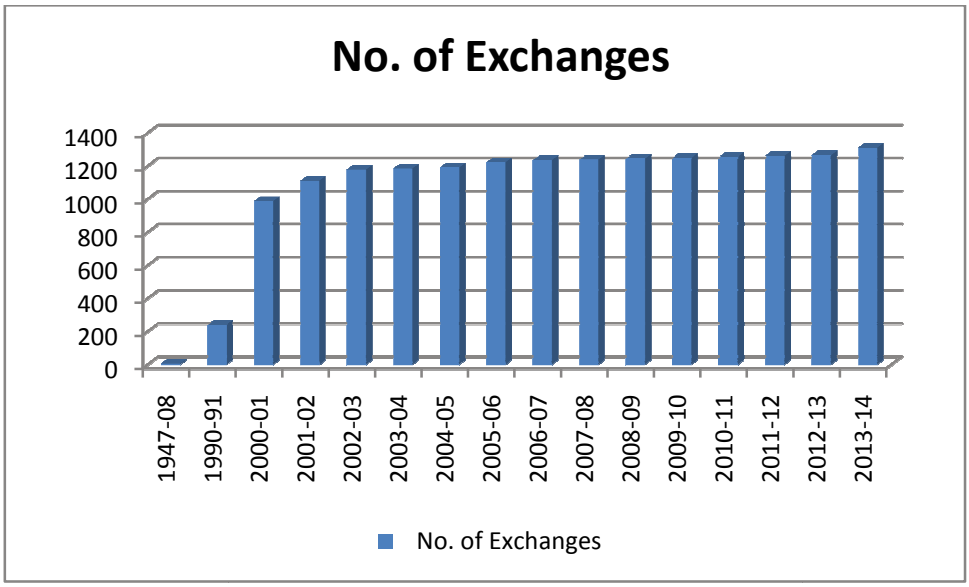
Growth of Exchanges and Line Capacity in Kerala

Year	Exchanges	Capacity
1947-08	7	2500
1990-91	241	412315
2000-01	988	2690584
2001-02	1112	3455000
2002-03	1179	3653413
2003-04	1185	3994584
2004-05	1192	4407520
2005-06	1223	4700880
2006-07	1237	6063725
2007-08	1240	6078431
2008-09	1246	6132352
2009-10	1251	6156960
2010-11	1255	6176648
2011-12	1262	6211100
2012-13	1266	6230787
2013-14	1312	6457182

Source: DoT Reports, Kerala Telecommunications

At the time of independence, there were less than 10 exchanges. By 2014 more than 1300 exchanges existed in this small territory of 38904 square kilometer. Expansion of telecommunication network was possible only through increasing the number of exchanges in the state, by interconnecting the exchanges and by modernizing the equipments. In 1990-91, at the time of New Economic Policy there were only 241 exchanges and in 2000-01 it became 988, showing an increase of 747 exchanges during the decade. It may be noted that on independence there were only 7 exchanges and it took more than four decades for the number to reach 241. After the introduction of the New Economic Policy in 1991 and the declaration of NTP 1994, there was a massive effort on the part of the DoT to clear the demand for telephone connections (waiting list), resulting in 310 per cent increase in the number exchanges. Capacity increase during the same period was from 412315 to 2690584 showing an increase of 2278269 new lines, an increase of 552.56 per cent. Following graph shows the increase in the number of exchanges in Kerala.

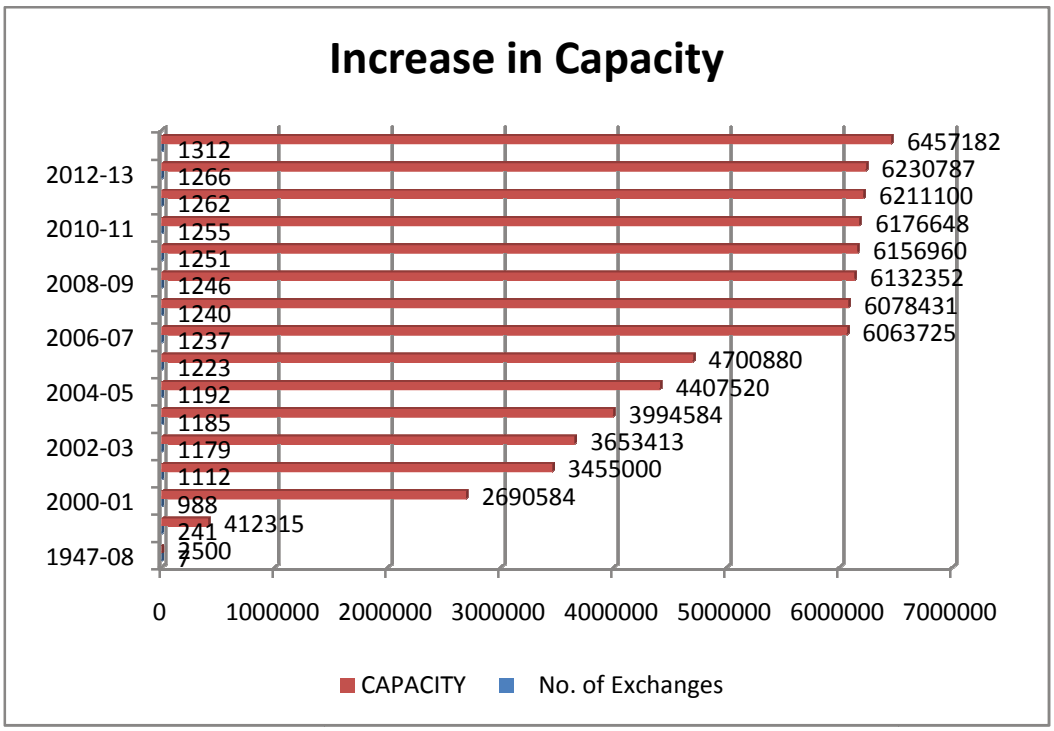
Figure 5.1



Source: Compiled

In the year 2000-01 there were only 988 exchanges and network capacity was 2690584 connections. It increased by 33 percent and the number of exchanges came to 1312 by the year 2013-14. The capacity addition was dramatic over the same period. It was 2690584 in the year 2000-01 but reached 6457182 achieving an increase by 140 percent. Thus, 33 percent increase in the number exchanges resulted in 140 per cent capacity addition, as a direct result of telecommunication automation and modernization. A graphical presentation given below brings out the relation between number of exchanges and capacity available.

Figure 5.2



Source: Compiled

Population Density and Availability of Telephone Capacity

The table given below is a decadal population table for comparison with the increase in exchange capacity[19] (telecommunication network capacity) during the same period. It can be seen that the network expansion was very fast and was even greater than 300 per cent on certain occasions. For the period up to 1991 population changed from 13549000 to 29099000, showing an increase of about 115 per cent whereas increase in the density of population was 135 per cent. During the same period the telecommunication network capacity was expanded to 412315 from a mere 8000, an increase of 5054 percent. Thereafter, the network expansion was phenomenal and it reached 6176648 in the year 2011. Still the demand for telecommunication facility was greater in Kerala for several reasons and the DoT could not adequately provide the same. Provision of telecommunication facility required that the subscriber premises should be connected to the nearest exchange and that adequate maintenance be provided in time so as to keep the subscriber equipment alive. With the budgetary allocations and the mindset of the DoT and its establishment, the telecom needs of the people remained unsatisfied.

Table 5.2

Comparison of Population Density and Availability of Telephone Capacity

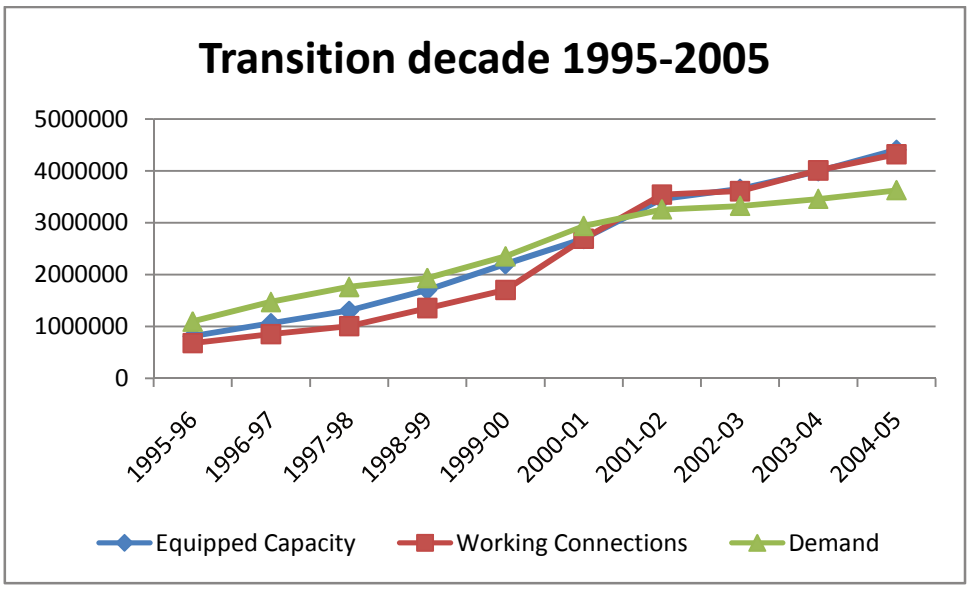
Year	Population(000's)	Density	Capacity (No. of lines)
1951	13549	348.6349484	8000
1961	16904	434.9638474	24000
1971	21347	549.2885264	49000
1981	25454	654.9674498	209823
1991	29099	748.7584592	412315
2001	31841	819.3141001	2690584
2011	33387	859.0947688	6176648

Sources: Census of India, various years, Office of the Registrar General andCensus Commissioner India, DoT Report on Analysis of telecom growth, Economic Survey 2012-13

Growth of Switching Capacity[20] and Telecom Expansion in Kerala

There has been a dramatic growth in the network capacity of DoT/BSNL in Kerala during the past few decades. Between 1971 and 2002, the capacity grew by more than 600 per cent: from 49000 in 1971 to 3445000 in 2002. The demand for connections has also been increasing at a very high rate and the only landline operator DoT[21]/ BSNL could not keep pace with the ever growing demand.

Figure 5.3



Source: Compiled

The chart shows the telecommunication scenario in Keraladuring the transition decade of 1995 -2005. It was a transition phase, during which the telecommunication services moved to duopoly status and thereafter to oligopoly. From the situation where only land phone services of DoT/BSNL were available, Mobile services by BPL and Escotel brought a new substitute product to the market. And later the PSU operator – BSNL – was allowed to enter the mobile services. Thus, the telecommunication services market became an oligopoly market in Kerala. The data relates to the mainstream communication mode of landline technology prevalent then. The chart clearly depicts that

demand was higher in all these years. In 2001, working connections exceeded the equipped capacity. Department experts, during an interview pointed out that it was provided so on the basic assumption of allocation/sharing of resources[22] that all subscribers are not using the telephone at the same time. If it had happened at some point of time the exchanges would have remained unable to resolve the situation, until all the unmet demand for connectivity was killed. The transition decade chart is significant on various counts. There are three variables – available capacity (possible number of lines), working connections (issued to applicants), and demand for a connection. It can be seen that in the initial years of analysis, equipped capacity remained unutilized even though there was demand. Further, in 2000-01, the year of corporatization of DoT to BSNL and in the next year, the number of lines given has exceeded capacity. Hence, a slow pace of activity generally spoken of about government departments can be seen. Even after corporatization the trend seems mixed. At no point of time, adequate capacity is available to meet the demand for connectivity. Therefore, it can be understood that the monopoly government structure of the telecom service arm and inadequacy of funding led to the retardation of telecom infrastructure in the country and it was inadequate to cater to the needs of the people.

With the entry of BSNL to the mobile telecom services market of Kerala by the end of 2002, market forces in Kerala telecom started concentrating on the mobile segment. Besides, demand for land phone connections drastically came down. Thus, it was the mobile segment that drove up the telecom aspirations and teledensity figures of the country as a whole and Kerala in special. This decade is significant for the Kerala telecommunication services market as the introduction of new services like Pagers[23], CDMA WLL (F), CDMA WLL (M), GSM mobile and FWP (GSM) etc. took place during this period. Further, entry of new players in the market also took place during this phase and thus the monopoly characteristics of the Kerala telecommunications services market were forgone.

From 2003-04 onwards, the growth rate of telephones in Kerala increased quite rapidly. Of the 20,55,000 connections planned during 2005-06, rural target was

3,37,500 connections and the rest for urban areas. In 2005-06 Reliance Communications came out with its Basic Services in Kerala and in 2006-07 Bharti and TTL came to Basic Services in the state, even though their contributions were not that significant in the basic services scenario. The presence of other operators in private sector in the basic services scenario is significant to show the shift in the market structure from pure monopoly of DoT/BSNL to Duopoly and to Oligopoly in Landline services.

Table 5.3

Decadal increase in Capacity

Year	Capacity	Capacity Addition/Decade
1947-08	2500	-
1990-91	412315	409815*
2000-01	2690584	2278269
2001-02	3455000	-
2002-03	3653413	-
2003-04	3994584	-
2004-05	4407520	-
2005-06	4700880	-
2006-07	6063725	-
2007-08	6078431	-
2008-09	6132352	-
2009-10	6156960	-
2010-11	6176648	3486064
2011-12	6211100	-
2012-13	6230787	-
2013-14	6457182	-

Source: Compiled from DoT Annual Reports, DoT Records on Kerala Telecommunications

*More than four decades.

After independence, taking more than four decades, capacity was increased to 4,12,315 lines, ie. 163.93 times of the base year. It was average annual increase of 10245 lines only. Thereafter, it was faster and in a decade, the lines increased to 26,90,584 in the year 2000-01. During this decade, the average annual increase in capacity was 2,27,827 lines. In the next decade, capacity addition reached to 6176648 lines, by the year 2010-11. Here, the average annual increase in lines was 3,48,606. Growth in capacity was accelerated from the time of the New Economic Policy and further increased during the Telecom Liberalization (See Table 5.3).

Table 5.4

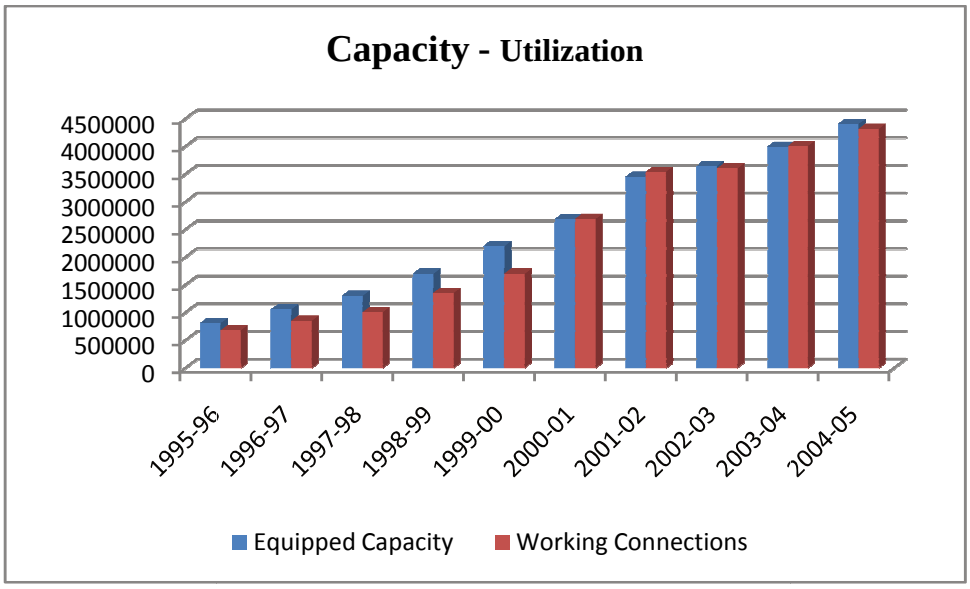
Telecom Penetration as Percentage of Capacity of Wire Line

Year	Equipped Capacity	Working Connections	% achieved
1995-96	812371	681234	83.8575
1996-97	1062198	854009	80.40017
1997-98	1305098	1008419	77.26768
1998-99	1704395	1355084	79.50528
1999-00	2203954	1705139	77.36727
2000-01	2690584	2694156	100.1328
2001-02	3455000	3542460	102.5314
2002-03	3653413	3608424	98.76858
2003-04	3994584	4010326	100.3941
2004-05	4407520	4320285	98.02077

Sources: Directory of Telecom Services 2002, Kerala Telecommunications, Annual Reports of DoT/TRAI.

The table reveals that capacity utilization was not effectively being done until 2000-01, the year of corporatization of DoT to BSNL. As already seen in Chapter 2 & 3 corporatization of DoT by itself was the result of international agreements. Thereafter, capacity utilization went above cent percent and was swung back to less than 100 percent but remained near to total. It was the transition decade, where people started moving to mobile communication, ensuring them teleaccess anytime. During the past years, people were waiting for a telephone connection. But, the waiting list became bulkier, year by year. The sole service entity i.e. DoT felt the need for accelerating the process of providing wire line connections and also to add capacity faster (i.e the spirit of competition with the new mobile technology) during this decade. Thus, here again with NEP and NTP, better capacity utilization is found. Figure 5.4 gives a better picture. As mobile technology gradually takes over the market, the land phone segment readies itself for competition by capacity addition and utilization. It can be considered as an internal competition arising from the dilemma on accepting a sunrise technology against an existing technology. Unlike in the past, the corporatized new entity i.e BSNL goes to the extent of providing more connections than the capacity available, based on the practical thought of 'all phones are not used all the time'. It marked a positive shift in the mindset of the organization. Still during this transition decade, it is seen that the new communication technology which offered mobility became the accepted product of the masses when compared to the wired technology. This aspect is discussed separately.

Figure 5.4



Source: Compiled

The teledensity of Kerala in comparison with that in other states is increasing at higher rates. However, it is increasing at lower rates in rural areas than in urban areas. The rate of growth in Kerala began to leap particularly since 2000 as mobile communication started penetrating the mindset of the people.

Kerala has one of the highest proportions of telephone connections in both rural and urban areas among all the states in India. While national average of telephone connections was 29 per cent (as on 31.12.2004); Kerala's average was as high as 59 per cent. This is due to various reasons. 'The State has now 52.30 percent rural population in 2011 Census as against 74.04 per cent in 2001 Census. The unprecedented growth in urban[24] population during the decade 2001-2011(92.72 %) could be attributed squarely to the manifold increase in number of towns from 159 to 520, in the state during the period spanning from 2001 to 2011. 47.72% of the total population of Kerala are from Urban.[25] As per 2011 Population Figures, Rural[26] Population in Kerala is 17, 455, 506, whereas urban population in this state is 15,932,171. The urban population has grown by 92.72% during the 2001-2011 decade[27].

The entire state depicts a picture of rural-urban continuum except for a few panchayats in hilly regions[28]. Therefore, Kerala is subject to increasing urbanization. This is shown by the fact of increasing number of Urban Agglomerations (UA)[29] in the State. As per the 2011 census, there are 19 Urban Agglomerations in Kerala. The Census estimation of rural population is arrived at by deducting the urban population from the total population. Increased urbanization of Kerala naturally brings down the rural population. As of 30 June 2005, the teledensity (number of telephones per 100 populations) of Kerala was 19.5, a very high level as compared to the national average of national 9.37. Only Panjab and Metropolitan cities have higher teledensity than Kerala. The rural teledensity of Kerala was 9.74 whereas the corresponding national average is 1.74. Urban teledensity of Kerala was as high as 47.61.

Even at this stage, it has to be stated that measure of teledensity does not properly depict a reliable picture. Because a telephone connection, whether land or mobile could be given to a person above 18 years of age, as this is the contracting age allowed as per the law of contract. Even as there was a massive drive in Kerala among the competing telecom firms to enroll the young student population to their network, it could be done only through the legal guardian. Thus, population statistics gives the number of persons living irrespective of their age and telepopulation[30] is only a part of the total population. Therefore, in the given circumstances, measure of teledensity is only a statistical approximation helping to reach certain conclusions, which may not be fully reliable. Teledensity as a statistical measure can be used as an indicator only and only with caution. Therefore, following table is presented for analysis where number of phones per square km is estimated.

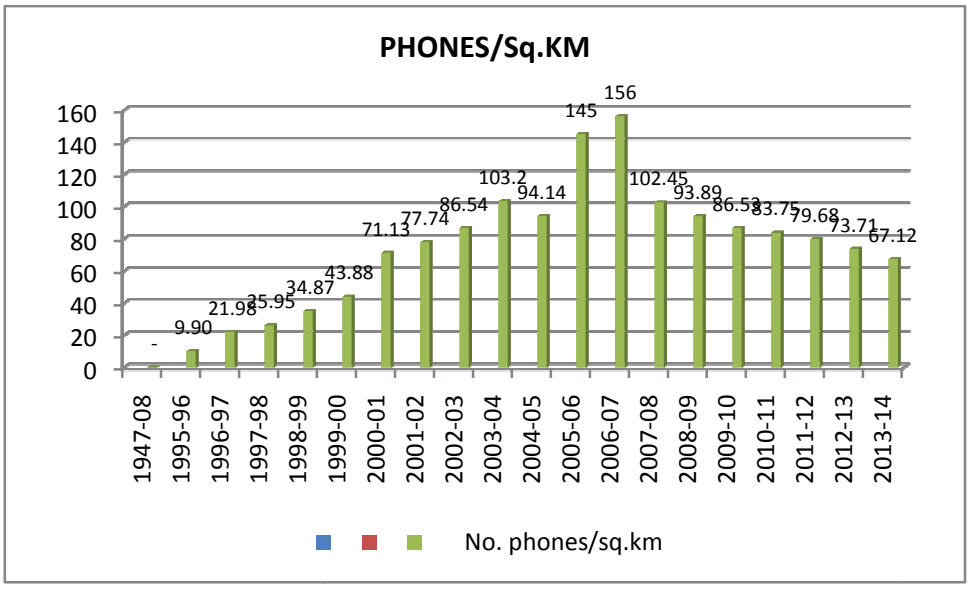
Table 5.5

Number of Telephones per Square Kilometer: Kerala

Year	Capacity	Working connections	No. phones/sq.km
1947-08	2500	2500	-
1995-96	812371	681234	9.9
1996-97	1062198	854009	21.98
1997-98	1305098	1008419	25.95
1998-99	1704395	1355084	34.87
1999-00	2203954	1705139	43.88
2000-01	2690584	2694156	71.13
2001-02	3455000	3542460	77.74
2002-03	3653413	3595460	86.54
2003-04	3994584	4010326	103.2
2004-05	4407520	3658242	94.14
2005-06	4700880	3890000	145
2006-07	6063725	4036000	156
2007-08	6078431	3981256	102.45
2008-09	6132352	3648785	93.89
2009-10	6156960	3362846	86.53
2010-11	6176648	3254691	83.75
2011-12	6211100	3096479	79.68
2012-13	6230787	2864423	73.71
2013-14	6457182	2608162	67.12

Source: Compiled from data obtained from DoT Reports and Kerala Telecommunications

Figure 5.5



Source: Compiled

The above chart shows number telephones per square kilometer. It is different from teledensity. For the calculation of teledensity either the number of households or population[31] of a territory is considered. In the above chart, the available number of telephones in a square kilometer is estimated. At the time of NTP 1994 it was below 10 per square km. Thereafter, with private participation and accelerated working of the incumbent operator (DoT/BSNL), the number increased rapidly and reached its peak at 156 during 2006-07.

It was at this time that availability of mobile handset became cheaper as the Central Government reduced the Customs Duty on import of handsets, reduced the Central Excise Duty on manufacture of handsets in India and withdrew the 'One by Six Scheme[32]' of the Income Tax Act, 1961. After the sharp increase in the number of land phones up to 2006-07, it started declining and now it has reached 67.12 per square km as people started abandoning land phones as liberalization offered cheaper and convenient mobile connections. During 2005-06 to 2007-08, the number of phones per

sq. km reached the maximum. It shows a capacity utilization of above 100 per cent. Thereafter, it comes down, and it reached 67.12 in 2013-14. This is due to various reasons. Expansion of mobile telecommunication made landline a redundant facility to a great extent. Increase in tariff of landline and reduction in tariff of mobile added momentum to the decline of landline. Higher operational costs and lower income made the operator to reduce the weightage given to landline. Thus, it can be seen that the presence of landline is declining from the telecommunication scenario of the state.

Telecommunication Market Structure in Kerala: The Transition

DoT was the only service provider and wire line was the only technology in use for voice communication, in Kerala, until the initiation of liberalization. A change in the market structure occurred in 1986 with the formation of VSNL for international calls, but the change did not make any impact on the market or the subscribers in Kerala and merely ended with an accounting rate settlement between DoT and VSNL due to VSNL carrying the international calls from Kerala to outside India and to Kerala from outside India. The NEP 1991 started the spade work for the liberalization and a concrete policy solely for the telecommunication sector was framed as NTP 1994. Through NTP 1994, the Government of India acknowledged that the Department of Telecommunication alone was unable to cater to the telecommunication needs of the people of the country and introduction of private players in the field with new services, the demand for telecommunication facility continued to grow stronger.

In India, the Industrial Policy was based on the IPR 1956, where the Government and the PSU were assigned ‘commanding heights’ and the role of private players were expected to be minimum in the development spectrum of the economy of the country. A separate policy declaration through NTP 1994 was done whereby goals were set by the government in such a way as to improve the telecom connectivity in India through private participation and introduction of new technologies. How this shift in policy impacted the Kerala

telecommunication is discussed in detail in this chapter. NTP 1994 marked a radical shift in the industrial policy of the country. After the initiation of liberalization of the economy especially with NEP 1991, telecom sector was singled out and a separate policy was declared for the first time. It was in the same lines as the GATS and its special protocol on telecommunication which stood for the progressive liberalization of the services sector.

Change in the Kerala Telecommunication Services Market Structure and NTP 1994

With NTP 1994, the Central Government decided to allow private operators to provide mobile communication services under the category of Value Added Services. In Kerala, from the inception of telecommunication services there was only the Governing Authorities – before independence, the authorities under the respective regional Kings and after independence the DoT - providing telecommunication services.

Table 5.6

Telecommunication Services Sector in Kerala up to 1997

Only Landline services & Telegraphy	–	**Only One operator**
(a) Local call service (BTS)		(a), (b) & (c) – only DoT
(b) National Long Distance (NLD)		(d) – only VSNL
(c) Telegraphy		
(d) International Long Distance (ILD)		

During those days Telegraph services and later the wire line telephone services were provided. The policy of liberalization (NEP 1991), NTP 1994, NTP 1999 and consequent decisions etc. brought a U-Turn in the history of telecommunication market, market structure and telecommunication services of the country. These changes led to the introduction of new services including Value Added Services, corporatization of the service arm of DoT to BSNL as a Central PSU and invoking the licensing authority of the Central Government for granting licenses to private companies (Indian and

Foreign) to provide telecommunication services and thereby to bring competition in the changed market structure. All these changes caused introduction of new technologies like CDMA and GSM for providing telecommunication services and data services – Broadband and upgraded GSM services – became popular.

Growth of Mobile Communication in Kerala

Geographically, Kerala is divided into three distinct climatic regions. They are the eastern highlands, the western lowlands (i.e. coastal plains) and the central midlands. The topography of the State also favored introduction of mobile communication. As already seen capacity addition and demand for telecommunication services were growing disproportionately in Kerala. The teledensity of the State was poor even though Kerala is hailed as the Rank No.1 state for Human Development Index[33] (HDI). Mobile communication came as a boon to the inhabitants of the State as a reliable form of communication, cheaper and more convenient.

Table 5.7

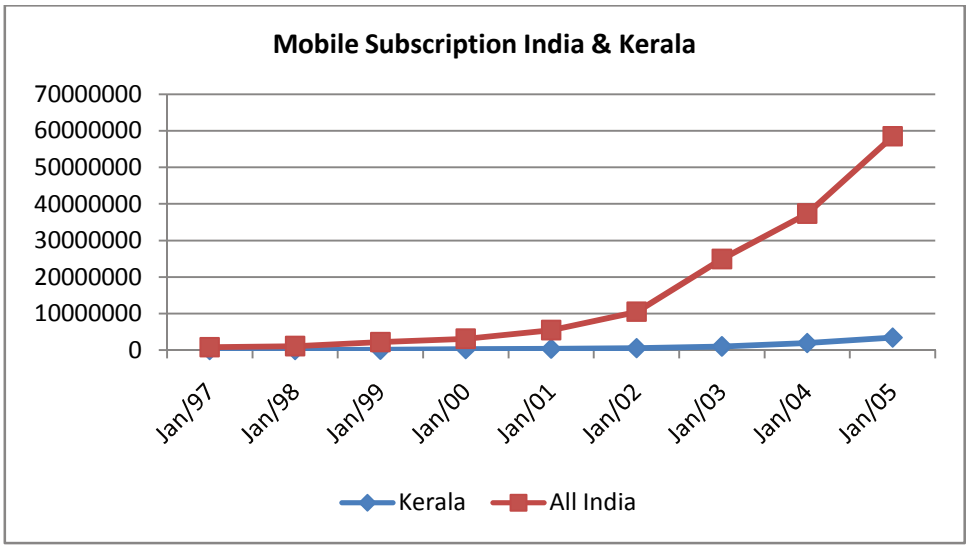
Number of Mobile Phone Subscribers

Year	Kerala	All India	Percentage
Dec-97	15197	794232	1.913420764
Dec-98	39712	1070603	3.709311481
Dec-99	80781	2197288	3.67639563
Dec-00	247617	3107449	7.968497633
Dec-01	348861	5478932	6.367317572
Dec-02	531464	10480430	5.071013308
Dec-03	1023096	24931697	4.103595515
Dec-04	1918180	37378807	5.131731465
Dec-05	3434537	58510000	5.870000000

Source: Cellular Operators Association of India (COAI), Various Reports

Kerala is 1.23 percent of the territory of India. But it has more than 2.76 per cent of the population of the country. Its population density per sq. km is above 859, whereas the same for the country as a whole is 382 only per sq.km as per the 2011 census. The above table shows the percentage of mobile phone subscribers in Kerala. By the end of the year 2005, there were almost 6 percent of the total mobile subscribers in Kerala, even though the territory comes to 1.23 per cent only. During the year 2000, the share of Kerala mobile subscribers had reached near 8 percent. At that time the Public Sector Companies (BSNL/MTNL) had not begun providing mobile service as the third operator. It was in 2002 that BSNL rolled out its mobile service in Kerala. Before the entry of BSNL in the mobile segment, the mobile segment was a duopoly market with only two private operators[34]. It shows that even in those initial days of mobile services, the private operators could make their way into the Kerala market in a greater way because DoT was unable to satisfy the telecom needs of the people.

Figure 5.6



Source: Compiled

Duopoly Mobile Communication Market in Kerala

The first license[35] in Kerala Telecommunication Market was received by Escotel Mobile Communications Limited, a joint venture between Escorts Limited, a leading industrial house in India, and the Hong Kong based First Pacific Company Limited. Escotel rolled out its mobile communication services in April 1997. Escotel obtained licenses in Uttar Pradesh (West), Haryana and Kerala, Punjab, Rajasthan, UP (East) and Himachal for operating Mobile services. In 2004, Escotel Mobile Communications Limited was acquired by Idea Cellular Limited[36].

BPL Mobile Cellular Ltd. obtained licenses[37] to operate telecom licenses in Kerala in 1995. But the company could start providing services only in June 1997. BPL was operating in Maharashtra and Goa, Tamil Nadu and Pondicherry, Kerala and Mumbai. Hutchison Max (A joint venture established in 1992 between Hutchison Whampoa and MAX group) acquired BPL Mobile Cellular Services in all service areas except Mumbai in 2005[38]. France Telecom had earlier entered into a joint venture with BPL Mobile (renamed Loop Mobile in March 2009, and acquired by Airtel in 2014[39]), a competitor of Hutchinson Max in the Mumbai circle; but sold its entire 26% stake in the joint venture in December 2004.

Shift to Oligopoly – Entry of BSNL as Mobile Operator post NTP 1999

Kerala Mobile Services Market had two operators (duopoly mobile communications market) - both private operators as in other Circles in the country - till BSNL/MTNL, the two PSUs were given permission to roll out their mobile services[40]. Until NTP 1999, Indian Mobile segment was characterized by duopoly[41]. BSNL received license to operate mobile services in 2000 and started its mobile services[42] in Kerala. With the roll out of BSNL mobile services, the Kerala Mobile Services Market moved to Oligopoly. Competition increased in the communication sector of Kerala – internally and externally. The private mobile operators feared the strong infrastructure background of BSNL. Further, the employee unions/ associations in BSNL demanded revival of landline technology

and there was anti-propaganda within BSNL against popularizing Mobile communications and also against drawing staff for the new services from the existing pool of employees. It was in effect a resistance to change. The PSU kept the mobile network and administration separately and network expansion was done vigorously. It improved competition in the market and changes were reflected in tariff and various consumer offers.

Thereafter, Reliance Info-com Ltd[43] and Bharati Cellular Services Limited[44] were given licenses for the service area of Kerala. Tata Tele Services Limited started its Kerala operation with its True Value Hubs in 2005. Tata Docomo is Tata Teleservices Limited's telecom service on the GSM platform – formed from the strategic alliance of Tata Group with Japanese telecom major NTTDOCOMO in November 2008[45]. On 20 October 2011, the Tata Group brought all its teleservices – CDMA, GSM, Walky (Fixed Wireless Phone), Photon internet – under the Tata DOCOMO name. All subscribers to these services were migrated to the DoCoMo brand on 20 October 2011[46].

Among the private service providers, Reliance, Bharati and Tata are unified service providers, who are free to provide services which carry collection, carriage, transmission and delivery of voice and/or non voice messages using licensees network through circuit or packet switched equipment, within their respective area of operation. Also they provide Fixed (BTS) as well as wireless services in their service areas. Wireless services include Full Mobile, Limited Mobile and Fixed Wireless Services. The licensees also provide various Value Added services.

Thus, Kerala Mobile Services Market turned out to be a testing ground for many operators, even before the issue of January 2008 licenses to other private companies. During the Oligopoly regime there were six operators in Kerala providing mobile communication. The operators were the following: BPL Mobile Cellular Ltd (called as Hutch from 2005/2006, and Vodafone from 2007); Escotel Mobile Communications Limited (known as IDEA from 2004);

BSNL - the Public Sector operator; Reliance Infocom Ltd; Bharati Cellular Services Limited; Tata Tele Services Limited (Tata DOCOMO from 2011).

Oligopoly to Competition regime in Telecommunication services of Kerala

It was already seen in a previous chapter that with the recommendation of TRAI, the Government of India removed cap on the number of operators in a Circle. Besides, the eligibility criteria were diluted and the rule of First Come First Served (FCFS) was introduced for the grant of license. By 2012, there were 11 mobile operators providing services in Kerala, even though licenses were issued to more applicants[47]. Following table would give a clear picture:

Table 5.8

Competition Regime - Mobile Operators (GSM/CDMA) in Kerala

Sl.No	Licensed Operators	Subscriber Base as on 31 st May 2012
1	Idea Cellular (GSM)	75,40,664
2	BSNL (GSM)	72,62,335
3	Vodafone (GSM)	59,78,008
4	Reliance (CDMA+GSM)	56,02,243
5	BhartiAirtel (GSM)	38,93,000
6	Tata Docomo (CDMA+GSM)	24,06,801
7	Aircel (GSM)	18,52,675
8	Uninor (GSM)	7,42,113
9	MTS (CDMA)	6,11,582
10	Videocon (GSM)	1,50,651
11	Etisalat DB[48]– Cheers- Varkala&Paravoor only	(below 1000)
12	Datacom Solutions Pvt. Ltd*	-
13	Loop Telecom Private Ltd*	-
14	Aska Projects Ltd*	-
15	ShyamTelelink Limited*	-
16	Swan Telecom Pvt. Ltd*	-

(*Had not rolled out telecommunication services in Kerala and license was cancelled by the Supreme Court.)

Source: COAI, Report 2012

An oligopoly becomes a competitive regime when the numbers of players are increased. Further, the Government of India, in its policy regarding telecommunication services sector opted for competition regime by removing the cap on the maximum number of players in a circle. It offered spectrum to the applicants on First Come First Served (FCFS) method and eligibility criteria were relaxed. Thus, more players came to the market. Implementation of Mobile Number Portability (MNP) made the market more competitive in nature. Earlier, each service provider tried to attract new subscribers to their network. The subscribers were either non- users of mobile communication or they had to subscribe for a connection giving up the existing number or as an additional connection. But, with implementation of MNP feature to the telecommunication competitive market, the network operators could attract the subscribers without losing their mobile number. That is, the subscriber could leave his current network and join another network of his choice. This feature elevated the level of competition in the market, in more than one way, leading even to sale of subscribers as an asset by a company to another. Further, it facilitated entry and exit of service providers without affecting the connectivity of the subscribers.

Supreme Court Verdict brings back the telecommunication services market to Oligopoly

During the competition regime there were many telecom operators in Kerala. There were operators having subscribers even less than 1000.In Centre for Public Interest Litigation and Dr. Subramanian Swamy versus Union of India the Supreme Court cancelled 122 licenses issued by DoT after January 2008 pointing out procedural lapses in issuing licenses. It was a landmark judgment whereby the Supreme Court upheld the principles of rule of law and equity above business conveniences and considerations. As MNP feature already existed in India, the cancellation of licenses would not affect the subscribers from the point of view of connectivity. But, from the business/investment point of view, it was a shock. The telecom services

industry easily swung back to oligopoly market structure and consolidation process (M&A) became easier.

Currently Kerala has six operators in the mobile segment and five in the BTS segment. Further MTS (a company in the wireless segment) operates mainly for providing wireless data. It is a rare situation where judicial intervention has directly impacted the market structure of an industry.

Effect of Liberalization on Telecommunication Pricing

Pricing is an important function of market structure. As already seen, a monopolist would charge a price of his choice as the market is unable to access the product/service from any other source. In telecommunication, with the introduction of competition, the operators started innovatively price their service. The product/service in telecommunication service industry is in fact unit of time accessing the network for communication. The unit of time is called a pulse. The tariff per pulse of use of network is the charge/price to be paid by the customer. Pricing became a marketing tool for customer acquisition.

Pricing Telephone Calls - Land Phone Services

During 1994, at the time of declaration of NTP, the land line reference tariff of DoT for urban area was as follows: Pricing policy for the landline in Kerala was in consonance with the all India tariff of DoT for its services.

Rent for a Bi-month period – Rs 500, the subscriber would get 500 free calls[49] to land phones in the SSA. For each call above 500 calls would be charged Re. 1 per call for number of calls up to thousand and thereafter Rs.1.20 per call. Thus, a high caller is in fact penalized for his calls. It was a kind of step up cost method[50] of charging calls.

Currently, for land line calls the charges are given below:

Rent for a Bi-month period – Rs. 280/-, the subscriber would get 140 free calls on net[51]. Thereafter, on net calls would be charged at Re.1 and off-net calls would be charged at Rs. 1.20. It shown in chart below:

Table 5.9

Price Comparison

Particulars	On introduction of NTP 1994	Currently prevailing rates
Bi-Monthly Rent	500/-	280/-
Free Calls	500	140*
Additional calls up to 1000	Re.1 per call	-
Additional calls above 1000	Rs.1.20 per call	-
Additional calls on net@	-	Re.1 per call
Additional calls off net#	-	Rs.1.20 per call

*Most often free calls are now restricted within network.

@On net call refers to calls ending within the same network.

#Off net call refers to calls ending in the network of another operator.

Source: Tariff comparison reports TRAI- Modified

In 1994, before NTP, a subscriber with 500 calls would make a payment of Rs. 500/- only for a bi-month period. The same customer would have to pay higher now. Because, Rent is Rs.280 for 140 free calls balance 360 calls would be charged at Re.1, if all calls are within BSNL network, which is not practically possible now. Effectively, the landline tariff has doubled, over these years. Because a customer could make 500 free calls bi-monthly for a payment of Rs.500/-. But now, the same customer can make 140 free calls only for a bi-monthly payment of Rs. 280/-.Other operator calls are charged at Rs. 1.20 which again increases telephone expenses of the subscriber.

So, it can be seen that effect of competition did not help a land line customer, from the tariff point. The operators could not bring it down substantially as the cost of setting up a subscriber line is estimated to be around Rs. 25000/- and the operational expenses are often higher and varying due to rain, flood, lightening etc apart from the normal expenses. Further, even though Basic Telephone Services were also opened for competition and operators like TATA, Bharthi, and Reliance came to the scenario, they did not come to wire line basic, instead they provided wireless basic services (with limited mobility). Therefore, competition in this segment was among the operators with similar technology. Even that competition could not help bring down the tariff as the initial setting up expenses were high and as there was a strong presence of DoT/ BSNL in the wire line segment. Further, people moved either for a wire line connection or for a GSM mobile connection. Therefore, pure land line services continue to be unaffected by competition, on tariff count.

Pricing Mobile calls

For a mobile subscriber, the initial tariff was very high due to the price skimming strategy of the operators at the time of introduction of mobile services. Further, until 2003, it was RPP in India – the call Receiving Party Paying (RPP) regime. RPP regime adversely affected the rapid growth of mobile services as subscribers picking up a call reaching his equipment were required to pay for availing the service. Shift to CPP - Calling Party Paying- regime was a boost to the growth of the sector.

The following comparative table would make the picture clear on mobile tariff. Until the establishment of TRAI in 1997, it was DoT decisions[52].

Table 5.10

Comparison of Change in Telecom Tariff 1994-1999-2004-2012

Tariffs	DoT ceiling on tariffs under National Telecom Policy, 1994 (in rupees)	TRAI ceilings on tariffs under the New Telecom Policy, 1999 (in rupees)	Industry average rates under the NTP,1999 (in rupees) March 2004	Industry average rates under the NTP,1999 (in rupees) Dec 2012
Call Rates (peak-time)	16.80 per minute	6.00 per minute	2.89 per minute	47 paise
Rental	156	600	195	-
Security	3000	-	-	-

Sources: http://cis-india.org/telecom/resources/licensing-framework-for-telecom (modified) andhttp://pib.nic.in/newsite/erelease.aspx?relid=96268

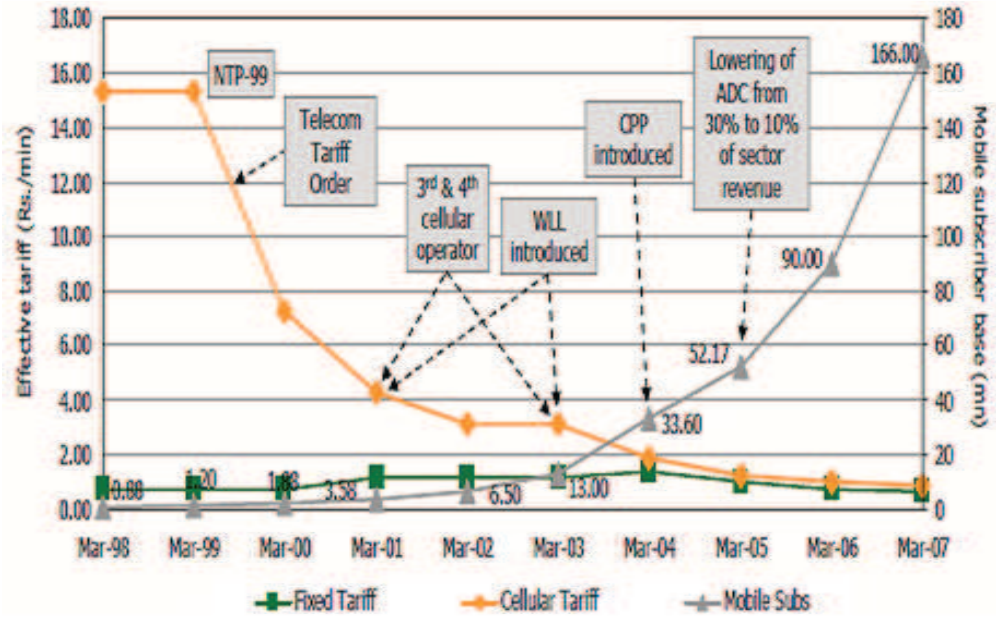
After the establishment of TRAI in 1997, TRAI regulated the tariff .Under the New Telecom Policy, 1999, it brought in several tariff related orders (RTO[53]s). It brought down the call tariff from the peak rate of 16.80 to Rs. 6 per minute with a pulse of 20 seconds. Thus, the consumers could make calls for a minimum of Rs. 2.00. TRAI placed a maximum ceiling of Rs. 600 on the rental charges. TRAI periodically examined the accounts of the service providers and ensured that under the 1999 licensing regime a healthy competition was developing and the service providers were offering mobiles services below the price ceilings of TRAI.

As the mobile telecommunication market moved from Duopoly to Oligopoly and thereafter to Competition, the operators started offering cheaper tariff to subscribers. Advertising the tariff rates became the most effective marketing strategy for the operators. Effective tariff came down drastically through various offers like full talk time, extra talk time, Special Tariff Vouchers (STVs)/ Rate cutters, time based offers like peak time call charges/off-peak call charges, changing pulse definitions and so on. Pulse definition was revolutionized when a new operator came with 1 paise / second plan. Thus,

even 1 paise(a monetary unit which was not a legal tender[54] in India) became important. Thereafter, the operators reduced the rates further, and the mobile call charges touched the low of 1paise/ per 2 seconds for local calls, .49 paise/ minite for STD calls and ISD rates varying according to the country but rates touching around Rs. 6.5 –Rs. 15 per minute. Even INMARSAT calls[55] came down to around Rs. 411.43/minute[56].

Figure 5.7

Telecom Tariff Chart – India/Kerala



Source: 'Indian Telecom Journey', Bigger than Any Bollywood Movie, Telecom India Daily

MNP feature [57] heated the telecommunication market further. Because operators started marketing their product/service to obtain converts, which had a double edge effect of reducing the market share of the other and increasing own market share. MNP feature enabled the customers to continue connected to the network of their choice with the same mobile number. Even if an operator stops services, the subscribers could switch to another network. Such seamless mobility added value to the mobile telecommunication and absence of these discounted the popularity of land phones.

Choice of Subscriber equipment has impacted popularity of mobile telecommunication. The initial handsets were bulkier and heavier and could use only for the purposes of making calls and messaging. Gradually, there came innovative handsets with bundled features of unimaginable facilities and conveniently portable, turning the handsets to a visible symbol of upward movement to the higher strata of the society. At the same time a person who needed to fulfill his basic need of communication could afford cheaper handsets which are also easily available in the market. Thus, a variety of handsets were available in the market in keeping with requirement and affordability of the subscribers. As for Kerala the handset market was vibrant. "The mobile applications space was also set to surge in the State, what with the handset mapping data available indicating that nearly 7,500 different models of handsets were being used by Keralites. Of these, the top six per cent or around 500 models were used by 90 per cent of the people[58]".

Market Expansion -From Wire line Communication to Wireless Communication

It took more than four decades for the capacity of wire line communication to reach 412315 lines (1990-91) in Kerala. In 1994, at the time of declaration of NTP, there were less than 10 telephones in Kerala per square kilometer. During the time of initiation of telecom service liberalization and introduction of mobile phones, annual additions to the number of phones was meager as can be seen from the table. NTP 1999 introduced DoT /MTNL to Mobile Services in their respective territories. This decision shook both the sectors – Wire line and mobile. Wire line sector, vigorously started adding to capacity and issuing telephones on demand. Table below depicts the speed with which mobile penetration was taking place in Kerala.

Table 5.11

Expansion of Mobile Connections

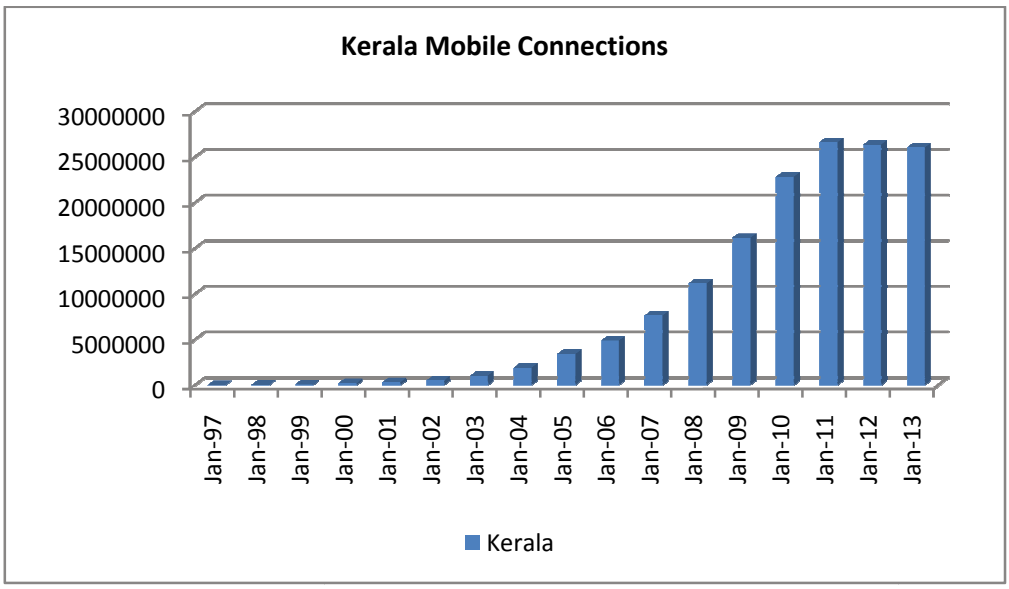
Year	Kerala	All India	Kerala Share	Annual Kerala Addition	Annual India Addition	Percentage Kerala Share in Annual Addition
Dec-97	15197	794232	1.913420764	15197	794232	1.913420764
Dec-98	39712	1070603	3.709311481	24515	276371	8.870322863
Dec-99	80781	2197288	3.67639563	41069	1126685	3.645118201
Dec-00	247617	3107449	7.968497633	166836	910161	18.33038331
Dec-01	348861	5478932	6.367317572	101244	2371483	4.269227315
Dec-02	531464	10480430	5.071013308	182603	5001498	3.650966171
Dec-03	1023096	24931697	4.103595515	491632	14451267	3.401999285
Dec-04	1918180	37378807	5.131731465	895084	12447110	7.191098978
Dec-05	3434537	58510000	5.87000000	1516357	21131193	7.175917611
Dec-06	4883223	105425183	4.631932202	1448686	46915183	3.087883085
Dec-07	7652577	172219135	4.44351146	2769354	66793952	4.146114906
Dec-08	11165324	258235642	4.323695952	3512747	86016507	4.083805682
Dec-09	16142394	380447562	4.243001037	4977070	122211920	4.072491456
Dec-10	22834949	542967008	4.205586834	6692555	162519446	4.118002593
Dec-11	26632524	639637109	4.16369276	3797575	96670101	3.928386296
Dec-12	26355949	657158013	4.010595394	-276575	17520904	-1.578542979
Dec-13	26047428	694825704	3.748771505	-308521	37667691	-0.819060027

Source: COAI, DoT /TRAI Annual Reports of various years

In 1999 there were only 80781 mobile connections in Kerala, at the time of declaration of NTP 99 and it became531464 in December 2002.Thereafter, the growth was phenomenal reaching to 26047428 connections by December

2013, in around a decade. Following bar chart clearly shows the speed with which mobile subscriber additions was effected. Table 5.7 showed the sharp increase and thereafter decline of landline in Kerala. By the year 2013-14, number of land phones in Kerala was only 67.12 phones/square kilometer from its peak of 156 in 2006-07,where as the number of mobile subscribers was increasing year by year (See table 5.8). Thus, the land phone market in Kerala slipped to under utilization from the stage of overutilization.

Figure 5.8



Source: Compiled

The Kerala growth analysis over the period of 16 years gives a Compounded Annual growth Rate (CAGR) of 59.27%. From the time of introduction of PSU to Mobile telecommunication the compounded annual growth rate was 42.45% over a period of 11 years.

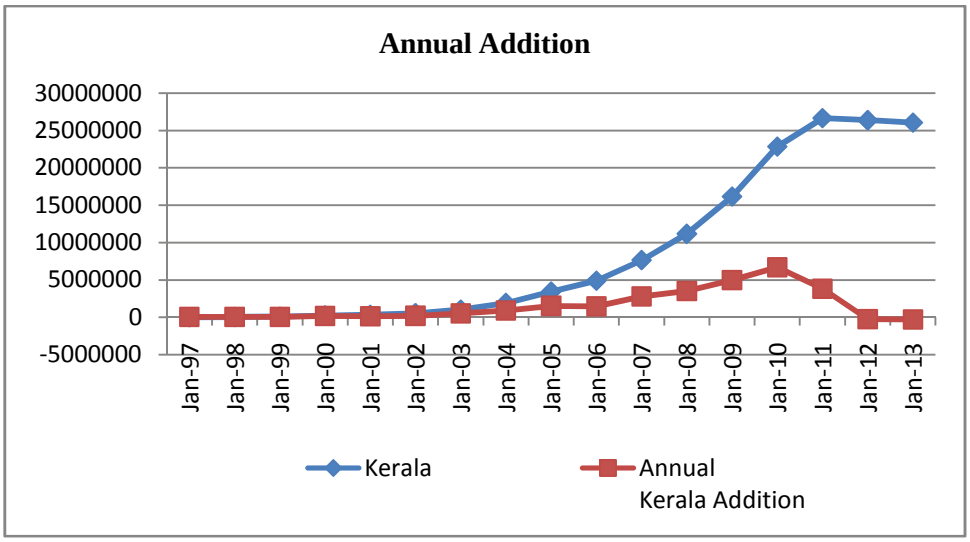
Table 5.12

Annual Rate variation in Penetration Mobile Communication, Kerala

Year	Kerala total	Annual Kerala Addition	Rate variation p.a Kerala
Dec-97	15197	15197	-
Dec-98	39712	24515	61.31473317
Dec-99	80781	41069	67.52600449
Dec-00	247617	166836	306.2334121
Dec-01	348861	101244	-39.3152557
Dec-02	531464	182603	80.35932994
Dec-03	1023096	491632	169.2354452
Dec-04	1918180	895084	82.06382009
Dec-05	3434537	1516357	69.40946325
Dec-06	4883223	1448686	-4.462735358
Dec-07	7652577	2769354	91.16316441
Dec-08	11165324	3512747	26.84355268
Dec-09	16142394	4977070	41.68597966
Dec-10	22834949	6692555	34.46776919
Dec-11	26632524	3797575	-43.25672333
Dec-12	26355949	-276575	-107.2829371
Dec-13	26047428	-308521	11.55057399

Source: COAI, DoT/TRAI Annual reports

Figure 5.9



Source: Compiled

With liberalization and licensing the private sector companies to offer telecommunication services and gradually permitting 100 per cent FDI in the sector, the people of India saw an unprecedented competition in the sector in various aspects:

(a) Introduction of new forms of telecommunication services – pager, mobile services, WLL etc.

(b) Withdrawal of unviable forms of service – pager, telegraph service

(c) Competition to acquire spectrum- the natural resource required for mobile services

(d) Competition to offer mobile services to new areas, to improve quality of service, to acquire new customers, to take away the customers of other operators (MNP) etc.

(e) As competition heated up and infrastructure expenses grew (while revenue reduced) , sharing of infrastructure

(f) As investment in Mobile Communication technology was lower per line compared to wire line services, companies concentrated on

Mobile services. Further, cost of acquiring and maintaining a mobile connection and was lower for the customer also. Operation and maintenance cost of mobile connections was also lower compared to wire line services. All these caused the new services to take over the wire line services. It can be seen from the following table.

Table 5.13

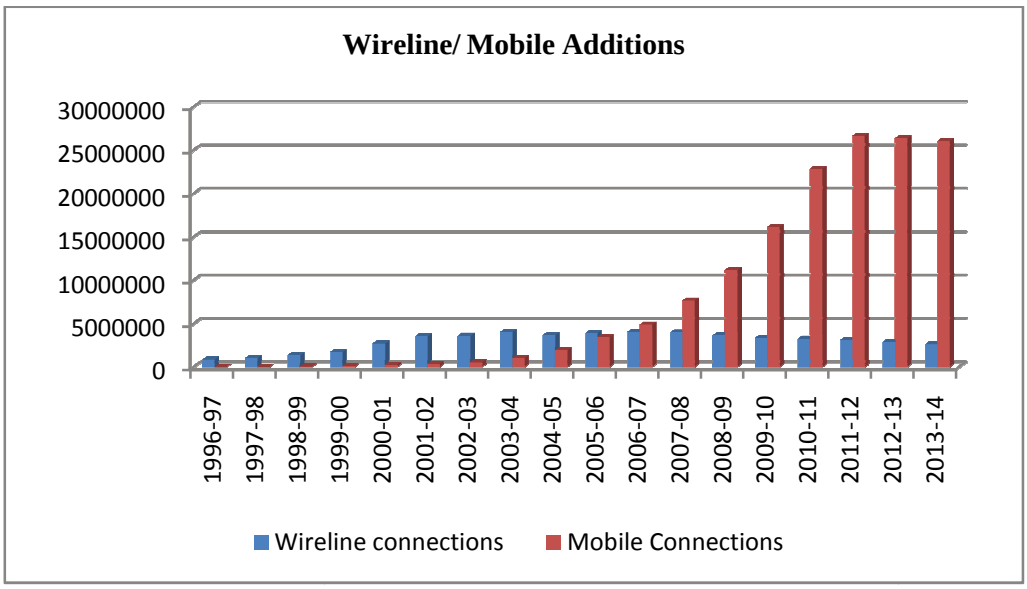
Comparison Wire line and Mobile Connections in Kerala

Year	Wire line connections	Mobile Connections
1996-97	854009	-
1997-98	1008419	15197
1998-99	1355084	39712
1999-00	1705139	80781
2000-01	2694156	247617
2001-02	3542460	348861
2002-03	3595460	531464
2003-04	4010326	1023096
2004-05	3658242	1918180
2005-06	3890000	3434537
2006-07	4036000	4883223
2007-08	3981256	7652577
2008-09	3648785	11165324
2009-10	3362846	16142394
2010-11	3254691	22834949
2011-12	3096479	26632524
2012-13	2864423	26355949
2013-14	2608162	26047428

Source: Compiled from various Reports on Kerala Telecommunications & the reports of COAI

Comparison of wire line addition and mobile addition gives a clear impact of competition. It was already seen that competition had not effectively helped in reducing the tariff in the wire line segment. Similarly, absence of effective competition in the wire line segment and availability of a substitute (Mobile connection for landline) and competition in the substitute segment prompted people to move towards mobile connections. Thus, number of mobile connections increased while number of landline connections came down substantially. This happened irrespective of the fact that the landline operator substantially added to the existing capacity of landline exchanges with the introduction of competition in telecommunication services sector. Further, it is already seen that there was over utilization of capacity during 2005-08 (See Table 5.7). But, the situation turned the other way and in 2013-14 number of working connections came down to 67.12 per square kilometer from 156 in 2006-07.(Table 5.7)

Figure 5.10



Source: Compiled

In less than two decades, mobile connections in Kerala reached ten times higher than the number of wire line connections built up over nine decades in the state.

Increased urbanization and the thinning distinction between rural areas and urban areas in Kerala prompted spread of telecommunication access. Better transportation media – public and private – contributed to mobility of people which in turn led to greater requirement of tele- access.

Thus, we could say that for more than four decades, the telecommunication needs of the people could not be satisfied by the wire line telecommunication. Waiting List of applicants for a connection became bulkier. Even the available capacity was not utilized prior to the policy implementation of NTP 1994. Thereafter, a massive effort to add capacity and also to utilize to the maximum was found. But, a substitute telecommunication device with mobile technology entered the market as part of the NTP 1994 and people subscribed to it. Further, from the point of view of competition, wire line firm faced no competition whereas mobile segment faced stiff competition with the entry of more players in to the market. Thus, mobile services sector in Kerala which was a duopoly from its beginning in 1997 to 2002 became an Oligopoly in 2002. Gradually, as the Government of India issued more licenses, the number of operators increased in the mobile segment. In 2008, based on a TRAI recommendation to remove cap on maximum number of operators in a circle, the Central Government issued licenses on First Come First Served (FCFS) basis and this policy brought open competition to the mobile telecommunication market. But as the Supreme Court, in 2012, cancelled all 122 licenses issued across India in 2008 on FCFS basis, the telecommunication services market turned back to Oligopoly again.

As a result of the stiff competition in the sector, tariff came down sharply even to the extent of 1 paise per two seconds. At a time, there was a tariff of 10 paise per minute of usage. Market expansion and customer acquisition

both ways- acquiring new customer and taking away the customers of other operators - became the two pronged strategy of the operators. For this purpose, operators issued new free sims, Jodi offers with lower call rates, friend & family connections, insurance protection to new customers, free data offers, lower denomination top ups/recharge, life time validity offers, segment wise offers for women/student/jawan etc. All these brought in the results. Along with this, the progressive liberalization policy of the Central Government under the GATS added momentum to mobile penetration. Reduction in excise duty on manufacturing handsets, tariff cut on import of handsets and withdrawal of One- by- Six Scheme under the Income Tax Act, 1961 etc. prompted more and more people to accept mobile connection. Thus, the teledensity in Kerala improved and reached above hundred. But as ghost connections and multiple connections exist the measure of teledensity may not give accurate figures. Still, it can safely be concluded that progressive liberalization of telecommunication services has definitely increased competition and competition has benefitted the industry, the economy and the society.

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[1] The state has the highest Human Development Index (HDI) (0.790) in the country according to the *Human Development Report 2011*. "India Human Development Report 2011: Towards Social Inclusion". Institute of Applied Manpower Research, Planning Commission, Government of India. Retrieved 24 October 2014

[2] Political Kerala is 38863 sq.km and Mahe (under Kannur SSA, but politically under Pondicherry is 9 sq.km and Lakshadweep (under Ernakulam SSA, but politically another Union Territory) is 32 sq.km, scattered over 45000 sq.km of Indian Ocean. Lakshadweep has 27 coral islands - India's only coral islands. Totally, there are 10 inhabited islands, 17 uninhabited islands and islets, four recently formed islets and five underwater reefs. Mahe Population is 36000 and Lakshadweep population is 60650 as per 2011 census.

[3] Number of persons per square kilo meter. (33380000/38863=859).

[4] Planning Commission**,** GOI (2008):*Kerala Development Report*, New Delhi, Academic Foundation, P.248

[5] "Private Telegraphs", *The Times*, April 19, 1878,p. 6.

[6] http://www.kerala.bsnl.co.in/growth1a.asp , visited on 13th August 2014.

[7] Mattancherry was the commercial capital of Kerala.

[8] The smallest towns with manual service often had magneto, or crank, phones. Using this type of service, the subscriber turned a crank to generate ringing, so as to gain the operator's attention. Then the switchboard responds by interrupting the circuit that dropped a metal tab above the subscriber's line jack and sounded a buzzer. Dry cell batteries (normally two large No. 6 cells) in the subscriber's telephone provided the DC power for conversation.

[9] It includes the following islands – Agati, Amini, Androth, Bitra, Chetlath, Kavarati, Kalpeni, Kiltan

[10] Mahi, U.T is part of Pondicherry Administration, but for telecom purposes, it falls under Kannur SSA of Kerala Circle.

[11] Automatic exchanges, or dial service, came into existence in the early 1900s. Their purpose was to eliminate the need for human operators at the switchboard who completed the connections required for a telephone call. Automation replaced human operators with electromechanical systems and telephones were equipped with a dial by which a caller transmitted the destination telephone number to the automatic switching system. A telephone exchange automatically senses an off-hook condition of the telephone when the user removes the handset from the switch hook or cradle. The exchange provides dial tone at that time to indicate to the user that the exchange is ready to receive the dialled digits. The pulses or DTMF tones generated by the telephone are processed and a connection is established to the destination telephone within the same exchange or to another distant exchange. The exchange maintains the connection until one of the parties hangs up. This monitoring of connection status is called *supervision.* Additional features, such as billing equipment, may also be incorporated into the exchange.

[12] If a subscriber dialed a manual number, an operator at the destination office would answer, see the number on an indicator, and connect the call by plugging into the correct circuit and ringing the call.

[13] Newer exchanges consisted of one to several hundred plug boards staffed by switchboard operators. Each operator sat in front of a vertical panel containing banks of ¼-inch tip-ring-sleeve (3-conductor) jacks, each of which was the local termination of a subscriber's telephone line. In front of the jack panel laid a horizontal panel containing two rows of patch cords, each pair connected to a cord circuit. When a calling party lifted the receiver, a signal lamp near the jack would light. The operator would plug one

of the cords (the "answering cord") into the subscriber's jack and switch the headset into the circuit to ask, "Number, please?" Depending upon the answer, the operator might plug the other cord of the pair (the "ringing cord") into the called party's local jack and start the ringing cycle, or plug into a trunk circuit to start what might be a long distance call handled by subsequent operators in another bank of boards or in another building mile away. In 1918, the average time to complete the connection for a long-distance call was 15 minutes. In the ring down method, the originating operator would call another intermediate operator who in turn would call the called subscriber, or pass it on to another intermediate operator. This chain of intermediate operators could complete the call only if intermediate trunk lines were available between all the centres at the same time.

[14] A Central Office refers to switching (exchange) equipment and the operators, the building that houses the switching and related inside plant equipments.

[15] A circle is an administrative bifurcation in the telecommunication scenario. The telecom India is divided into various circles, almost equivalent to a political state and a Circle is subdivided into various SSAs almost equivalent to a district and an SSA is further subdivided into various SDCAs.

[16] STD stands for Subscribers Trunk Dial and trunks are circuits interconnecting the exchanges.

[17] In telecom parlance a switch refers to an exchange, as the basic function of an exchange is to switch calls.

[18] For details, please refer to: Nair, V. Balakrishnan(1994): *Social Development and Demographic Changes in South India: Focus on Kerala*, New Delhi, M.D. Publications Pvt. Ltd. at p. 35-36

[19] It refers to the available number of lines.

[20] Switching capacity refers to the capacity of an exchange to handle/route the calls made through the exchange.

[21] DoT was all in all (Policy formulation, implementation, Regulation, service provisioning etc.), up to the formation of BSNL for service provisioning on 01-10-2000.

[22] In telecommunication “time is money”. All the subscriber equipments connected directly to the exchange through wire (DEL) are not in use all the time. Therefore, the available exchange capacity to transfer/route the calls arriving to the exchange equipment remains idle greatly. Hence, even a 10 percent additional connection can be handled by the exchange smoothly.

[23] There were, mainly, three operators in India- Hutchinson Max Telecom, Punwire and BPL Wireless Telecommunications Services - offering paging services. Hutchinson Max was operating in Punjab. BPL Wireless commenced operations in Kerala, Tamil Nadu and Karnataka. Punwire obtained licences for 12 states - Punjab, Himachal

Pradesh, Haryana, Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. BPL Connect changed its name to India Paging Services and later on stopped providing services by April 2001 as the subscriber base could not be picked up especially as mobile phones also came to the market. EasyCall offered pagering services in Thiruvananthapuram, Kollam and Ernalulam with 2000 customers and BPL had only around 6000 customers.

[24] For the Census of India 2011, the definition of urban area is as follows:

(i)All places with a municipality, corporation, cantonment board or notified town area committee, etc.

(ii)All other places which satisfied the following criteria:

(a)A minimum population of 5,000;

(b)At least 75% of the male main working population engaged in non-agricultural pursuits; and a density of population of at least 400 persons per sq. km.

[25] http://www.kerala.gov.in/index.php?option=com_content&id=4010&Itemid=3191, visited on 2th April 2014

[26] Rural population refers to people living in rural areas as defined by national statistical offices. It is calculated as the difference between total population and urban population. Aggregation of urban and rural population may not add up to total population because of different country coverages.

[27] Press release, Census 2011, available at, http://censusindia.gov.in/2011-prov- results/ paper2/data_files /kerala/press%20note_kerala.pdf

[28] Available at http://www.kerala.gov.in/index.php?option=com_content&id=4010& Itemid =3191, visited on 18th October 2014.

[29] An Urban Agglomeration is a continuous urban spread constituting a town and its adjoining urban out-growths, or two or more physically contiguous towns together and any adjoining urban out-growths of such towns. In some cases, railway colonies, university campuses, port areas, military camps, etc., would have come up near a city or statutory town outside its statutory limits but within the revenue limits of a village or villages contiguous to the town. Each such individual area by itself may not satisfy the minimum population limit to qualify it to be treated as an independent urban unit but deserves to be clubbed with the towns as a continuous urban spread.

The following are the possible different situation in which urban agglomeration would be constituted.

(i) A city or town with one or more contiguous out-growth;
(ii) Two or more adjoining towns with their out-growths;
(iii) A city and one or more adjoining towns with their out-growth all of which form a continuous spread;

(iv) The core town or at least one of the constituent towns should necessarily be a statutory town; and

(v) The total population of all the constituent units (i.e., towns and out-growths of an urban agglomeration should not be less than 20,000) (as per 2001 census).

30 Telepopulation refers to number of persons (from the total population) legally eligible to apply for a telephone connection.

31 One wire line phone may be sufficient for a house hold having average 4.8 numbers of members. Further, the entire population cannot be considered as telepopulation as the entire population is not legally eligible for a connection.

32 In 1998 the Central Government had introduced the "One by Six Scheme" through the budget whereby a person was liable to file income tax return if he had fulfilled any one of the following six criteria. It had a detrimental effect on mobile subscription. It was introduced to identify potential tax payers and to widen the tax net. It was withdrawn by the government during 2006-07. Withdrawal of the scheme removed fear of taxmen from the minds of the people. The six criteria were the following:

1. Ownership of Motor Vehicle (Four Wheelers).
2. Subscriber to a Cellular Phone.
3. Credit Card Holder.
4. Member of a Club.
5. Occupation of an Immovable Property in specified cities and urban agglomerations.
6. Travel to any Foreign Country.

33 The HDI is a composite index, consisting of three indicators – consumption expenditure (as a proxy for income), education and health.

34 Escotel Mobile Communications Ltd. and BPL Mobile Celular Ltd.

35 The license was issued on 12/12/1995, by DoT to Escotel Mobile Communications Ltd.

36 Idea Cellular completed the acquisition of Escotel Mobile Communications Ltd (EMCL) by purchasing all shares from its promoters, Escorts Telecommunications Ltd and First Pacific.(REF: Business Standard, June 11, 2004, " Idea completes acquisition of Escotel Mobile".

37 Licence was issued on 19/12/1995.

38 "BPL Kerala rebranded as Hutch", Article Published in the Business daily, 'Business Line,' dated 31st March 2006.

39 Now the transaction is called off as TRAI and DoT objected the deal. Loop Mobile, now owned by Khaitan family did not buy airwaves during the 2014 February auctions, leading to the expiry of 20 year license. Bharti Airtel was in deal for a slump sale (i.e without assigning value to individual assets) with Loop for all its infrastructure including 25000 cell sites and nearly 3 million subscribers. DoT and TRAI says that on expiry of the license, subscribers should be intimated and given a chance to port out to an operator of their choice. (Ref: The Economic Times, 26 Sep 2014, P.8 "Airtel- Loop Deal may Hit DoT Hurdle).

[40] India had considered mobile services as Value Added Services (VAS) and the private sector was allowed in the mobile communication sector. At that time, MTNL and DoT was the service providers in India. In the year 2000, DoT was Corporatized into BSNL and as part of the revenue sharing agreement (introduced through the NTP 1999) between the private operators and the GOI, private operators gave up their duopoly status and the PSU (BSNL/MTNL) was allowed as third operator to roll out mobile services and fourth operator was allowed to increase competition.

[41] As a part of NTP 99, each circle could have potentially any number of operators. It also introduced the state owned operators, BSNL and MTNL as the third mobile operator in each circle. Subsequently, in 2001, the DoT auctioned licenses for the fourth mobile operator, with GSM standard.(Role of Universal Service Obligation Fund in Rural Telecom Services: Lessons from the Indian Experience RekhaJain,G. Raghuram,W.P. No. 2009-06-03 June 2009, Indian Institute Of Management Ahmedabad-380 015 India).

[42] The Chief Minister, Sri. A.K. Antony commissioned the service by making first call to state co-operation minister MV Raghavan and also by handing over the start-up kit to Malayalam superstar Mamooty. The Kerala segment of the project set up at a cost of Rs.144 crore envisaged a customer base of 3.26 lakh in two phases, the first phase comprising 1.25 lakh line and the balance of 2.01 lakh in the second phase.The network comprised two MSCs (Mobile Switching Centres) located at Ernakulam and Thrissur and seven base station controllers located at Thiruvananthapuram, Kottayam, Ernakulam,Thrissur,Kozhikode and Kannur. (The Economic times, 23-10-2002).

[43] Reliance Infocom received license on 20-07-2001

[44] Bharati Cellular Services Limited received license on 28-09-2001 for the brand name Airtel.

[45] Available at, http://www.tatadocomo.com/about-tata-docomo.aspx, retrieved on 24th June 2013

[46] "TATA Indicom is Now TATA DOCOMO". Telecomtalk.info. 19-10-2011. Retrieved on 28th June 2012.

[47] With the issue of 2G licenses on First Come First Serve basis in 2008, the mobile services market in India became a competitive market, moving from Oligopoly to Competition.

[48] Cheers Mobile (Etisalat DB) a joint venture with real estate major DB Group and Dubai (UAE) based Etisalat acquired Unified Services Access License(UASL) in 15 circles - Andhra Pradesh, Delhi, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Mumbai, Punjab, Rajasthan, Tamil Nadu (including Chennai), Uttar Pradesh (East), Uttar Pradesh (West), Madhya Pradesh and Bihar. But it was closed down in March 2012, with the SC verdict of cancellation of 2G licenses.

[49] Telecom time unit is measured in pulse which is 60 seconds. Even if a call is 40 seconds, it would count as 1 pulse and if a call goes to 61 seconds, it would be counted as 2 pulses.

[50] In simple terms, Step up Cost Method in Cost Accounting refers to slab system of tariff fixation.

[51] On net calls refers to calls within the operator network and off net calls refers to calls made to the network of other operators.

[52] After the issue of cellular licences in 1995, six of the service providers were in default not paying licence fee by the early 1997 pleading financial break down. By the year 1998 the number of defaulters increased to eight. The Bureau of Industry Cost and Prices (BICP) was requested by the Government to look into the reasons for the financial failure of the mobile operators. After investigation BICP reported that 13 operators were running in heavy loss. According to the report, the service providers were in loss on account of the huge licence fee, interconnection charges and spectrum usage charges imposed by the DoT. BICP recommended increasing rent from Rs. 156 to Rs. 600 even though it would decrease the demand for mobile connectivity but help the operators to sustain their business. ICICI conducted another study which revealed that 17 per cent of the consumers had not used their cell phone and 37 per cent of the subscribers had bills below Rs. 500 a month.

[53] RTO refers to Reference Tariff Orders. The service providers could offer lower competitive tariffs, but not more than the reference tariffs of TRAI.

[54] Coins in India are presently being issued in denominations of 50 paise, one rupee, two rupees, five rupees and ten rupees. Coins up to 50 paise are called 'small coins' and coins of Rupee one and above are called 'Rupee Coins'. Coins in the denomination of 1 paise, 2 paise, 3 paise, 5 paise, 10 paise, 20 paise and 25 paise have been withdrawn from circulation with effect from June 30, 2011 and are, therefore, no more legal tender. Ministry of Finance,(Department of Economic affairs) Notification **[**F.No.11/19/2009-coin] (December 20.2010)S.O.2978 (E) –In exercise of the powers conferred by sub-section 15A of the Coinage Act, 1906 (3 of 1906), the Central Government hereby determines to call in from circulation the coins of the denomination of 25 paise and below, issued from time to time, with effect from June 30, 2011 and from this date these coins shall cease to be a legal tender for payment as well as on account. The procedure for call in shall be notified separately by the Reserve Bank of India.

[55] INMARSAT calls are satellite calls from Ship to Ship, from Ship to land or land to ship

[56] For INMARSAT calls from Landline, pulse rate is 0.175 sec. whereas for mobile services pulse rate is 60 sec. As such, for mobile services, ISD tariff for INMARSAT call will be charged @ Rs.411.43 per minute (Rs.1.20 / 0.175 sec x 60sec). In case of

any future revision in pulse rate in Landline Tariff, the rate per minute for mobile services will be revised accordingly.

[57] MNP refers to Mobile Number Portability (i.e Facility for a subscriber to switch operators without number change).

[58] "State may soon reach 100% tele-density", *The Hindu*, 8 June 2011, Kochi.