

Growth and Role of Telecom Industry in Jammu & Kashmir State

Parul Gupta

Dept. of Economics, University of Jammu (India)

ABSTRACT

Indian telecom industry has experienced a revolution in its growth over the last two and half decade. It has shown sustained growth as a result of increased competitiveness, relaxed restriction, and establishment of Telecom Regulatory Authority of India (TRAI) as an independent regulator. Telecom industry in Jammu and Kashmir is one of the growing industries in India. It has brought significant contribution in communication with the provision of various telecom services. It is one of the developing sectors with rising number of mobile and broadband services. Mobile phone has made it possible to reap the benefits of Telecommunication within the reach of the world's population. It helped to shrink the gap of digital divide. Telecom Industry is very important in the current era due to its contribution in different sectors of the economy. As such the primarily objective of the present paper is to analyze the structural changes of telecom industry in Jammu and Kashmir (J&K), role of Telecom services in J&K. It also recommended measures for the development of the Telecom Industry. The statistical tools Herfindahl-Hirschman Index (HHI) has been used to measure the market concentration of Indian Telecom Industry.

Keywords: Herfindahl Index, Market concentration, Subscribers, Telecom Services.

1. INTRODUCTION

Telecommunication is the process that deals with the exchange of information through the application of technology. It has positive and multiplier effect which makes the people to bring in connection in easy and approachable manner either in rural or urban areas. It is one of the world's biggest machines that bind the society with its vast coverage of network and provision of various services. The services of telecom industry help to decrease and bridge the gap of digital divide. Telecom industry in Jammu and Kashmir is one of the growing industries in India. State of Jammu and Kashmir is in northern part of India. The state covers the area of 222,236 square kilometer which is comprised of three regions i.e. Jammu, Kashmir valley and Ladakh. Jammu And Kashmir State has not developed a lot due to the existence of various reasons like militancy, geographical conditions that is comprised of hilly areas and inadequate available infrastructural facilities for the development of the state. The telecom industry in the state Jammu and Kashmir has brought revolution in communication with the provision of various telecom services. Services of telecommunication are fixed and wireless cellular services, internet connections, broadband connections, and value added service which helps the information accessible, storable, transmittable and manipulative for the service users. All these services contribute to the socio economic development of the nation [1]. Application of telecom services have been widely used in order to cater the present technological needs and to face the international competition. It is not only useful for the purpose of emergency, health, administration, commerce and social services but it also acts as a stimulator in the economic growth and quality of life by creating effective network worldwide which will bring immense benefit [2]. Jammu and Kashmir Circle is in the circle C with the inclusion of the mobile subscribers in the year 2003. Telecom industry in India is one among the growing industries that is contributing to the development of Indian economy up to great extent. In this backdrop, focus of the study is to examine the structural changes of telecom Industry in Jammu and Kashmir, role of telecom services in different sectors and suitable measures which are contributed to the development of the telecom Industry.

2. REVIEW OF LITERATURE

The review of literature shows the highlights of various studies conducted by the different authors on Telecom industry in order to put the present study in proper and theoretical perspective. Seetharam and varadharajan (2006) in their paper have concluded that the telecom sector has helped to fill the gap that existed between the developed and developing economies.

Telecom is an important ingredient in the growth of economic development of an economy through fulfilling various purposes like the awareness about the prices, job opportunities etc. [3] Sudan (2009) in his paper has analyzed the growth performance of telecommunication Industry in India in recent years and stated that telecom sector has emerged as a winner today to bridge the gap of digital divide [4]. Sarin and Jain (2009) in their study namely effects of mobiles on socio-economic life on urban poor which was conducted in three metropolitan cities with 1774 respondents, founded that the majority of the respondents admitted an improvement in their economic life as well as social life. Mobile phone work as a productive and effective tool for the workers who are self-employed by reducing search and transaction cost for business, intermediaries regarding search of work and enhancing their productivity [1]. Jonas and Maryn (2010) in their paper assessed the impact of information and communication technology by stating the role of mobile phones on the behavior of market in developing countries. This study has also highlighted that there is positive relationship between use of mobile phone technology and country's development at the macro level [6]. Sahoo Pravakar et al., (2012) have assessed the role of infrastructure in economic growth in China. The study states that the heavy investment in infrastructure by China is supported to sustain the growth which in turn reduces the affects of global financial crisis. The study states that there exists positive relationship between the development of infrastructure and economic growth in China which in turn clarifies the reason that why china made a large spending in infrastructure development from a longer period [7].

Prasad kiran (2012) in her paper examined the role of mobile phone in attaining sustainable development by addressing the importance of telecom policies, national and economic policies. She also stressed on various applications of mobile technology like m-business, m-education, m-governance etc to excess its benefits in bridging the gap of digital divide within and between countries [8]. Assawatia & Meel (2012) in their study describes ICT tools (Telecom, Television, Radio, Hardware, Software, Electronic media) which supports the process of networking for removing gender gap and empowering women. It also emphasized over the potential of ICT to attain the objective of economic growth, economic development, social development, effective governance etc. It also recommended some strategies to meet the problem of industry while accessing the ICT applications [9]. Podesta John (2013) examined that inclusive economic growth can be attained by raising connectivity which helps to extend the opportunities and decreases the level of vulnerability. It states that connectivity works as silver bullet to attain broad economic growth with great pace at equitable level that brings connectivity between every person either rich or poor [10]. Sanap Mahohar K (2015) in his paper addressed the importance of ICT to eliminate gender gap. ICT favor women in assessing health services, education, political participation, sustainable livelihoods etc. He also stated in his paper that through internet services women are enjoying freedom of sharing their expression, communication which leads to remove gender discrimination and promote human right of women [11].

Jollie N. Alson et al. (2016) in their study have explored the role of smart phone among youths of Philippines and has revealed that the use of mobile phone from educational perspective has the highest priority, using social cites mostly for the socialization like face book, instagram, chat, phone call has got the 2nd preference, where checking emails is at the least preferences of all [12].

The review of various studies has shown the positive impact of telecom sector on economic development, to reduce poverty, gender equality, to access to education, enhance connectivity, and reduce vulnerability among different countries and of the different sectors of the economy. It has examined that how mobile phone has helped to fill the gap between the developed and developing countries. In this backdrop an attempt has been made to measure the structural changes of Telecom Industry in Jammu and Kashmir and to explore the role of telecom industry in different sectors of J&K state with the help of case studies.

3. OBJECTIVES & RESEARCH METHODOLOGY

The objectives of the present study are to analyze the structural changes of Telecom Industry in J&K State, to explore the role of telecom industry in different sectors of J&K State with supportive case studies and finally the measures are suggested for the development of the Telecom Industry. The present study is primary as well as secondary in the nature. The primary data has been taken from different parts of J&K for to the case studies. The secondary data has been collected from the various published Journals, documents available from Websites of International Telecommunication Union (ITU), Telecom Regulatory Authority of India (TRAI), Department of telecommunication (DOT), Central statistical organization (CSO), Cellular operators Association of India (COAI) and other allied departments for the present study.

4. FINDINGS OF THE STUDY

The state of Jammu & Kashmir has also experienced the growth of telecom services. The telecom services in the state of Jammu and Kashmir has brought revolution in communication with the provision of mobile, fixed, value added and various other services. Teledensity of Jammu and Kashmir telecom circle is 100.56 percent which is above the Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Meghalaya, Nagaland, Haryana, Uttar Pradesh (UPE+UPW), West Bengal and Rajasthan telecom circle [13].

Table-1 Teledensity Of Indian States

SR. NO.	STATE	TOTAL TELEDENSITY		
		TOTAL	RURAL	URBAN
1.	Andhra Pradesh	51.12	59.73	193.36
2.	Arunachal Pradesh	106.19	83.13	139.68
3.	Assam	67.55	50.48	154.19
4.	Bihar	59.05	41.27	209.66
5.	Chhattisgarh	67.02	41.29	143.32
6.	Goa	126.63	152.81	111.97
7.	Gujarat	108.52	71.42	159.07
8.	Haryana	117.87	64.79	208.51
9.	Himachal Pradesh	152.37	116.83	414.63
10.	Jammu & Kashmir	100.56	67.92	183.64
11.	Jharkhand	65.44	37.65	153.46
12.	Karnataka	115.08	58.87	201.67
13.	Kerala	120.06	72.77	259.99
14.	Madhya Pradesh	68.87	43.84	131.66
15.	Maharashtra Incl. Mumbai	109.79	69.38	152.21
16.	Manipur	104.68	67.99	214.39
17.	Meghalaya	81.66	62.74	151.33
18.	Mizoram	116.28	98.53	130.50
19.	Nagaland	75.02	44.11	222.64
20.	Odisha	80.79	58.31	183.01
21.	Punjab	122.94	80.24	182.43
22.	Rajasthan	90.60	59.42	187.98
23.	Sikkim	113.19	71.23	347.63
24.	Tamil Nadu (incl. Chennai)	131.64	96.47	154.02
26.	Tripura	89.16	61.84	196.19
27.	Uttar Pradesh (UPE+UPW)	76.10	45.47	180.17
28.	Uttarakhand	113.29	71.86	208.96
29.	West Bengal Included Kolkata	93.02	61.97	169.72
Union Territories				
1.	Andaman & Nicobar Islands	113.89	94.17	139.28
2.	Chandigarh	98.55	56.68	103.29
3.	Dadar & Nagar Haweli	135.95	122.20	142.78
4.	Daman & Diu	105.83	26.95	400.03
5.	Delhi	186.81	187.45	186.79
6.	Lakshdweep	91.66	120.12	13.29
7.	Puduchery	70.70	66.31	72.53
	Total	93.40	56.71	173.15

Source- TRAI Report, 2017 [13]

5. STRUCTURE OF TELECOM INDUSTRY IN THE STATE OF JAMMU AND KASHMIR

Out of the eight telecom companies (BSNL, MTNL, Reliance communication Ltd, Bharti Airtel Ltd, Tata Teleservices Ltd., Quadrant Televentures Ltd, Sistema Shyam telelink Ltd and Vodafone) that were providing fixed telecom services in India, only BSNL telecom Company is providing fixed telecom services in Jammu and Kashmir Circle in the Year 2017 [13]. Among the Telecom companies in India (Bharti, Vodafone, Idea, Reliance Jio, BSNL, Aircel, Reliance, Telenor, Tata, Sistema, MTNL) that are providing mobile services in India, only seven companies BSNL, Reliance, Bharti, Idea, Aircel, Vodafone and Reliance Jio are providing their subscriptions in Jammu and Kashmir Circle in the Year 2017 [13].

5.1 SELLER'S CONCENTRATION FOR MOBILE SERVICES IN J&K (DEC, 2004 AND DEC, 2009)

The mobile subscribers in Jammu and Kashmir have been added by the telecom company BSNL which was the first mobile telecom service provider in the J&K with the subscribers 171 in August, 2003.

Table-2 Seller's Concentration For Mobile Services (DEC, 2004 AND DEC, 2009)

S.NO	TELECOM COMPANIES FOR DEC, 2004	TELECOM SUBSCRIBERS FOR DEC, 2004
1	BSNL	140360
2	Bharti Airtel	70676
	Total	211036
	H Index	0.55
S.NO	TELECOM COMPANIES FOR DEC, 2009	TELECOM SUBSCRIBERS FOR DEC, 2009
1	BSNL	970542
2	Bharti Airtel	1724263
3	Dishnet wireless	1484090
4	Vodafone essar	157202
5	Idea	11684
	Total	4347781
	H Index	0.32

Source- Cellular operator Association of India (COAI)

There were 211036 telecom subscribers in the telecom circle Jammu and Kashmir for the period Dec, 2004 with the inclusion of Bharti Airtel Telecom Company. The herfindahl index for the observed telecom subscribers is 0.55 which indicates high market concentration of mobile service providers in J&K.

The leading five telecom companies in the telecom circle J&K have been taken for the period Dec, 2009 for to find out the market concentration of the mobile service providers telecom industry. The observed herfindahl index for the period Dec, 2009 is 0.32 which indicates high market concentration in J&K.

Table-3 Seller's Concentration For Mobile Services In J&K (July, 2013)

S.NO.	TELECOM COMPANIES	TELECOM SUBSCRIBERS
1	BSNL	1071907
2	Bharti Airtel	2491371
3	Dishnet wireless	1963263
4	Vodafone essar	670063
5	Idea	254455
	Total	6451059
	H Index	0.28

Source- Cellular operator Association of India (COAI)

On the basis of five leading mobile service providers in Jammu and Kashmir Telecom circle, Herfindahl index was used again to measure the market concentration for the period of July, 2013 which is 0.28 indicates high market concentration in the telecom market.

Table-4 Seller's Concentration For Mobile Services In J&K (March, 2017)

S.NO.	TELECOM COMPANIES	TELECOM SUBSCRIBERS
1.	Vodafone (GSM)	994663
2.	Bharti (GSM)	3624527
3.	Idea (GSM)	694436
4.	Aircel (GSM)	2992224
5.	Reliance (GSM)	872711
6.	BSNL (GSM)	1449322
7.	BSNL (CDMA)	24331
8.	Reliance Jio (LTE)	1251478
	Total	11903692
	H. Index	0.19
S.No.	Telecom companies	Telecom subscribers
1.	BSNL	134283
	Total	134283
	H. Index	1

Source- Telecom Regulatory Authority of India (TRAI) Report, 2017

The herfindahl index for the mobile service providers in the year 2017 is 0.19 which is between 0.15 to 0.25 clearly indicates the moderate concentration in the market of mobile service providers for the period June, 2017 whereas there exists complete monopoly for fixed/wire line telecom services.

Telecom industry has been playing an important role in all sectors of the economy and in all spheres of life irrespective of rich and poor. It has revolutionized the whole economy of Jammu and Kashmir when even the street vendors, beggars can be seen availing the mobile services. Case studies have been conducted in order to support the role of telecom industry in Jammu and Kashmir State, primary data has been collected. Except that the role of telecom services on health was also highlighted. Indian economy is divided into telecom circles/service area as stated above where Jammu and Kashmir telecom circle cover the whole state of Jammu and Kashmir. There are number of service providers who provided telecom services to the Jammu and Kashmir state.

Telecom industry made its contribution to the development of the nation as well as different parts of the economy. It helps to uplift the social and economic status of the persons by raising the connectivity and providing cellular services.

6. ROLE OF TELECOM INDUSTRY IN J&K STATE

Telecom industry has been playing an important role in all sectors and spheres of life. It has revolutionized the whole economy of Jammu and Kashmir even the street vendors, beggars can be seen availing the mobile services. Telecom industry made its contribution to the development of the nation as well as different parts of the economy. It helps to uplift the social and economic status of the persons by raising the connectivity and providing cellular services. Various services have been provided by the telecom services and contributed to various significance attained by those who availed telecom service.

Employment and Income

Telecom industry is providing income. A study by Group Special Mobile Association (GSMA) states that the telecom sector is expected to create 4.1 million additional jobs by 2020. It has been found that many persons are directly employed in the telecom industry and generates their source of income.

Education

Telecom industry plays an important role in education through the provision of various services. Telecom services have contributed in the education of their children like a call provides the information to students as well as parents regarding the classes, the class work etc. A student will clear its query through internet. An educational institution can pass the information to the students what they are demanding through a call.

Social connectivity

Telecom industry contributes to the social connectivity by its services. Social connectivity is comprised of connectivity between persons existing in the society. A single call will remove the distance between the persons who are sitting in different parts of the country. It will reduce the gap and pass the information between the persons with a phone call.

Telecom industry has brought drastic changes as well as contribution in the different sectors of the Jammu and Kashmir state i.e. primary, secondary and territory. In this context, some supportive case studies have been conducted to state the role of telecom industry in the different sectors in Jammu And Kashmir State. Telecom industry is making its invaluable contribution to the development of different sectors of the economy.

6.1 Case Studies Of Primary Sector

Primary sector is mainly comprised of agriculture, forestry, grazing, hunting, fishing, mining and quarrying. State Jammu and Kashmir is dependent on the agriculture and allied activities. Primary sector has main function is to provide food and to fill the mouth of every person that resides in India. By exporting the agricultural products, this sector also considered as a source of income for the government of India. It is also used as raw material for working and in turn production of the industrial sector. Telecom industry has contributed to the primary sector with the provision of various services to the farmers. Telecommunication helps the farmers to make research with the help of connectivity. It is the communication that brings the farmers closer to the information they require with the use of connectivity. It helps them to get adequate information regarding the market price of the agricultural products, selling price of a particular products, weather forecasting etc. Telecom industry brings the farmers in contact so that with the help of mobile or fixed phones they can make themselves aware of the required things. They can share the concerned information among the other farmers and thus helps them to provide relevant information regarding concerned occupation like market information regarding the particular product which comprises of demand for the product, prevailing prices for the particular product, agricultural production for the particular period etc. After getting information about the selling prices, the farmers do not immediately sell their output and wait for the right time in the market for getting higher returns.

Two case studies have been done in state Jammu and Kashmir in order to find out the views shared by the farmers regarding the contribution of the telecommunication in the agricultural sector. The case studies have been done in the Akhnour tehsil and R.S. Pura Tehsil in Jammu District of the Jammu and Kashmir state.

The first case study is of Mr. Preet Paul Singh in R.S. Pura Tehsil of Jammu district who stated that mobile phone work as a source of connection between farmers and provides them information from the agricultural institutions whenever they required. A phone call will share the information between the callers and in getting expertise from the agricultural institutions. According to him, their family member engaged in the agriculture i.e. in production of rice, vegetable etc. where telecom services helps to maintain connectivity between the man to pass and get the information from the person whom they want without the wastage of time.

Another farmer is of Jorian, Akhnoor tehsil .He stated that mobile phones empower a common man as well as farmer. It helps in the availability of information regarding fertilizers, seeds, pesticides, weedicides and other input used to raise the agricultural production. It aware us regarding the market price and by comparing the market price and production cost makes marketing more efficient. This in turn works for the improvement in agricultural productivity also. Mobile phone helps to find and share the relevant information regarding the growth of agricultural production.

6.2 Case Studies Of Secondary Sector

Secondary sector is comprised mainly of manufacturing, construction, electricity, gas and water supply. Jammu And Kashmir State is broadly famous for its horticulture industry which has contributed to the economic development of the state up to great extent. The secondary sector is considered as another important source of income to the state as well as nation in turn. Telecom sector has made an important contribution in the industrial sector which can be supported by the case studies done to assess the role of telecommunication. Telecommunication provides a pace in the field of secondary sector by speeding up the business performance. It is done with the help of call by the business parties for the smooth functioning of their business activities. A business party can order for its demand with the help of the telecom services.

The first case study is of an Entrepreneur named Rajinder Gupta who is owner of the rice and flour mill in Jammu and run its business in the Kashmir Valley. According to him, mobile is source of blood in the business. It also creates the economies of scale with its services. He states that much of the business is dependent on the cell phone. A call by the telecom services helps in taking and passing the order to the place where the demand is. He can contact and pass order in Jammu even when he is sitting in Kashmir. As Kashmir valley suffers from the militancy problem such a long time. During that period it is the phone call through which he continues business dealing while sitting in his home.

Another case study is of another Entrepreneur named Raman Mahajan who is the owner of rice mill in the Jammu district. He stated that the importance of telecom services to the broader level. Telecommunication helps in the expansion of the business by extending the network connectivity with the market. This also expands the market size for the business, reduces the transportation cost and overall cost of production. According to him, a mobile phone connection helps to continue the dealings even when he is sitting at home. It helps to make contact with the partners live with the simple calling function of telecom industry. It increases the number of customers. Telecommunication improves the sale and purchase of goods. It improves the frequency of service to the customers which results in the attainment of the satisfaction of the customers.

Another case study is of Artisan from Kashmir namely Nazir Ahmed who stated that he get order for embroidered Shawls, Suits, Cushions, curtains on cell phones from the businessmen of Raghunath market of Jammu city as well as other parts of the country.

6.3 Case Studies Of Tertiary Sector

Tertiary sector is comprised of Transport, storage and communication, trade, hotel, entertainment, tourism, banking and insurance, real estate, ownership of dwelling and business services, public administration etc. Today every person requires the services up to great extent for living a smooth and qualitative life which is to be fulfilled by the development in the tertiary sector. Telecommunication has made its contribution in the development and the working of the tertiary sector with its supporting role. Telecom services works as a great contributor for providing the services in an easy and approachable way. Two supporting case studies have been taken to state the role of telecom services in the tertiary sector.

Case studies have been done in state Jammu and Kashmir in order to find out the views shared by the service providers regarding the contribution of the telecommunication in the tertiary sector. The telecommunication services were contributed in the service sector with its various applications. A call can aware a person regarding the provision of any services. Through a call, any person can acquire any information regarding the required purpose. E.g. during emergency, a single call provides the solution like ambulance etc. A person can acquire the information for the Air ticket, train ticket, their prevailing fares etc. The case studies have been done in the Jammu District of the Jammu and Kashmir state.

The first case study was done with the Tarun Sharma who is working in the Samsung Company as a service provider in the District Jammu, Poonch, Reasi and Rajouri who stated that mobile phone work as a source of connection between the service provider and service gainer up to greater extent. Telecommunication helps to run their business in smooth manner by their services. A single call helps many a time to remove the queries of the customers regarding their products. Through a call, he can get much information regarding the product, its features, its range etc. which saves the travelling cost and saves the time of customers.

Another case study has been done with Hitesh Mahajan who is working in the Axis Bank as an Assistant Sales Manager in the Branch Jammu. He stated that with the help of phones either fixed or mobile i.e. in the bank he and their staff members made telecom calling through which they remove the queries of their customers regarding the information of their account, their balance, current bank rate and other information regarding their account or any information concerned to the accounts. It is also useful to inform their customers regarding any new bank services or also whenever bank needs information or required documents for their customers.

CONCLUSION

Telecom Industry both in number and its size distribution has grown at a faster rate and revolutionizing all the sectors of the Jammu and Kashmir State. It has made market more efficient by reducing the cost of travelling, transportation and there by enjoying the economies of scale.

From all the above case studies, it is clear that the telecom industry has been contributing to the each and every sector in the Jammu and Kashmir state. After 2003 the telecom industry helps to develop the state with the provision of the various mobile services. It helps in the smooth functioning of the different sectors of the economy in the state such as Agriculture, Industry and Tertiary Sector. It works as source of life in the business activities. The services of telecom industry makes person aware regarding the prevailing prices which in turn frames market more efficient which in turn contributes in the improvement in the productivity in the different sectors. Telecom Industry works to find and share the relevant information in the all the sectors.

MEASURES FOR THE DEVELOPMENT OF THE TELECOM INDUSTRY

For exploring the potential of economic growth in rural areas there is a need to improve the telecom services. For improving the telecom services, in these areas thrust should be given on development of telecom infrastructure. Measures should be encouraged for strengthening the signal system of the mobile towers in higher ridges & in the backward regions. Moreover telecom companies should focus on the availability of telecom services without a hectic and waiting procedure. For meeting the manpower requirement of telecom services specific skills need to be imparted to tap the available opportunities of further growth in the rural and urban India.

REFERENCES

- [1] Sarin Ankur and Jain Rekha (2009), "Effects of mobiles on socio-economic life of urban poor"
- [2] Missing Link, A Study by ITU, Telecommunication and Development, 1985.
- [3] Sridhar kala Seetharam and Sridhar varadharajan, Telecommunication and growth: causal model, quantitative and qualitative evidence", Economic and political weekly, 41(25), 2006, PP- 2611-2619, <http://www.jstor.org/stable/4418381>.
- [4] Sudan Falendra, Industry in India: Growth performance and opportunities Ahead, Economic journal of development Issues, vol 9 and 10. E mail:fk_sud@rediffmail.com.
- [5] Bhardwaj, A., Tung, N. S., & Kamboj, V. (2012). Unit commitment in power system: A review. International Journal of Electrical and Power Engineering, 6(1), 51-57.
- [6] Hadlich Simon Jonas, Wilkinson Maryn, information, communication and power: Mobile phone as a tool for empowering Women in sub Saharan Africa, october 22,2010
- [7] Sahoo pravakar, Kumar Ranjan, Nataraj Geethanjali, China's growth story: The role of Physical and social infrastructure, Journal of Economic Development, Vol-37, 2012, Number-1. Email-Pravakar@iegindia.org.
- [8] Prasad Kiran, Mobile Communication for Sustainable Development: Change and Challenges in South Asia, 2012
- [9] Amit Mini Arrawatia and Meel Pankaj, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 1(8), October 2012, ISSN: 2278 – 1323
- [10] Podesta John, Inclusive Economic Growth; increasing connectivity, expanding opportunity and reducing vulnerability (2013), www.americanprogress.org/issues/economy.
- [11] Preet Khandelwal, Surya Prakash Ahirwar, Amit Bhardwaj, Image Processing Based Quality Analyzer and Controller, International Journal of Enhanced Research in Science Technology & Engineering, Volume 2, Issue 7, 2013.
- [12] Sanap Mahohar K, Role of Information and Communication Technology in the Women Empowerment, Chronicle of the Neville Wadia Institute of Management Studies & Research, 2015, ISSN: 2230-9667
- [13] Jollie N Alson and Lifezel V. Misagal, Smart phone usage among collge students, International Journal of Research in Engineering & Technology, 4(3), (2016).
- [14] Cellular Operator Association of India (COAI), India, www.coi.com
- [15] Annual Report 2016-17, Telecom Regulatory Authority of India (TRAI), India <http://www.trai.gov.in>.