

Study paper

On

Telecommunications / ICTs for rural and remote areas of India

Abstract: - Telecommunications / Information & communication Technology (ICT) has worked as a key enabler & driver for social and economic development of a country, in a knowledge intensive global scenario. As per the World Bank's study, 10% mobile and broadband penetration increases the GDP by 0.81% and 1.38% respectively. In India approx. 68% population lives in rural areas where the teledensity is approx. 42%. For launching ICT applications such as e-health, M-health, e-education and e-Governance etc, teledensity should be increased and high speed internet service should be provided in rural and remote areas of the country. In this paper we have taken the Indian scenario and initiative to be taken by all stakeholders for providing / improving the telecom and internet services in rural and remote areas of the country.

1.1 Introductory Background

Indian Scenerio:-India is one of the fastest growing telecom markets in the world. The unprecedented increase in teledensity and sharp decline in tariffs in the Indian telecom sector have contributed significantly to the country's economic growth. Besides contributing to about 3% to India's GDP, Telecommunications, along with Information Technology, has greatly accelerated the growth of the economic and social sectors.

1.2 Urban – Rural details of Telecom subscribers

As per TRAI report of June 2013, urban India has reached a teledensity of 146%, whereas the teledensity in rural India stands only at 42%.

Total Broadband subscriber (download speed \geq 256kbps) base has increased from 15.13 million at the end of May 2013 to 15.19 million at the end of June 2013, thereby showing a monthly growth of 0.39%. As on 30th June 2013, there are 161 Internet Service Providers (ISPs) which are providing broadband services in the country. Top five ISPs in terms of market share (based on subscriber base) are: BSNL (9.97 million), Bharti Airtel (1.41 million), MTNL (1.10 million), Hathway (0.37 million) and You Broadband (0.32 million). BSNL is having approx. 0.52 million broadband connections, working in the rural areas despite having largest network in the country in terms of mobile coverage and OFC penetration.

There are approx. 144 million subscribers accessing internet through wireless phones. Out of this approx. 10% to 15% subscribers from rural areas.

1.3 Population structure of Urban- Rural areas in India

As per the Census of India 2011, provisional population of the country was 1.21 billion. Out of this rural population was 0.833 billion and urban 0.377 billion. Rural – Urban distribution was 68.84% & 31.16%. There may be no significant change in rural – urban distribution of population in two years. We can expect that approx. 68% population is living in the rural areas (approx. in 0.65 million villages) and the rest in urban area (Towns and cities). India is having twenty eight states and seven union territories. States are further divided in districts, district in tehsils & blocks and block in village panchayats for the purpose of administration and development. There are approx. 672 districts and 6382 blocks in the country. Each block is having approx. 390 village panchayat and each village panchayat is having 2-3 villages. Total no. of village panchayat in the country are approx. 0.25 million.

1.4 Urban – Rural digital divide

From the details in point 1.2 & 1.3, it is clear that the growth has been mainly in urban area and there is a big urban – rural digital divide. The full potential of mobile and internet in enabling higher growth will not be realised until the use of these services spreads much wider in the rural area. Growth of mobile and internet in the rural area will help in Tele- education, Tele-health, skill development, expansion of various services such as banking, insurance etc, creation of new jobs and also in running various e- governance programmes. It will in turn help in curbing poverty, reducing migration, population control and also in improving the quality of life.

1.5 Challenges for Telecommunications/ICTs /Broadband Development in Rural and Remote Areas

Expansion of telecommunications in the rural areas has been much slower than urban areas due to poor ROI (return on investment) for the service providers. Such a low teledensity in rural areas is due to poor economic condition of most of the villagers and also due to poor coverage of telecom services. There are less no. of BTS, abrupt electricity supply, poor transport system & roads and distant location of petrol pumps etc in major portion of the rural areas.

A complete ecosystem is required to be developed for the rural area. Govt. as a policy maker, Telecom service providers and Equipment manufacturer have to work together for a win-win situation for the expansion of telecom services in rural areas. Optical fiber cable (OFC) is to be laid in rural areas for developing the backbone network. It is a very expensive work and may be financed by the Govt. It may be quite difficult and expensive to lay the OFC in some remote and hilly areas of North Eastern region and states of Himachal Pradesh, Uttarakhand and J&K. These areas may be covered on VSAT or through M/W.

1.6 Govt. of India Initiative for expansion of Internet services in rural areas

Mobile and Internet services improve the lives of the people by providing affordable access to information and knowledge. Many Information and Communication Technology (ICT) applications such as e-commerce, e-banking, e-governance, e-education and telemedicine require high speed Internet connectivity. Therefore OFC is required in backbone network to create a super highway of bandwidth and may also be used in access network for providing 100 Mbps to 1 Gbps bandwidth for providing various services. Following provisions have been made as a directive by Department of Telecom (DOT) in National Telecom Policy (NTP)-2012 for the fast expansion of telecom services:-

1. Recognize telecom as Infrastructure Sector to realize true potential of ICT for development.
2. Address the Right of Way (RoW) issues in setting up of telecom infrastructure.
3. Provide secure, affordable and high quality telecommunication services to all citizens.
4. Promote innovation, indigenous R&D and manufacturing to serve domestic and global markets, by increasing skills and competencies.
5. Transition to new Internet Protocol (IPv 6) as IPv4 addresses are going to exhaust. IPv6 will provide unique ID to all the devices connected on the internet.
6. Min 256 Kbps download speed (Broadband) has been revised to min 512 kbps. It will be revised to 2 Mbps in 2015 and thereafter 100 Mbps.
7. Increase rural teledensity from the current level of around 39 to 70 by the year 2017 and 100 by the year 2020.
8. Provide affordable and reliable broadband-on-demand by the year 2015 and to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps download speed and making available higher speeds of at least 100 Mbps on demand.
9. Provide high speed and high quality broadband access to all village panchayats through a combination of technologies by the year 2014 and progressively to all villages and habitations by 2020.

Govt. of India has created a special purpose vehicle, named Bharat Broadband Network Limited (BBNL) in 2011 for accelerating the National optical fiber network project (NOFN) for providing 100 Mbps connectivity to 0.25 million village panchayat. Approx. 1.5 Km - 2 Km OFC will be laid from the existing OFC coming from the block headquarters (BHQ). Fiber to the home (FTTH) and Giga bit passive optical network (GPON) technology shall be used to provide 100 Mbps connectivity to each

village panchayat. OLT (optical line terminal) will be installed in the exchange, preferably at BHQ and ONT(optical network terminal) in the village panchayat and connected on OFC to create 100 Mbps bandwidth. OLT may be further connected at the backend with different networks on Giga bit connectivity for providing the services. Router, computers, battery bank and solar panel may be installed in the village panchayat for e-governance and other services. Project cost may be approx. Rs. 20000 Cr. (US \$3.3 Billion) and shall be financed by Universal services obligation fund (USOF). Project shall be executed by Bharat Sanchar Nigam Limited (BSNL), Power Grid Corporation of India Limited (PGCIL) and RAILTEL, public sector undertakings of Govt. of India.

1.7 Telecom Service Provider's perspective:- 100 Mbps bandwidth created in the village panchayat may be hired/ extended to other location by laying OFC by telecom service providers for commissioning new BTS (2G / 3G/ 4G) to provide mobile coverage in the rural area. For this, a lot of efforts are to be made by BBNL to attract the telecom service providers as they may be having lesser interest in the rural area due to poor return on their investment.

Infrastructure such as tower of 20/40/60 meter height, DG set, Battery set, and Container etc may be created by one telecom service provider, which may be shared by other telecom service providers. Tower height will depend upon the terrain and the region to be covered. Cost effective solar panels capable of replacing electric generators may be a solution for fast expansion of mobile network in rural area.

Sharing of passive/ active infrastructure and also the unused spectrum in the rural areas will help in reducing the overall cost of the project.

Tower and the bandwidth may also be used by FM broadcasters for transmitting regional programmes. Besides entertainment, FM channels may play important role in spreading important news such as cyclone/ heavy rains weather forecast to alert the people and civil agencies for moving to safer areas. It could save thousands of lives in Uttranchal.

All efforts should be made to utilise the OFC as soon as it is commissioned and it should be monitored from central monitoring server (CMS). OFC if lying idle for a long time and damaged in some development activities such as road widening, drainage work etc, will be difficult to repair later on at the time of starting the services.

1.8 Equipment Manufacturer's perspective: - Role of equipment manufacturer is also very important. Due to poor electricity condition, poor roads and distant location of petrol pumps in rural areas, it is quite difficult and expensive to run the rural BTS with even 90% availability. Low power BTS&Transmission equipment will also help in reducing the overall power consumption.

Laptop/ tablets are out of the budget of lower medium families in India. Rural India may be a big market of cheaper & good quality mobile handsets / Tablets / Laptops with long battery life and may also accelerate the growth of mobile network in rural areas. Basic mobile hand set should be available at approx. Rs. 600/- (US \$ 10), smart phone / Tablet at Rs. 2000/- to Rs.2500/- and Laptop at approx. Rs 12000/-

Five million Laptops / Tablets have already been planned by various states Govt. for distribution to class 12th passed students free of cost in next 2-3 years. Approx.20% of the total quantity has already been distributed in this financial year. All these schemes shall also increase the tele-density in rural areas and the demand of internet may also rise as the students will get attracted to use the internet services.

1.9 Applications:- High speed internet, videoconferencing, TV channels may be provided in each village panchayat on the OFC being laid. In addition to this various Government programmes such as e-governance, Telemedicine (primary health centers may be connected with district hospital on video conferencing), Teleeducation (connected Schools), National knowledge network (NKN), e-panchayat, Aadhar, Mnrrega and various other programmes can be extended and monitored. Banking and insurance network can be extended in the rural areas.

Various types of M2M applications such as e-health, vehicle tracking, security, surveillance, e-education, food supply chain management system (FSCM) may be implemented in rural areas. Agriculture related M2M services such as remote controlled water pump solution, water level monitoring, data gathering for milk & agri cooperatives, fisheries, poultry & soil analysis may also be extended in near future.

2.0 Conclusion: - Project for connecting the 0.25 million village panchayat has already been started and expected to be completed by 2015. It will not only help in increasing the mobile and internet teledensity in rural areas but a large no. of applications as described may be launched. All these applications will help in improving the social & economic condition of the people living in rural areas to a larger extent

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