Chapter 1
Introduction

1.1. Overview

The telecom revolution in India started in 90s with opening of telecom sector to private players. The country witnessed tremendous increase in voice telephony and the tele-density has reached to 91.90 per 100 citizens as on 31.12.2017. However, the same success could not be achieved in the data segment with total broadband subscribers being 362.87 million as on 31.12.2017 and most of these subscribers are concentrated in urban areas.

Experts believe that broadband has more impact than any other ICT on GDP. According to a World Bank report, a 10% increase in broadband penetration increases the GDP of a developing country by 1.38%. To have a high sustained growth of broadband in the country, creation of a robust broadband infrastructure is of utmost importance.

The UN summit on Millennium Development Goals 2010 finalised a global action plan to achieve eight anti-poverty goals by 2015. The members agreed on the following eight goals: Eradicate extreme poverty and hunger, achieve universal primary education, Promote gender equality and empower women, Reduce child mortality, Improve maternal health, Combat HIV/AIDs, malaria and other diseases, Ensure environmental sustainability and Develop a global partnership for development.

As per the Millennium Development Report, 2010 -

“A challenge in bringing more people online in developing countries is the limited availability of broadband networks. Many of the most effective development

applications of ICT, such as telemedicine, e-commerce, e-banking and e-government, are only available through a high-speed Internet connection. But a significant divide exists between those who enjoy fast access to an online world increasingly rich in multimedia content and those still struggling with slow, shared dial-up links."

For creation of robust broadband infrastructure in the country, TRAI gave its recommendations on National Broadband Plan in December 2010 after extensive consultations with all the stakeholders. The Authority recommended that the broadband target in National Broadband Policy may be fixed as under:

- 75.0 Million broadband connections to be provided by the end of year 2012
- 160.0 Million broadband connections to be provided by the end of year 2014

The bandwidth requirement for villages will be high due to use of multimedia especially where literacy is low. TRAI projected the following bandwidth requirement for villages:

Table 1.1: Bandwidth Requirement for Villages

S. No.	Item	2012			2014		
		Total	Wireless	Wireline	Total	Wireless	Wireline
1.	Total Broadband Subscriber in Villages (in millions)	23.0	8.0	15.0	63.1	23.5	39.6
2.	Av. No of HHs* per village	327.00	327.00	327.00	334	334	334
3.	BB penetration (%)	12%	4%	8%	32%	12%	20%
4.	BB Households	39.64	13.48	26.16	106.44	39.64	66.80
5.	BW requirement per HH (in Mbps)	2	2	2	2	2	2
6.	BW requirement in access network (in Mbps) per village	79.29	26.97	52.32	212.9	79.28	133.60
7.	Contention ratio	10:01	10:01	10:01	10:01	10:01	10:01
8.	BW requirement per village in Backhaul in Mbps	7.93	2.70	5.23	21.29	7.93	13.36
9.	BW req. Per Gram panchayat in Mbps (2.24 village per GP)	17.76	6.04	11.72	47.69	17.76	29.93
10.	BW req. Per Block in Mbps (approx 41 gram panchayat per block)	728.19	247.68	480.51	1955	728.13	1226.98

* Projected household is taken for population of 2012 and 2014

Source: TRAI recommendations on National Broadband Plan 2010

TRAI recommended creation of a National Optical Fibre Network to be shared by all the service providers. For this purpose, a 100% Central Government owned company to be incorporated which would plan, establish, operate and maintain the National Optical Fibre Network. The company would arrange and manage funds from the Government programmes like Universal Service Obligation Fund (USOF). Debt is to be raised by the company and further given to state level agencies.

Based on the above recommendations of TRAI, the Department of Telecommunications (DoT) proposed setting up of National Optical Fibre Network

(NOFN) to provide optical fibre connectivity to all the Gram Panchayats in the country (approx. 2,50,000) with availability of at least 100 Mbps bandwidth to each Gram Panchayat. This network was to be created using existing OFC network and extending it to Gram Panchayats through laying of incremental OFC. The project was approved by Union Cabinet on 25.10.2011 with a direction to complete the project in two years' time.

In July 2017, the Union Cabinet approved a modified strategy for implementing BharatNet under which, the remaining 1,50,000 (approx.) Gram Panchayats (GPs) in the country are to be provided broadband connectivity in Phase-II of the project. BharatNet Phase II, which includes providing broadband connectivity to all Gram Panchayats is to be completed by March 2019. The salient features of the BharatNet Phase-II are as follows:

i. The implementation is to be done through State Model, Private Sector Model and CPSU Model.
ii. Optimal mix of media (OFC, Radio and satellite) to be used to connect GPs.
iii. Service delivery mechanism by providing last mile connectivity, through Wi- Fi or any other suitable broadband technology to all GPs has been made an integral part of the project.

1.2. Statement of the Problem

As per ICT development index 2017 released by International Telecommunication Union (ITU), India ranks 134 out of 176 countries. ICT and economy have recursive relationship. Broadband is the most important element of ICT. It has greater impact on the GDP. Therefore, success of BharatNet project is very important for the growth of GDP of the country and provision of e-governance services in all parts of the

country thereby improving the overall living standards of the citizens. The National Telecom Policy, 2012 envisages 175 million broadband subscribers by 2017 and 600 million broadband subscribers by 2020.

The National Optical Fibre Network project (later renamed to BharatNet) is an important initiative of Government of India for providing a robust broadband infrastructure for improving the broadband penetration in the country and achieving the targets of NTP 2012. The BharatNet project is also an important pillar of Digital India and success of Digital India depends largely on the success of BharatNet project. Without having a robust broadband infrastructure extended up to rural areas of the country, various initiatives of the Government like cashless economy, e-Governance, tele-medicine, e-banking etc. will not be possible to succeed.

The BharatNet project was approved by Union Cabinet in October 2011. Under this project, all the Gram Panchayats (approx. 2,50,000) in country are to be provided optical fibre connectivity with availability of at least 100 Mbps bandwidth at each Gram Panchayat. As per the approval of Union Cabinet, the project was to be completed in two years' time. However, even after completion of more than six years only 40% of Gram Panchayats have been provided connectivity.

The utilization of the infrastructure is as important as creation of it. However, it is seen that wherever the connectivity has been provided, there is very less utilisation of the infrastructure.

1.3. Objectives

The prime objectives of the current research study are as given below:

- To identify various issues and challenges in implementation of BharatNet.

- To suggest alternatives for faster implementation of BharatNet.
- To identify reasons for low utilisation of BharatNet infrastructure.
- To suggest solutions for better utilisation of BharatNet infrastructure.

1.4. Rationale

Use of broadband is driven by a number of economic, social and technological factors. It is very important to provide better life enhancing urban like amenities to rural areas and include them in Governance and decision making process which is possible through use of ICT only. Therefore, countries are concerned about creating a robust broadband infrastructure so as to have a sustained broadband growth. Competition has driven down revenues from traditional voice telephony and service providers are forced to look for new streams like broadband. For a country like India, Government can play a significant role in improving the penetration of broadband. There is enough evidence (domestic and global) to establish the growth benefits of Broadband.

ICT has brought rural areas much closer to the markets and has improved business transactions. India's technological capabilities and rising exports in information technology (IT) have been one of the major drivers of growth. Goldman Sachs Economic Research paper on "India's Rising Growth Potential" (Global Economics Paper No: 152) dated January 22, 2007 indicates that India's GDP (in US$ terms) will surpass that of the US before 2050, to make it the second largest economy.

The underlying assumption in continuation of the growth story is that growth-supportive policies are continued to be implemented. The cited report emphasizes that to continue growing, India will have to educate its children and its young people (especially its women). Lack of education can be a critical constraint to the growth of

the knowledge-based IT sector, as well as in the move to mass employment in manufacturing. It is important to educate people to take the advantage of the demographic dividend.

The demographic dividend arises from the fact that more than 50% of its population of India is below the age of 25 and more than 65% hovers below the age of 35. This makes India one of the youngest countries in the world. It is being increasingly recognized that what matters is not the size of the population, but its age structure. A population "bulge" in the working age groups(15-64 years), however large the total population, is an inevitable advantage. Thus, India, which is beginning to be characterized by such a bulge, is seen as advantaged, despite its large population.

In the above context it is absolutely essential that the information and communication technologies (ICT) be harnessed to the utmost potential. The inclusive potential of ICT at two levels: the benefits that can be brought to poorer communities and the capacity of individuals within these communities to participate in new economic opportunities.

However, India's broadband growth story has not been very impressive so far. As mentioned earlier, India ranks 134 out of 176 countries in ITU's ICT Development Index released in 2017. Government has taken various initiatives to promote broadband penetration in India. Government released National Broadband Policy 2004. In 2011, on the recommendations of TRAI on National Broadband Plan 2010, Government approved creation of National Optical Fibre Network to connect all the Gram Panchayats in the country (approx. 2,50,000) through optical fibre thereby creating a robust broadband infrastructure up to Gram Panchayat level to stimulate broadband demand. The project was approved in 2011 and was to be completed in two years' time. During last six years, various reviews have taken place and a

modified implementation strategy has also been approved by Government for Phase-2 of the project. However, the progress of the project is still slow. Therefore, it is felt necessary to study the issues involved in implementation of the project and utilization of the infrastructure created.

1.5. Research Questions (RQ)

The research study tries to answer the following questions:

RQ 1. What are the challenges/hindrances to the successful time bound completion of the project?

RQ 2. What can be the alternative viable/ feasible strategies to expedite implementation of BharatNet?

RQ 3. Why the infrastructure created under BharatNet is not being effectively utilised?

RQ 4. How can the utilisation of BharatNet infrastructure be improved?

1.6. Limitations

Due to time constraints, the study is limited to history and present status of the project, issues involved in implementation of the project and utilization of the network and possible solutions to address the issues.

The study was severely limited since there was very limited time available and the study was to be carried out along with other mandatory activities related to the APPPA course.

The study was also limited by the geographical constraints as this is a pan India project and the implementing agencies have field units all over the country. It was not possible to visit the field units in the limited time. Therefore, the data was collected from the officers of USOF HQ, and BBNL Corporate Office.

Since this an ongoing project, not much information is available in public domain. Still, an attempt has been made to collect information from websites of various international and Indian organisations. Attempts have also been made to gather information from interactions with officers of USOF, the funding agency and BBNL, the implementation agency.

1.7. Significance of the study

BharatNet project is a flagship project of Government of India. It is an infrastructure project which aims to create a robust broadband infrastructure up to Gram Panchayat level. Success of various other important schemes of the Government like Digital India, cashless economy, tele-education, etc. depends on this project. Therefore, it is of utmost importance that BharatNet project is completed at the earliest.

This study will provide an insight to the decision makers for better implementation of the project and thereafter better utilization of the infrastructure created.

1.8. Methodology

The methodology used for this study is qualitative based on primary and secondary data.

The literature survey involved browsing many journals, articles, websites and few relevant pieces of literature were shortlisted. The requisite information regarding infrastructure required for connectivity and how it is being laid etc. was collected. Besides, the primary data was collected from interactions with officers of USOF and BBNL. This report has been prepared after analyzing this primary and secondary data.

Chapterisation:

Chapter 1: **Introduction**. This chapter gives the brief background, research objectives and questions, research methodology used and significance of this study.

Chapter 2: **International Initiatives**. This chapter gives a brief idea of initiatives taken by various other developed and developing countries in creation of broadband infrastructure in these countries.

Chapter 3: **Issues and Challenges in Implementation and Utilisation**. This chapter discusses various issues and challenges encountered in implementation of the project and effective utilization of the network.

Chapter 4: **Conclusion and Recommendations**. This chapter tries to find out the alternatives for faster implementation of the project and solutions for better utilization of the network.