

# Impact of National Optical Fibre Network on Rural Development : A Case Study in BSNL, Hazaribagh Telecom District



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## Abstract

This study examines NOFN initiatives as an empowerment enabler in rural India. The National Optical Fibre Network project has the underlying objective of providing the telecom infrastructure in rural areas and it will extend the country's existing fibre optic network from the district to the village level, or gram panchayat level. The main aim of this project is to provide high-speed broadband to all the panchayats in the country by March 2019. The target includes 1.5 lakh Gram panchayats with additional optical fibre across 10 lakh kilometres. It may be regarded as a highly scalable network infrastructure, giving net accessibility to every person without any discrimination. On demand, a connectivity of upto 2 to 20 Mbps for every household. As per the capacity of demand the same facility will be extended to the Govt. and private institutions there too.

The plan for the project is to be implemented in three phases with the first phase providing broadband connectivity through optic fibre cable to one lakh gram panchayats. The deadline for this phase was fixed for December 2017. The second phase will extend the cables to 2, 50,000 gram panchayats. This time a mix of underground fibres, fibre over power lines, radio and satellite media are to be used. March 2019 has been set up as its deadline. Instead of the OFC underground, the aerial mode of connectivity is being used. The third phase involves providing state of the art and future proof network between the districts and blocks. In order to provided some redundancy ring topology is being used.

The project is being funded by the Universal Service Obligation Fund (USOF). The total project requires an expenditure of Rs 45,000 crore with Rs 11, 200 crore for the first phase. This fund was established with the object of improving telecom services in the remote and rural areas of India. This project research focused on the implementation of national optical fibre network for rural development in BSNL, Hazaribag telecom District in Jharkhand circle. After the implementation of NOFN , definitely our country will develop and bring revolution in the area of communication.

**Keywords:** National Optical Fiber Network, E- Services, Voice Over Internet Protocol, Special Purpose Vehicle.

## Introduction

One of the core challenges in nation building today is to create an equitable society where the citizens have universal access to information and knowledge to benefit them. With 70 per cent of India's population residing in villages, the inclusive growth agenda of the government can only be successfully realised by addressing the growth and development issues in rural India. Towards this end, the thrust of major policy interventions, schemes and programmes of the Government of India has been towards benefiting the rural community. As the Government plans to further its agenda of inclusive growth geared towards rural India, there is an urgent need to build effective and efficient Public Information infrastructure and associated organisational and governance mechanisms which are scalable, reliable, and sustainable.

The Indian government has announced nation wide plans to extend the existing fibre optical network to rural areas. The move will boost the village economy by creating additional jobs and curbing migration to urban centres. The extension of connection will boost economic benefits such as provide additional employment, e - education, e - health, e -

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agriculture and other e - services as well as reduce migration of rural population to urban areas. BSNL has put major focus on increasing its fibre Network especially in rural India. BSNL will further follow its growth path and has set itself an inspirational target of massively increasing market share further over the next years in the rural area. In order to achieve these targets, fibre network is must and its application may be explore in rural areas.

### Objectives of the Study

1. Establish Optical Fibre cable (OFC) based high capacity broadband connectivity at every Panchayat in the country to benefit from convergence of voice, data, and video for improving training, education, service delivery and governance.
2. Develop relevant applications, processes, programs and standards for Panchayats to meet local, state, central government and public needs.
3. Build Infrastructure and institutional mechanisms to including OFC connectivity, computer hardware, software, trained human resource, management, organisation, etc, to assure utility, scalability and sustainability

The combination of broadband connectivity, applications platform and institutional mechanisms at the Panchayat level will have a significant impact not only in terms of improving local governance, but also in implementation of schemes and programmes of the State and Central government. It will also yield tremendous benefits to the citizens through new employment and opportunities. It will offer an opportunity for rural India to become the back office of urban India to create high paying jobs and increase income.

### BSNL: Organization under Research

Bharat Sanchar Nigam Limited, a largest PSU in India, was formed in October, 2000; earlier it was Department of Telecommunication (DOT). It is world's 7<sup>th</sup> largest Telecommunication Company providing comprehensive range of telecom services in India viz, Wire line, CDMA WLL, GSM mobile, Internet, Broadband, carrier services, Lease line, VSAT, IP services, POI, WIMAX, 3G mobile services, fibre network etc. BSNL is the only telecom company that is providing data speed up to 2.5Gbps in India.

BSNL is the only service provider, making focused efforts & planned initiatives to bridge the rural-urban digital divide in ICT sector. In fact there is no telecom operator in the country to beat its reach with its wide network giving services in every nook & corner of the country & operates across India except New Delhi & Mumbai. Whether it is inaccessible areas of Siachen glacier or North-Eastern regions of the country, BSNL serves its customers with a wide bouquet of telecom services namely Wireline, CDMA mobile, GSM mobile, Internet, Broadband, Carrier service, MPLS-VPN, VSAT, VoIP, IN Services, FTTH, etc.

BSNL is committed to provide quality telecom services at affordable price to the citizens of the remotest, rural & hilly part of the Country. BSNL is making all out efforts to ensure that the main objectives of the new Telecom Policy are to be

achieved. Due to tough competition in telecom sector, BSNL has planned to layout the Optical Fibre Network up to Panchayat level. Now more & more focus are being given on improving & expanding the NOFN, introducing day to day new telecom strategies to winning customer's confidence for retaining existing customers and building new customers base also.

### Hazaribag Telecom District

Hazaribag, "the land of thousand gardens" is famous for its natural forests, wildlife, pleasant weather and minerals specially Mica and Coal. India's largest reserve of Mica is found in Koderma (better known as Jhumri-Telaya). Head quarter of Hazaribag SSA is at Hazaribag. It is situated at NH 33 and NH 2 also passing through this telecom district.

Telecom district Hazaribag serves an area of 18057 Sq. Km with a population of 68.88 lakhs(2011 census), covering the five Revenue Districts Hazaribag, Ramgarh, Koderma, Giridih and Chatra. For charging purpose, the Hazariabag SSA is divided into 13 Short Distance Charging Areas (SDCAs). Administratively, the Telecom District is divided into 3 phone divisions namely Hazaribag, Ramgarh and Giridih headed by Divisional Engr. Phones(DEP), and 2 Telegraph/phone Sub-divisions, Chatra and Jhumritilaya each headed by a Sub divisional Engr. Phone(SDE phone).

The Telecom District is headed by GM (General Manager, who is supported by DE(Admn. & Plg.) and CAO(Chief Accounts Officer).

### NOFN: National Optical Fibre Network

Aimed at providing broadband connectivity to Panchayats, the government approved the scheme of creating a national optical fibre network, which will help in offering governance, banking and health services online.

"The objective of the scheme is to extend the existing optical fibre network which is available up to district/block headquarter level to the gram panchayat level initially by utilizing the Universal Service Obligation Fund (USOF)". A similar amount of investment is likely to be made by the private sector complementing the NFON infrastructure while providing services to individual users. As per a study conducted by the World Bank, with every 10 per cent increase in broadband penetration, there is an increase in GDP growth by 1.4 per cent. "NOFN will also facilitate implementation of various e-governance initiatives such as e-health, e-banking, e-education, etc, thereby facilitating inclusive growth".

Initially, the broadband project will be executed by state-owned Bharat Sanchar Nigam Limited (BSNL) and other institutions like RailTel. "For the implementation and execution, the Cabinet has approved the formation of a special purpose vehicle (SPV) with equity from government of India". Later on BSNL, Power Grid and Gas Authority of India would also be made partners, he added. The NOFN will also provide high bandwidth connectivity for electronic delivery of services to citizens. The proposed NOFN will enable effective and faster implementation of various mission mode e-governance projects amounting to about Rs 50,000 crore initiated by Department of Information Technology as well as

delivery of a whole range of electronic services in the above areas by the private sector to citizens in rural areas.

Hence we need to extend the OF cable throughout the country, especially in the rural area to cover all blocks and panchayats.

#### **The Need for NOFN**

1. Guaranteed Bandwidth at GP and Block.
2. Beneficiary operators to interconnect NOFN at its PoP at Block and further built up connectivity using existing networks upwards.
3. Access Providers to interconnect at GPs to launch their retail services.
4. Standard interfaces for interconnection at GPs as well as Blocks.
5. Centralised Management – NMS.
6. Both Active & Passive technologies to be deployed depending on ground situation.
7. Ring & tree architecture to be used depending on ground realities and requirements.
8. NOFN will use technologies that are scalable, maintainable, observable & controllable meeting ground realities of diverse rural environment.
9. NOFN to be operated and controlled centrally (NMS).
10. Evolution: HLC-Advisory body-SPV(Incorporated as BBNL).
11. NOFN to be built using dark fibres leased from three CPSUs (or any other desirous telecom operator) and laying incremental fibre.
12. NOFN to offer interconnection at Block level and Gram Panchayat (GP) level.
13. Guaranteed Bandwidth of 100 Mbps at GP.

#### **Materials and Methodologies**

Research methodology can minimise the degree of uncertainty in the study. It reduces the probability of making a wrong choice amongst the available alternative course of action in the implementation of National Optical fibre network strategy to enrich rural areas in Hazaribag Telecom District. It plays a very important role in providing systematic supply of information coupled with tools of analysis for making sound decisions based on scientific principles which has the minimum risk.

#### **Data Collection**

To make a decision in any business situation we need data. Facts expressed in quantitative form can be termed as data. Success of any statistical investigation depends on the availability of accurate and reliable data. These depend on the appropriateness of the method chosen for data collection. Therefore data collection is very basic in decision making. There are two types of method for data collection as below:-

1. Primary data
2. Secondary data

#### **Primary Data**

When the data used in statistical study was collected under the control and supervision of the investigator first time, such type of data is referred to as primary data. Here primary data has been collected as follow:-

1. Through structured questionnaire.

2. Personal interview of the different rural subscribers and different officers and staffs of BSNL posted at Hazaribag SSA like SDE (Trans.), SDE (GSM), SDE (Phones), SDE (Broad band), SDE (Marketing), SDE (planning) and other executives.

#### **Secondary Data**

When the data is not collected by investigator directly but it is derived from other sources then such data is referred to as secondary data. Here secondary data has been taken from following sources:-

1. Circulars of BSNL, Hazaribag SSA
2. Circulars of BSNL, Circle office, Ranchi
3. Circulars of BSNL, Corporate office, New Delhi
4. GIS Mapping, NIC Office
5. Indian Telecom Sector Outlook
6. Annual report of BSNL, Hazaribag SSA.
7. (j) Internet websites like bsnl.co.in of BSNL, intranet.bsnl.co.in of BSNL, Reliance Telecom, Tata Telecom, Airtel and other sites.

#### **Review of Literature**

Ministry of Communication and Technology Report (2012) Implementation of National Optical Fibre Network (NOFN): All village Panchayats are to be connected through NOFN to enable delivery of public and private electronic services to citizens in urban and rural areas. Broadband is a tool for improving the life of people by providing affordable and equitable access to information and knowledge. For individual, broadband has direct impact on their day to day life style and behaviour. For State, it enormously contributes towards trade and generation of employment. Many Information and Communication Technologies (ICT) applications such as e-commerce, e-banking, e-governance, e-education and tele-medicine require high speed Internet connectivity.

Fibre Optic Communications: An Overview (2013) by Prachi Sharma, Rohit Kumar Arora, Suraj Pardeshi and Mandeep Singh, emphasized on communication using optical fibres. The transmission using high bandwidth can handle vast amounts of information, which can be further improved by reduction in fibre losses, increase in data rates and distances, development of optical sources and detectors compatible with fibres.

Ravin et al. (2015) conducted a survey to analyze the challenges faced in delivering of e-health care services in selected rural areas of Madhya Pradesh and Maharashtra. The study concluded that village health workers play crucial role in generating awareness about e-health service and act as mediator between village and the e-health center. The e-health care through ICT offers a new platform for the treatment of patients residing in rural and remote areas.

Renuka et al. (2015) analyzed the current position of Foreign Direct Investment (FDI) in Indian health care sector. Various opportunities and challenges regarding such investment have been identified. It has been suggested that FDI must create necessary infrastructure as well enhance awareness level to provide qualitative health care services. FDI funds can also be utilized to increase the physical

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capacity and development of specialty and super-specialty centres, up gradation of new technology like e-health services.

M.S.Swaminathan Research Foundation at South India in the year 1998. The title of the research was "Assessment of Impact of Information Technology on Rural Areas of India", has focused the impact of Information technology on rural areas of India. In India almost 70 % population residing in rural areas , so if they will develop ,it means the country will develop.

World Telecommunication Development Report (2002) shows that the technologies of mobile telecommunications and internet are going to set the contours of further technological progress in the current decade. The most recently initiatives aims at convergence of voice and data received from multiple sources both web based and real time video streams in mobile handsets and calling cards have virtual presence possible almost everywhere overcoming the barriers of distance, topography and remoteness.

Prithipal Singh (2004) observes that with the convergence of technologies, data services are expected to grow exponentially in the years to come. Broadband is likely to take a lead in the development of Indian Telecom Sector. Broadband is growing market and offers immense possibilities for investment. In Broadband policy, India has envisaged a target of 40 million Internet subscribers and 20 million broadband subscribers in the country.

P.S. Saran (2004) finds that the telecom technology in India has transformed from manual and electro-mechanical systems to the digital systems. India has stepped into new millennium by having 100% electronic switching system. The technological changes have made way for new services and economics in the provision of telecom services.

Mather (2005) explores that the challenge, of course, is that a competitor can show up in one of your established markets with new technology, better people, a better network of companies for support and a better management style and steal huge chunks of your business before you can respond. Staying at the forefront of all these issues will be the only way to stay successful.

### Impact of NOFN on Rural Development

Rural development is concerned with economic growth and social justice, improvement in the living standards of the rural people by providing adequate and quality society services and minimum basic needs. The Indian government has announced nationwide plans to extend the existing fiber optical network to rural areas. The move will boost the village economy by creating additional jobs and curbing migration to urban centres. The Fibre network extension will boost economic benefits such as provide additional employment, e-education, e-health, e-agriculture and other e-services as well as reduce migration of rural population to urban areas. The nationwide fiber optic network will help drive government initiatives such as e-health, e-banking, e-education and so on.

The country has been witnessing a revolution in communication technology. Ever since the

beginning of planned development in the country, the role of mass media in the development process has been recognized significantly. With the launching of grass roots democratic structures, followed by vigorous efforts to implement Right to Information, Rural Health Mission, Drinking Water Mission, Rural Electrification, Rural Employment, Empowerment of Women, and renewed enthusiasm to spread the light of Literacy, the mass media is now at an advantageous position to meet the challenges of rural uplift in this 21st century. Rural upliftment has always been remained a prime concern of all governments in India. Then Indian economy is pre-dominantly rural. More than 72 per cent of the Indian population reside in villages and rural areas. Rural women are a vital part of Indian economy and one-third of national labour force and a major contributor to the survival of the family. Government is making continued efforts to provide equitable growth opportunities to rural women by the ways of empowerment and upgrading the information infrastructure in rural and remote areas. In this paper, a detail study has been carried out how the telecom media has been flourishing and contributing towards the rural development process in India.

The following e-services which is mostly affecting the rural development and motivate rural people to adopt fiber technology to access all types of information quickly. This knowledge or information leads to rural people not to move anywhere in the urban area and will provide self employment in the rural areas.

### E-Commerce

Electronic commerce, commonly known as e-commerce or e-comm, is the buying and selling of products or services over electronic systems such as the Internet and other computer networks. Electronic commerce draws on such technologies as electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices and telephones as well.

### E-Education

Commonly referred to as online education, e-education is the process of learning online. Whether you're a high school student or a graduate college student, a person looking to expand technical skills or a retiree who simply wants to learn more, Internet learning provides a boundary-free way to broaden your horizons. Many elite universities, such as Arizona State, Villanova and North Carolina offer online programs, as well as nationally ranked technical schools. This wide variety of schools offers a range of programs from Master of Business Administration to graphic design. Depending on the program you select, you can complete it entirely online, or combine it with a traditional "in-person" learning setting. The flexibility of online learning is particularly helpful for working professionals who want

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to return to school, but need to remain employed to support their families.

## E-Marketing

E-marketing means using digital technologies to help sell your goods or services. These technologies are a valuable complement to traditional marketing methods whatever the size of your company or your business model. The basics of marketing remain the same – creating a strategy to deliver the right messages to the right people. What has changed is the number of options you have. Though businesses will continue to make use of traditional marketing methods, such as advertising, direct mail and PR, e-marketing adds a whole new element to the marketing mix. Many businesses are producing great results with e-marketing and its flexible and cost-effective nature makes it particularly suitable for small businesses.

## E-Health

(Also written e-health) is a relatively recent term for healthcare practice supported by electronic processes and communication, dating back to at least 1999. Usage of the term varies: some would argue it is interchangeable with health informatics with a broad definition covering electronic/digital processes in health while others use it in the narrower sense of healthcare practice using the Internet.

## E-Governance

Several dimension and related factors influence the definition of e-Governance. The word “electronic” in the term e-Governance implies technology driven governance. E-Governance is the application of Information and Communication Technology (ICT) for delivering government services, exchange of information communication transactions, integration various stand-one systems and services between Government-to-Citizens (G2C), Government-to-Business(G2B),Government-to-Government( G2G) as well as back office processes and interactions within the entire government frame work. Through the e-Governance, the government services will be made available to the citizens in a convenient, efficient and transparent manner. The three main target groups that can be distinguished in governance concepts are Government, citizens and businesses/interest groups. In e-Governance there are no distinct boundaries. Generally four basic models are available- Government to Customer (Citizen), Government to Employees, Government to Government and Government to Business.

## E-Judiciary

The performance of any Government can be tested by the efficiency of its judicial system. The Indian judicial system is known for its impartiality, independence and justice-oriented approach. The first duty of any court is to do justice, but in the process to perform it in the most democratic fashion. Today new frontiers are challenging its capabilities and its way of functioning. India currently is facing shortage of ‘Judicial Officers’ to handle the number of cases that have been filed and have accumulated over time. The seriousness of this situation should be realized and the Government should pro-actively use Information

Technology (IT) to make e-Judiciary an integral part of its judicial system.

E-Judiciary is a judicial system that uses the Internet and electronic documentation from the time the case is registered until the time judgment is rendered; the records of proceedings and judgment can be accessed for future reference. An ideal e-Judiciary system for any country at a given point of time should be compatible with the socio-economic factors of that country at that point of time.

## E-Banking

Online banking (or Internet banking) allows customers of a financial institution to conduct financial transactions on a secure website operated by the institution, which can be a retail or virtual bank, credit union or society. It may include of any transactions related to online usage

To access online banking, the customer would go to the financial institution's website, and enter the online banking facility using the customer number and password. Some financial institutions have set up additional security steps for access, but there is no consistency to the approach adopted.

## Conclusions

ICT tools of the 21st century will play a pivotal role in realising Government of India's commitment to empowering rural citizens and unleashing the growth and development potential of rural India by changing the governance and service delivery paradigm. A robust, reliable and scalable public information infrastructure, with Broadband access at every Panchayat at its core, will be the bedrock of this new paradigm and will offer unprecedented dividends to the Government and citizens. As delineated above, keeping in mind the issues of cost and sustainability, the way forward in this regard would be a plan for providing Broadband connectivity at Panchayats through the optical fibre route for long term growth and development.

To meet the Government of India's goal, it is essential to drive Fiber To The Home (FTTH) technology along with other broadband access technologies for providing broadband access. Panchayats are the key administrative interface of this programme and provide the requisite resources for capturing data and information about job cards, allocation of works, and payments to the beneficiaries. Similarly, Panchayats can play a pivotal role in the delivery of other key services and programmes such as food security, financial inclusion, agriculture, health, education, etc. Where efficient mechanisms of identification and authentication of beneficiaries, and monitoring and disbursement of benefits to the rightful beneficiaries are required. Panchayats are also critical for community participation in development, growth and prosperity.

## Recommendations

Laying optical fibre cable networks on a large scale will be critical for providing high speed, secure and reliable Internet access and network connectivity to Panchayats. There is an urgent need to focus attention on optical fibre so that most of the internet traffic is handled by the optical fibre network and the last mile is taken care of by WiMAX/ Ethernet/ copper

cable based connectivity. Though optical fibre connectivity to all the villages may be desirable, in exceptional cases such as geographically scattered and Inaccessible areas, and when the optical fibre option is not feasible, deploying wireless infrastructure and establishing satellite based connectivity may be considered. Presently, optical fibre connectivity is largely available up to the district headquarters. In the rural domain, OFC connectivity is available up to block headquarters and is primarily provided through the BSNL network. This necessitates exploring options to strengthen optical fibre connectivity from Blocks to the Panchayats and working out alternative plans to lay optical fibre network up to the Panchayat level on a priority basis. In addition, existing long distance fibre optic connectivity can be used for inter district/block connectivity. Realising the impact of connectivity on economic development, governments in most developing and developed economies have invested resources in increasing optical fibre to create a robust IT backbone. Considering the high investments involved, and the long term dividends that this infrastructure investment will pay in governance and service delivery, the Government should make available the requisite resources for creating the optical fibre network (aerial and underground) up to the villages to boost broadband penetration.

On the basis of available documentations and questionnaires responded by employees, business partners, rural customers of BSNL and private operator's business partners, all the recommendations will be fruitful for better implementation of national optical fibre network strategies to enrich rural development.

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