A Comparative Study on Retail Business Processes of RailTel and BSNL in the Provisioning of FTTH Based Broadband Internet Services

A study conducted at BSNL Telecom Division Nedumangad
Trivandrum SSA, Kerala Circle

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ABBREVIATIONS

ADSL	-	Asymmetric Digital Subscriber Line
ANP	-	Access Network Provider
BSNL	-	Bharat Sanchar Nigam Limited
BSS	-	Business Support Software System
CAF	-	Customer Acquisition Form
CPE	-	Customer Premises Equipment
CRM	-	Customer Relationship Management Software System
DoT	-	Department of Telecommunications
DSL	-	Digital Subscriber Line
FTTH	-	Fibre To The Home
FUP	-	Fair Usage Plan
GPON	-	Gigabit-capable Passive Optical Network
IP	-	Internet Protocol
ISP	-	Internet Service Provider
IT	-	Information Technology
JWG	-	Joint Working Group
KCCL	-	Kerala Communicators Cable Limited
KSEB	-	Kerala State Electricity Board
KYC	-	Know Your Customer
LCO	-	Local Cable TV Operator
MPLS	-	Multi Protocol Label Switching
MSP	-	Managed Service Provider
NMS	-	Network Management Software System
NOC	-	Network Operating Center
OLT	-	Optical Line Termination Unit

ONU	-	Optical Network Units
OSS	-	Operational Support Software System
PIJF	-	Polythene Insulated Jelly Filled
PON	-	Passive Optical Network
POP	-	Point of Presence
RF	-	Radio Frequency
RFQ	-	Request for Quotation
SME	-	Small and Medium sized Enterprise
TV	-	Television
UPS	-	Uninterrupted Power Supply
VPN	-	Virtual Private Network

EXECUTIVE SUMMARY

RailTel, a Govt. of India undertaking under Ministry of Railways, Govt. of India has now become a competitor to BSNL in broadband service provisioning. RailTel introduced their FTTH (Fibre To The Home) broadband services with the brand name RailWire. They have upgradable and high speed internet connectivity at all railway stations. They initiated a three tier business model to penetrate FTTH broadband connections in the country, including rural and remote villages. The business partners in this three tier system are RailTel, Managed Service Providers (MSP), and Access Network Providers (ANP). RailTel has identified the overhead fibre optic cables available in access network of Local Cable TV Operators (LCO) as the potential last mile reliable media. The LCOs are chosen as the access network providers for RailsTels's FTTH broadband retail business. RailTel extends their network through the Managed Service Providers to LCOs. The LCOs are now providing FTTH broadband connections even at the remote villages. RailTel positively differentiated their products from BSNL with competitive pricing. It is conclusively confirms that, very slowly the ADSL (Asymmetric Digital Subscriber Line) broadband connections of BSNL are substituted by RailTel FTTH broadband internet service, since the fibre optic media is free from all the inherent limitations of existing copper cable network.

This case study analyses the retail business model of RailTel FTTH broadband internet services in detail. To a great extent, the RailTel three tier business model eliminates the bottlenecks in the last mile, which is a primary hurdle for all wired access telecom service providers in India. This model can be adaptable to BSNL with suitable modifications. Apart from the three tier business model of RailTel, a two tier business model is suggested for BSNL. In BSNL, it is easy to replace the MSP, the middle tier interface of RailTel, with BSNL telephone exchanges. Therefore, BSNL can directly enter into a business contract with local cable TV operators and can utilise the immense potential of available overhead fibre optic networks in a cost effective way. BSNL can design and realise a win-win revenue share model with local cable TV operators, which can outperform the existing RailTel model, by utilising the brand image and network infrastructure of BSNL throughout the country. Developing a fine tuned FTTH broadband retail business model, incorporating LCOs in the last mile can contribute to digital India initiatives and reduce the digital divides in the country. This business model can change the BSNL broadband business profile and may lead to fibre to the home broadband revolution in India.

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1.   Introduction

The broadband internet services were introduced in India in early 2000s. The broadband service enables high speed access to the information super highway, the internet. In broadband provisioning, the available technology options are optical fibre technologies, digital subscriber lines (DSL) on landline copper loop, cable television network, satellite media, and terrestrial wireless technologies. The broadband services through the existing landline copper cable network became a golden opportunity for landline telecom service providers, especially the state owned operator BSNL.

In the mean time, the Indian telecom industry has witnessed an exponential growth in the development of mobile telecommunication sector. In India, the mobile subscriptions exceeded fixed line connections in the year 2004. Even though the mobile connections surpassed the landline connections, the land line segment continued its growth till the year 2006, and reached a subscriber base of 41.54 million. The landline industry has been showing declining trends since 2006. The fixed phones were widely substituted by mobile phones in India due to convenience and low pricing of the fast growing mobile telecom services[1]. At this declining stage of landline telephone services, the broadband provisioning through the landline offered a great hope to the landline sector. Today, in wired segment, DSL based broadband is the most preferred technology option in comparison with others. Even though DSL based broadband subscriber base predominates, it shows stagnation trends in the wired access broadband market in India. Whereas the growth rate of fibre optic technologies in broadband services is becoming more and more rapid.

1.1   Statement of the problem

The BSNL concentrates the provisioning of FTTH broadband services mainly in urban and semi-urban areas. BSNL experiences many operational bottlenecks in the development of FTTH access network. The pricing of BSNL FTTH services are comparatively high and the service delivery mechanism is not effective in the present competitive market. The RailTel business model is innovative and the service delivery and service assurance processes are seem to be more effective. In Kerala, there is ample chance that, BSNL fixed line broadband internet services may slowly be substituted by RailTel FTTH broadband internet services even at rural villages.

1.2   Scope of the study

This research work is an attempt to study the retail business processes of RailTel and BSNL in the provisioning of FTTH based broadband internet services. The scope of the study is limited to identify, illustrate and compare the business processes, service delivery and service assurances of FTTH based broadband internet services of RailTel and BSNL in Kerala. The retail business model of RailTel in collaboration with local cable TV operators who established a fibre optic based access network for cable TV operations is selected for the comparative the study.

1.3   Objectives of the study

The objectives of the study are:

1)   To study the retail business model of RailTel FTTH broadband internet services

2)   To compare and contrast the pricing of FTTH broadband internet services of RailTel and BSNL

3)   To analyse the retail broadband business opportunity of BSNL in association with local cable TV operators and suggest a mutually beneficial retail business model.

1.4   Research methodology

Case study research method is adopted for the study. In Kerala, RailTel entered into work contract assistance with Local Cable TV Operators (LCO) for providing retail broadband services. The LCOs are the Access Network service Providers (ANP) of RailTel's FTTH broadband services. A case of one of the LCOs is carefully selected from a rural area of Trivandrum district for the study.

2.   RailTel internet services

RailTel Corporation of India Limited is a Public Sector Undertaking under Ministry of Railways, Govt. of India. Its registered office is at New Delhi. The company offers following telecom services.

1)   Co-location Services under IP-1 License

2)   Managed Lease Line & MPLS VPN under NLD License

3)   Internet services under ISP-Class A License

2.1 The retail business model of RailTel FTTH broadband internet services

The broadband and application services across India including rural and remote areas are extended by RailTel under the brand name RailWire. The main entities in this collaborative business model are

1)   RailWire

2)   MSP(Managed Service Provider)

3)   ANP(Access Network Provider)

The block schematic of three tier retail business model of RailTel is shown in figure.1.

Figure.1

RailTel FTTH Broadband – Retail business Model
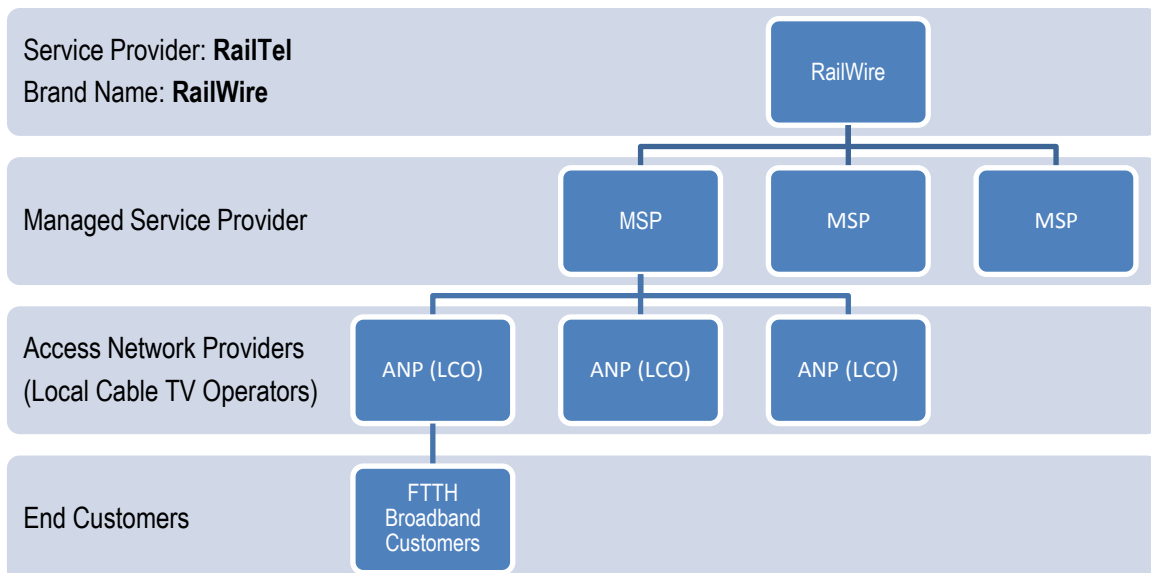
2.2 The roles and responsibilities of RailTel three tier interfaces

The RailWire provides broadband and application services with the support of Managed Service Providers and Access Network Providers. The ANPs are the real facilitator to the end customers; normally they are Local Cable TV Operators (LCOs). Before selecting the LCOs as the facilitators, RaiTel verifies their cable TV license which is authenticated and issued through the post offices. The business design of MSPs is almost similar to that of franchisees in BSNL. The selection of MSPs has been done by RailTel on the basis of a national level request for quotation (RFQ). The MSP has an intermediary role between

RailTel and ANP. The MSP identifies prospective ANPs (mainly LCOs), leading to signing of agreements between RailTel and the ANP.

The RailTel connects the MSP location through optic fibre or Radio Frequency (RF) link from its nearest POP (Point of Presence) along with all necessary hardware for availability of access to RailTel's centrally-hosted Operational Support Software System (OSS), Business Support Software System (BSS), Network Management Software System (NMS), and Customer Relationship Management Software System (CRM). The RailTel arranges for connectivity of the ANP location to the RailTel network through respective MSPs[2].

The MSP educates the ANPs in evangelizing the concept of RailWire and its uniqueness to apartment associations, builders' community, various residential colonies as well as the retail community. The MSPs also educates the ANPs on the design rules of the RailWire network which includes Aggregation Network, Edge Network and Core Network. MSP employs adequate staff trained in networking. MSP may procure network equipments, customer premise equipments (CPE) and supply to ANPs. The MSP manages the ANP networks and arranges the requisite IT (Information Technology) and network infrastructure. They also arranges other supporting infrastructure like commercial power supply, alternate power source, UPS (Uninterrupted Power Supply), air-conditioning, space, and staff.

For the installation and maintenance of RailWire broadband services, the LCO should obtain the permission from respective residential association representatives or building owners.

Majority of LCOs are equipped with instruments such as fibre optical fusion splicer and OTDRs (Optical Time Domain Reflectometres) for installation and maintenance of their fibre optic network. The Chinese made fibre optic splicing machines are offered in the market worth Rs 100000/-(Rupees one lakh) only. In addition to this, professional fibre optic splicing teams are accessible even in small townships. For splicing of optic fibres, they charge Rs 100/- (Rupees one hundred) only per splice joint. The LCOs have to bear transportation cost extra to arrange the service of professional splicers. It is interesting to note that, the cost of optic fibre splicing is sound less than the cost of PIJF (Polythene Insulated Jelly Filled) copper cable jointing.

2.3 Marketing, sales, and customer acquisition

The LCO is responsible for marketing of RailWire services, and identification and enrolment of prospective RailWire subscribers. They have to collect KYC (know your customer) document (as per DoT Guidelines) along with signed customer acquisition form (CAF) and should ensure activation and continuation of RailWire services. The LCO has to verify the copies of document collected from the subscribers against the originals. The LCO has to download the tariff plans published in RailWire website and made it available for the customers. They can also provide connection to SMEs (Small and Medium sized Enterprises) such as cyber cafes, private limited companies, and other enterprises.

The MSP pursues the targets fixed by the joint working group (JWG) consisting of RailTel and MSP officials. MSP deploys necessary resources for branding, marketing, and sales of RailWire services. In consultation with the JWG, MSP organises outdoor advertisements, print and electronic media advertisements, road-shows, tele-marketing, SMS campaign etc. The RailTel will provide the creative inputs for brand-building and advertisement campaign. The sample copies of RailTel CAF and a billing invoice are attached as annexure (i) and (ii). The CAF format is highly professional in appearance and the billing invoice is very simple to understand. A sample tariff brochure is given in annexure (iii).

In the selected case of the present study, the LCO started FTTH broadband retail business in September 2015. Within three months, 22 BSNL broadband connections were substituted in the area. In addition to this, they acquired 5 more new connections.

2.4 Customer support

The MSP facilitates call-center at its own cost, which will interface with RailTel's toll-free number and handle queries, complaints, and extend maintenance support to RailWire customers. MSP operates a service-center together with requisite skilled manpower on a 24x7x365 basis, specifically for RailWire customers. In order to ensure better quality of service to customers, the MSP periodically measures the customer experience of the brand-RailWire in accordance with the standards laid down by RailTel.

2.5 Revenue accounting

The revenue collections, accounting and settlement are managed through the RailWire billing system. Based on prepayment, RailWire connections are provisioned by RailTel

through its Network Operating Centers (NOCs). RailTel ensures that all revenue collection from ANPs are deposited into an account in a nationalised or first class commercial bank, opened and maintained by RailTel and reconciled on a monthly basis. The appropriation of revenue to RailTel and MSP is carried out on a weekly basis. The services of the MSP get audited by RailTel officials and or third party auditors. Payments to the ANPs are facilitated through a payment gateway.

2.6   Revenue share method

The business relationship of RailTel, MSP and LCO is based on a novel revenue share method. Apart from the capital investments incurred by the LCOs, RailTel or MSP didn't collect any fee or charges from the LCOs. The LCO enrolment in RailTel business is virtually free. The 40% of revenue collected from the subscribers' are assured for LCOs. The remaining 60% revenue is for RailTel and MSPs. The exact MSP share could not be identified in this case study. The revenue obtained from the subscribers for the second invoice is fully credited to LCOs as an incentive. In addition to this an unlimited FTTH broadband plan is provided to each LCO free of cost.

3.   The motive behind the selection of cable TV network operators by RailTel as their ANPs

The case study is conducted at a LCO affiliated to KCCL, Kerala Communicators Cable Limited. KCCL is an initiative of independent cable TV operators in Kerala. It is a conglomeration of more than 4000 independent cable networks functioning all over Kerala[3]. They branded their cable TV network as "Kerala Vision". This network extends cable TV connectivity to nearly 2500000 (twenty five lakhs) households. They are the major stakeholder in the cable TV network of Kerala. Another big player in the cable TV network of Kerala is Asianet Satellite Communications Limited. They are serving near about 1300000 (thirteen lakhs) households. The KCCL has fibre optic connectivity throughout the state managed through the mass collection of overhead fibre optic networks owned by its associates and LCOs. The LCOs have local agreement with Kerala State Electricity Board (KSEB) to draw overhead optical fibre cables through electrical distribution posts. The KSEB charges an annual rent of Rs 252/- (Rupees two hundred and fifty two only) per post for this arrangement. This annual rent is inclusive of all taxes.

The existing cable TV network deployment is highly conducive to provide FTTH broadband services with minimum capital investments. The figure.2 shows a typical network diagram of cable TV operations.

Figure.2

NETWORK DIAGRAM OF CABLE TV OPERATIONS
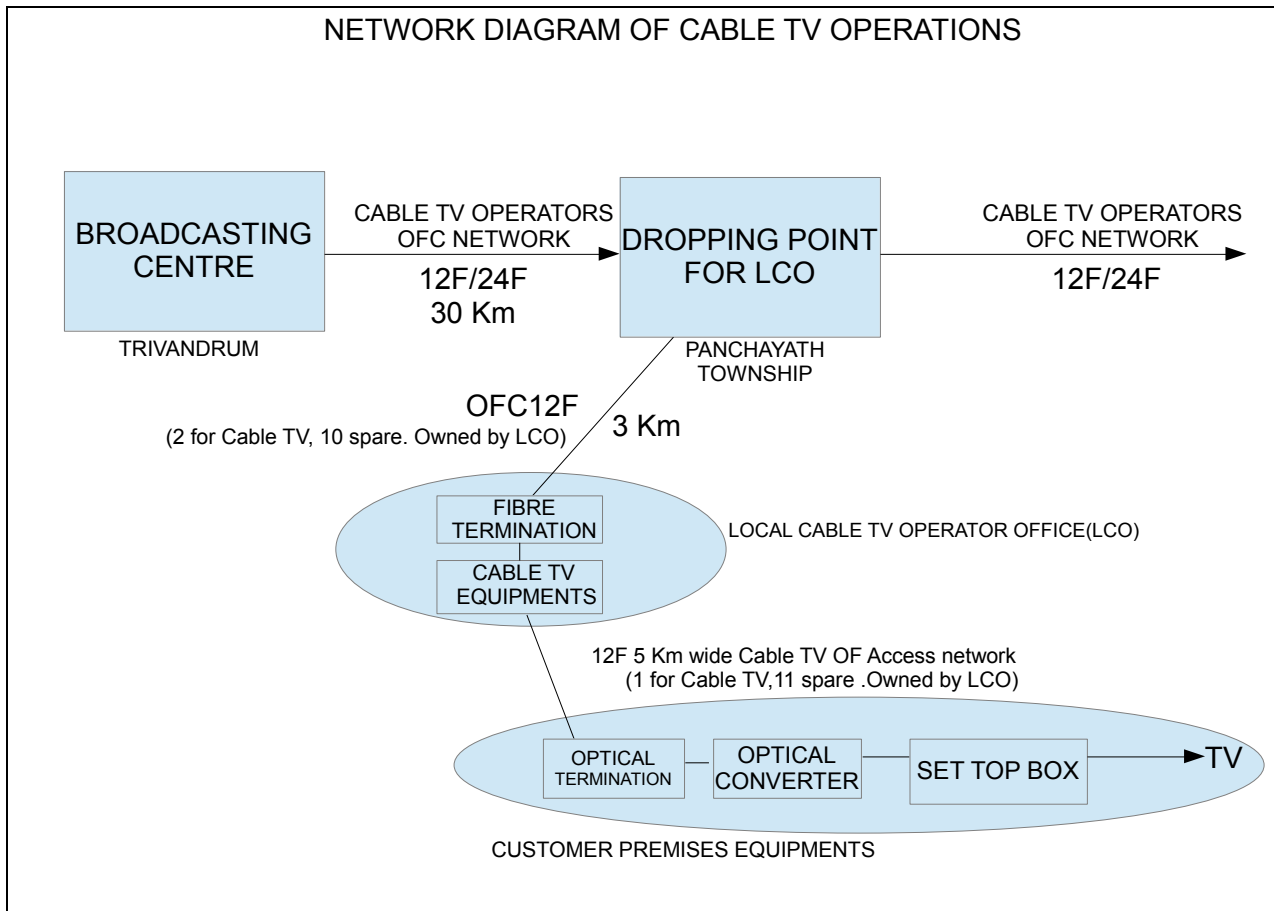
In this representative case, the main cable TV broad casting centre of KCCL is located at Trivandrum. The LCO is operating in a small village in Trivandrum district. The LCO office is 3 km away from the Panchayat township, which is 30 km far apart of the broadcasting centre. The overhead optical fibre cables from the Panchayath township to LCO operating centre is procured, drawn and maintained by the LCO. In addition to this, the LCO already established an overhead optical fibre cable network in its area of operation. This network covers nearly 650 households in the neighbourhood of the LCO office. The LCOs' fibre optic network mainly consists of 12 fibre cables. In this network one or two fibres are being utilised for cable TV transmission and the remaining fibres are spare and free. Similar unexploited optic fibres, stretching across the country including rural and remote villages, are the major temptation of RaiTel to begin the retail FTTH broadband business with local cable

TV operators. The RailTel declared that, they have a vision to enhance their ANP (Local Cable Operators) base to 100000 (one lakh) in near future[4].

4. The network architecture of RialTel - MSP - LCO FTTH retail broadband internet services

The typical network architecture of RialTel - MSP - LCO FTTH retail broadband internet services is shown in figure. 3.

Figure.3
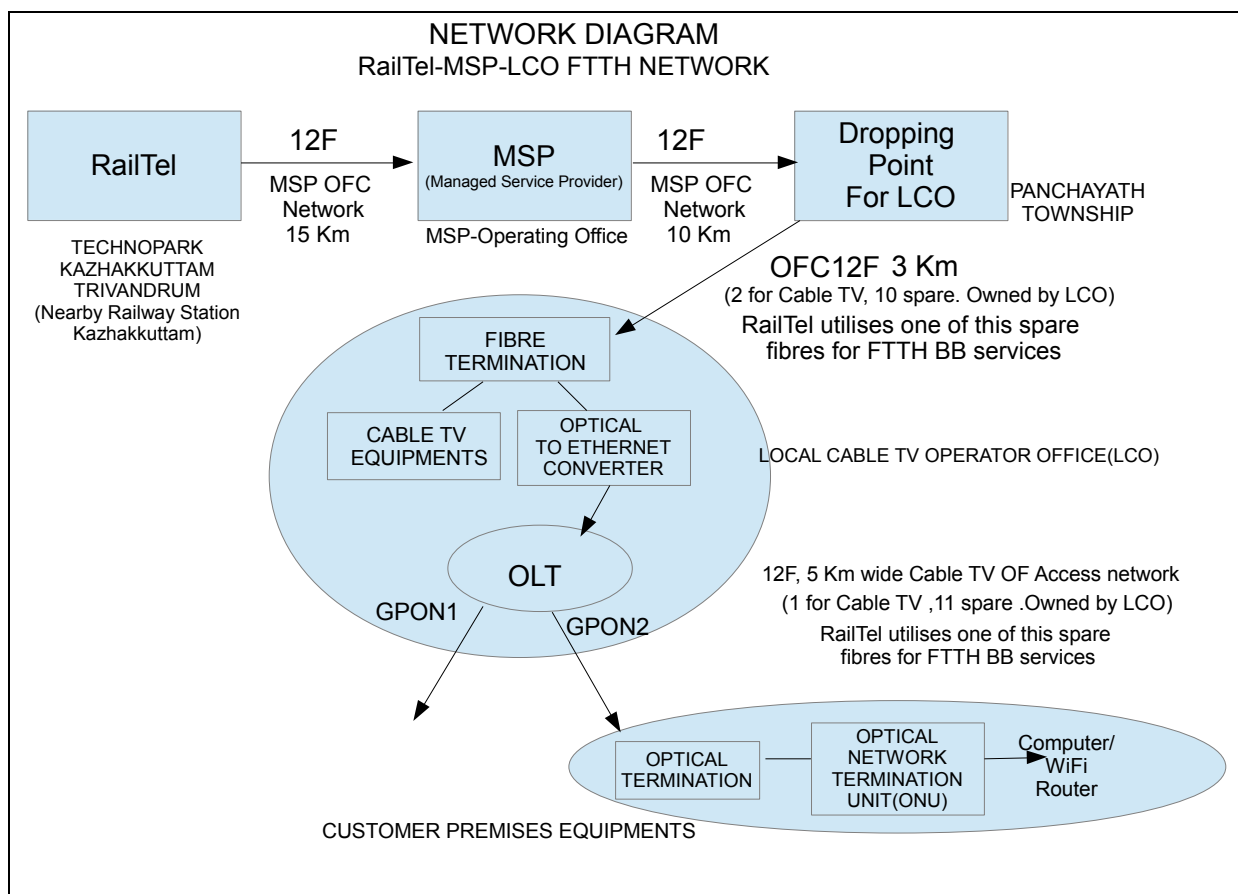
In the specific case of LCO selected for the study, the optical fibre connectivity is extended to their office from the RailTel's operating centre situated at Technopark, Trivandrum, near to Kazhakuttam railway station. The connectivity is extended through the MSP operating office at a township 15 km away from Technopark. The MSP also has agreement with KSEB to draw fibre optic cables through electrical posts. The MSP arranges RailTel's fibre optic connectivity up to the Panchayat township in the neighbourhood of LCO. The LCO in turn extends this connectivity through its existing overhead optical fibre network to their local office.

5.   The investment requirements of LCOs for augmenting Cable TV network into FTTH Broadband access network

The investment requirements of LCOs to augment their Cable TV network into FTTH broadband access network is shown in the table.1. In the selected case of LCO in our study, they procured one OLT (Optical Line Terminal) with two PON (Passive Optical Network) ports and one media convertor. The capital investment in this regard is Rs 51000/- (Rupees fifty one thousand) only. It is true that the cost of network elements of FTTH broadband network is drastically decreasing and it is reflected in the cost of fibre optic cables, media converters, optical line terminal units, GPON (Gigabit-capable Passive Optical Network) optical network units, PON splitters, patch codes, WiFi routers etc. This in turn reflects in the pricing of services.

Table.1

The investment requirements of LCOs to augment cable TV network into FTTH broadband access network

Network entities	Additional requirements in FTTH BB network	Investment Requirements	Remarks
Optical Fibre Overhead cable network	Already available	--	--
Media Convertor (Optical to Ethernet)	One unit	Cost of one unit: Rs 750/-	Available in local electronic market / Fibre optic suppliers
OLT (Optical Line Terminal)	One unit	2 PON Port (Rs 50000/-)	50 to 60 FTTH BB connections, up to a span length of 20 km can be extended from one PON port.
		4 PON Port (Rs 75000/-)	
		10 PON Port (Rs 100000/)-	
90:10 Splitter	One unit per FTTH BB connection	Cost of one unit: (Rs 250/-)	Splitters are used to provide FTTH BB connections from the single fibre extended from the OLT PON port.

The table.2 shows the details of FTTH broadband customer premises equipments (CPE) and the approximate cost requirements. The minimum requirements of CPE are optical fibre termination box (one unit), patch code (one in number), and GPON – ONU (one unit). At present, the total cost of all these customer premises equipments amount to Rs 2000/ (Rupees two thousand) only. RailTel permits the LCO to collect a maximum of Rs 3500/- as installation and CPE charges from the customers.

The GPON ONU installed at subscriber end has a single ethernet output port. It can be directly connected to the computer or a WiFi router. The connectivity through the WiFi router is optional to the customer. The market cost of WiFi router is as low as Rs 750/ (Rupees seven fifty) only.

Table.2

Details of FTTH Broadband Customer Premises Equipments

Customer Premises Equipments	Approximate cost	Remarks
Optical Fibre Termination box	Requirement: One Unit per customer. Unit cost: Rs 80/	The CPE cost is nearly Rs 2000/- RailTel permits the LCO to collect a maximum of Rs 3500/- as installation and CPE charges from the customers.
Patch Code	Requirement: One Unit per customer. Unit cost: Rs 120/	
GPON - ONU Gigabit-capable Passive Optical Networks - Optical Network Unit. (Single Ethernet output port)	Requirement: One Unit per customer. Unit cost: Rs 1800/	
WiFi Router	Requirement: One Unit per customer. Unit cost: Rs 750/	This unit is optional. If the customer requires WiFi connectivity or connectivity to multiple computers, this router has to be installed.

6. The pricing of RailTel FTTH Broadband Internet Services

It is observed that RaiTel is adopting a penetration pricing strategy to promote their FTTH broadband retail business. In Kerala they introduced unlimited FTTH Broadband plans in two main classifications for domestic customers[5]. The domestic plan classifications are detailed below.

(1) Home Unlimited Plans

(2) Home Fair Usage Plans (FUP)

In addition to domestic usage plans RailTel also introduces SME (Small and Medium sized Enterprises) plans for non-domestic users such as cyber cafes and industrial establishments.

6.1 RailTel - Home Unlimited Plans

The various FTTH broadband - home unlimited plans offered by RaiTel in Kerala are presented in the table.3.

Table.3

RailTel FTTH Broadband - Home Unlimited Plans

Sl. No.	Port Speed	Monthly Rental (Service tax extra)
1	512 Kbps	Rs 499
2	1 Mbps	Rs 899
3	2 Mbps	Rs 1399
4	4 Mbps	Rs 2499

6.2 RailTel - Home Fair Usage Plans (FUP)

The various FTTH broadband - home fair usage tariff plans offered by RaiTel in Kerala are presented in the table.4.

Table.4

RailTel FTTH Broadband - Home Fair Usage Plans (FUP)

Sl. No.	Port Speed	Data Usage	Speed After specified Data Usage	Monthly Rental (Service tax extra)	Remarks
1	1 Mbps	10 GB	512 Kbps	Rs 449	
2	1 Mbps	20 GB	512 Kbps	Rs 549	
3	2 Mbps	10 GB	512 Kbps	Rs 599	To continue browsing in actual port speed RailTel introduced two Top-up plans as Data Boosters. The pricing of top-up data boosters are (i) 5 GB for Rs 149 (ii) 10 GB for Rs 249
4	2 Mbps	20 GB	512 Kbps	Rs 699	
5	4 Mbps	30 GB	512 Kbps	Rs 799	
6	4 Mbps	40 GB	512 Kbps	Rs 899	
7	8 Mbps	40 GB	512 Kbps	Rs 999	
8	10 Mbps	40 GB	1 Mbps	Rs 1099	
9	10 Mbps	60 GB	1 Mbps	Rs 1249	

The fair usage plans of RailTel are similar to unlimited plans of BSNL. Once the data download limit is crossed, the speed has been shifted to reduced level. RailTel offers data boosters to continue browsing in initial designated port speed. The two varieties of top-plans introduced as data boosters are (i) Rs 149 (5GB) and (ii) Rs 249 (10 GB).

6.3 RailTel - SME (Small and Medium sized Enterprises) plans

The SME (Small and Medium Enterprises) plans are offered to non-domestic users such as cyber cafes and industrial establishments. In SME segment, RailTel also offers two

categories of plans namely (i) unlimited plans and (ii) fair usage plans. The details of SME unlimited plans are given in table.5 and SME fair usage plans are given in table.6.

Table.5

RailTel FTTH Broadband - SME Unlimited Plans

Sl. No.	Port Speed	Monthly Rental (Service tax extra)
1	1 Mbps	Rs 1699
2	2 Mbps	Rs 2999
3	4 Mbps	Rs 5799
4	8 Mbps	Rs 9999
5	10 Mbps	Rs 12999

Table.6

RailTel FTTH Broadband - SME Fair Usage Plans

Sl. No.	Port Speed	Data Usage	Speed After specified Data Usage	Monthly Rental (Service tax extra)
1	10 Mbps	60 GB	1 Mbps	Rs 4650

6.4   Comparison of FTTH Broadband tariff plans: BSNL Vs RailTel

The comparison of relevant FTTH Broadband tariff plans of BSNL and RailTel are given in the following tables[6]. The business terms pertaining to activation and installation charges of FTTH broadband services of BSNL and RailTel are shown in the table.7. The tariff of high bandwidth plans are compared in table.8. The comparison of plans with download speed up to 2 mbps is presented in the table.9. The table.10 shows the comparison of plans with download speed 4 mbps and above.

Table.7

FTTH Broadband Services
Installation and Activation charges: BSNL Vs RailTel

Particulars	BSNL		RailTel	
	Business Terms	**Amount**	**Business Terms**	**Amount**
Initial Charges	Activation/Installation charges	Rs 500	Installation and activation. (Inclusive of ONU with One year warranty and Maintenance support)	Rs 3500
	ONT Security deposit (refundable)	Rs 1000		
	ONT Rent per month	Rs 150		
	ONT along with ADSL WiFi Modem: Rent per month	Rs 200		
	ONT purchase from BSNL with five years AMC	Rs 12000		

Table.8

FTTH Broadband Services
High Bandwidth Plans: BSNL Vs RailTel

Particulars	BSNL		RailTel	
	Business Terms	**Amount**	**Business Terms**	**Amount**
Bandwidth (Download Speed) 10 Mbps	Up to 10 Mbps till 50GB, 512 Kbps beyond. (All users)	Rs 3999/ per month	Up to 10 Mbps till 40GB, 1 Mbps beyond (Domestic users)	Rs1099/ month
			Up to 10 Mbps till 60GB, 1 Mbps beyond (Non-Domestic users)	Rs 4650/ month
20 Mbps to 100 Mbps	Plans available		Plans NOT available	

Table.9

FTTH Broadband Services
Plans with Download Speed up to 2 Mbps: BSNL Vs RailTel

Particulars	BSNL		RailTel	
	Business Terms	Amount	Business Terms	Amount
Bandwidth (Download Speed Up to 2 Mbps)	BBG UL 545 Up to 2 Mbps till 1 GB, 512 Kbps beyond	Rs 545/per month	RailTel 449 plan Up to 1 Mbps till 10 GB, 512 Kbps beyond	Rs 449/per month
	BBG Combo UL 675 Up to 2 Mbps till 1 GB, 512 Kbps beyond	Rs 675/per month	RailTel 499 plan 512 Kbps, Unlimited	Rs 499/per month
	BBG ULD 795 Up to 2 Mbps till 8 GB, 512 Kbps beyond 8 GB	Rs 795/per month	RailTel 549 plan Up to 1 Mbps till 20 GB, 512 Kbps beyond	Rs 549/per month
	BBG Combo ULD 845 Up to 2 Mbps till 6 GB, 512 Kbps beyond	Rs 845/per month	RailTel 599 plan Up to 2 Mbps till 10 GB, 512 Kbps beyond	Rs 599/per month
	BBG Combo ULD 945, Up to 2 Mbps till 8 GB, 512 Kbps beyond 8 GB	Rs 945/per month	RailTel 699 plan Up to 2 Mbps till 20 GB, 512 Kbps beyond	Rs 699/per month
	BBG Combo ULD 1445 Up to 2 Mbps till 20 GB, 1 Mbps beyond 20 GB	Rs 1445/per month	RailTel 899 plan 1 Mbps, Unlimited	Rs 899/per month
	BBG ULD 1491EA Up to 2 Mbps till 30 GB, 512 Kbps beyond 30 GB	Rs 1491/per month	RailTel 1399 plan 2 Mbps, Unlimited	Rs 1399/per month
	BBG Combo ULD 3500 Up to 2 Mbps till 150 GB, 512 Kbps beyond 150 GB	Rs 795/per month	RailTel 1699 plan 1 Mbps, Unlimited (Non-Domestic users)	Rs 1699/per month
			RailTel 2999 plan 2 Mbps, Unlimited (Non-Domestic users)	Rs 2999/per month

Table.10

FTTH Broadband Services
Plans with Download Speed 4 Mbps and above: BSNL Vs RailTel

Particulars	BSNL		RailTel	
	Business Terms	Amount	Business Terms	Amount
Bandwidth (Download Speed 4 Mbps and above)	BBG Combo ULD 999 Up to 4Mbps till 8 GB, 512 Kbps beyond 8 GB	Rs 999/per month	RailTel 799 plan Up to 4 Mbps till 30 GB, 512 Kbps beyond	Rs 799/per month
	BBG ULD 1275 Up to 4 Mbps till 20 GB, 512 Kbps beyond 20 GB	Rs 1275 /per month	RailTel 899 plan Up to 4 Mbps till 40 GB, 512 Kbps beyond	Rs 899/per month
	BBG Combo ULD 1441 Up to 8 Mbps till 15 GB, 512 Kbps beyond 15 GB	Rs 1441 /per month	RailTel 999 plan Up to 8 Mbps till 40 GB, 512 Kbps beyond	Rs 999/per month
	BBG Combo ULD 1495 @@ Up to 4 Mbps till 30 GB, 512 Kbps beyond 30 GB	Rs 1495 /per month	RailTel 1099 plan Up to 10 Mbps till 40 GB, 1 Mbps beyond	Rs 1099/per month
	BBG Super Speed Combo 1745 VDSL Up to 8 Mbps till 30 GB, 512 Kbps beyond	Rs 1745 /per month	RailTel 1249 plan Up to 10 Mbps till 60 GB, 1 Mbps beyond	Rs 1249/per month
	BBG Combo ULD 2091 4 Mbps till 80 GB, 512 Kbps beyond	Rs 2091/per month	RailTel 2499 plan 4 Mbps, Unlimited	Rs 2499/per month
	BBG Speed Combo ULD 2295 8 Mbps till 80 GB, 512 Kbps beyond	Rs 2295/per month	RailTel 5799 plan 4 Mbps, Unlimited (Non-Domestic users)	Rs 5799/per month
	BBG Combo ULD 2799 4 Mbps Up to 30 GB, 2 Mbps beyond 30 GB	Rs 2799/per month	RailTel 9999 plan 8 Mbps, Unlimited (Non-Domestic users)	Rs 9999/per month
	BBG Speed Combo ULD 2841 8 Mbps till 175 GB, 512 Kbps beyond	Rs 2841 /per month	RailTel 12999 plan 10 Mbps, Unlimited (Non-Domestic users)	Rs 12999 /per month
	BBG Super Speed Combo 2845 VDSL Up to 16 Mbps till 80 GB, 512 Kbps beyond	Rs 2845 /per month		
	BBG Super Speed Combo 3445 VDSL Up to 24 Mbps till 80 GB, 512 Kbps beyond	Rs 3445 /per month		
	BBG Combo ULD 6300 Up to 4 Mbps till 200 GB, Up to 1 Mbps beyond 200 GB	Rs 6300/per month		

There is high price sensitivity in the market and perceived differences in the brands are many, the BSNL should focus on quality of service and ready to respond to competition and service improvements[7]. The pricing of RailTel FTTH broadband services are seems to be more competitive for domestic customers in terms of down load speed, data usage and tariff.

The BSNL tariff plans are designed for ADSL services now made available for FTTH customers. The additional ONT rent is also applicable to BSNL FTTH customers.

7. The fibre optic access network of LCOs – A potential business opportunity to BSNL

It is the fact that, BSNL has high brand value than RailTel in telecom services sector. The brand awareness of BSNL is very high among customers and Local Cable TV operators. The business processes pertaining to FTTH broadband retail business of BSNL and RailTel are compared in the table.11.

Table.11

FTTH broadband retail business processes

RailTel Vs BSNL

Particulars	BSNL	RailTel
Brand Value	High Brand value in telecom sector. High brand awareness among LCOs and general public.	A new entrant in the telecom retail business. Brand awareness is comparatively low.
Fibre Optic Network Availability	Available in almost all towns and Villages in India	Available only in Railway stations and Operating offices nearby railway routes
Development of Fibre Optic Access Network	Own arrangements. May not be effective	Utilisation of LCO's existing network through RailTel – MSP – ANP Retail Business Model.
Business Initiatives in FTTH Retail Broadband Services	Legacy Business Process	Innovative Business Model

The FTTH business of BSNL is mainly concentrated in urban area. It uses 1 x N PON splitting suitable for residential flats and high rise builiding as shown in figure.4.

Figure.4

FTTH 1 x N PON Splitting - Suitable for Urban Area
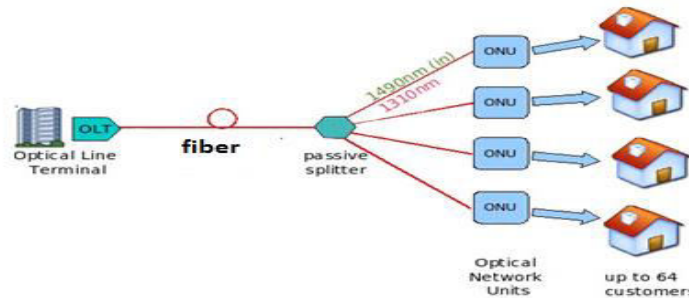
The RailTel FTTH access network design is in linear topology as shown figure.5. It uses comparatively low cost 1x2 (90:10) splitters, well-matched to utilise the local cable TV operators' fibre optic access network.

Figure.5

FTTH 1 x 2 (90:10) PON Splitting - Suitable for LCOs' Fibre Optic Access Network
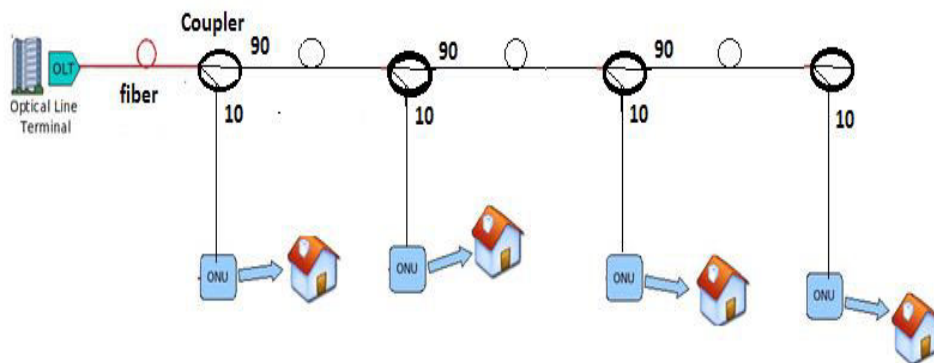
BSNL can positively utilise this untapped potential, the availability of the free and spare fibres with local cable operators throughout the country. Although certain cable TV operators still functioning with co-axial cable, they are bound to upgrade to optical fibre network in near future. The TV subscribers' base in India was 140 million in the year 2015. It is forecasted that this subscriber base will fetch 165 million in the year 2018[8]. This will be a great opportunity for BSNL to extend fibre to the homes through a visionary business partnership with local cable TV operators.

In wired broadband segment, the main focus of BSNL is in landline copper cable network, which is based on ADSL technology. In India, the subscriber base of wired broadband segment reached 19.21 million in June 2015[10]. The table.12 shows the growth of wired access broadband subscriber base in DSL and fibre optic technologies in India during the period from December 2012 to June 2015. Even though the most preferred technology option in the wired category broadband is still DSL, it is evident that the growth rate of DSL based broadband services are almost stagnated. Whereas the growth rate of fibre optic based broadband services conclusively predicts its bright future in India.

Table.12

Wired access broadband subscriber base in India (2012-2015)

DSL Vs Optical Fibre

Details	Broadband subscriber base in Lakhs			
	Dec. 2012	March 2013	Sept. 2014	June 2015
DSL	127.29	127.82	129.4	129.6
Optical Fibre	0.61	0.77	1.2	1.5

Source: www.trai.gov.in[10,11,12]

The low cabling cost, bandwidth, quality of service and reliability are the added advantages of fibre optic based broad band services. The DSL broadband services are slowly being substituted by FTTH broadband services. In the legacy system of BSNL, It may be difficult to develop its own access network for FTTH broadband services. Therefore, in this fast changing world, sharing of fibre optic network of local cable TV operators is a potential business opportunity to BSNL, in the provision of broad band with quality, reliability and cost effectiveness.

8. The Suggested FTTH Broadband Retail Business Model: BSNL-LCO Partnership

The three tier business model of RailTel FTTH broadband services is adaptable to BSNL with suitable modifications. Now it is admitted that copability (copying + ability) as a marketing strategy in a turbulent environment[9]. As the patent rules and intellectual property rights are not applicable in copying a strategy introduced by one telecom service provider by

others, copability have become a widely utilised strategy among the telecom service providers[1]. In line with the marketing strategy of RailTel, it is proposed to utilise this model to develop FTTH broadband retail business of BSNL. A two tier business model as shown in figure.6 is suggested for BSNL. In BSNL, it is easy to replace the MSP, the middle tier interface of RailTel, with BSNL telephone exchanges.

Figure.6

The Suggested FTTH Broadband Retail Business Model
BSNL – LCO Partnership
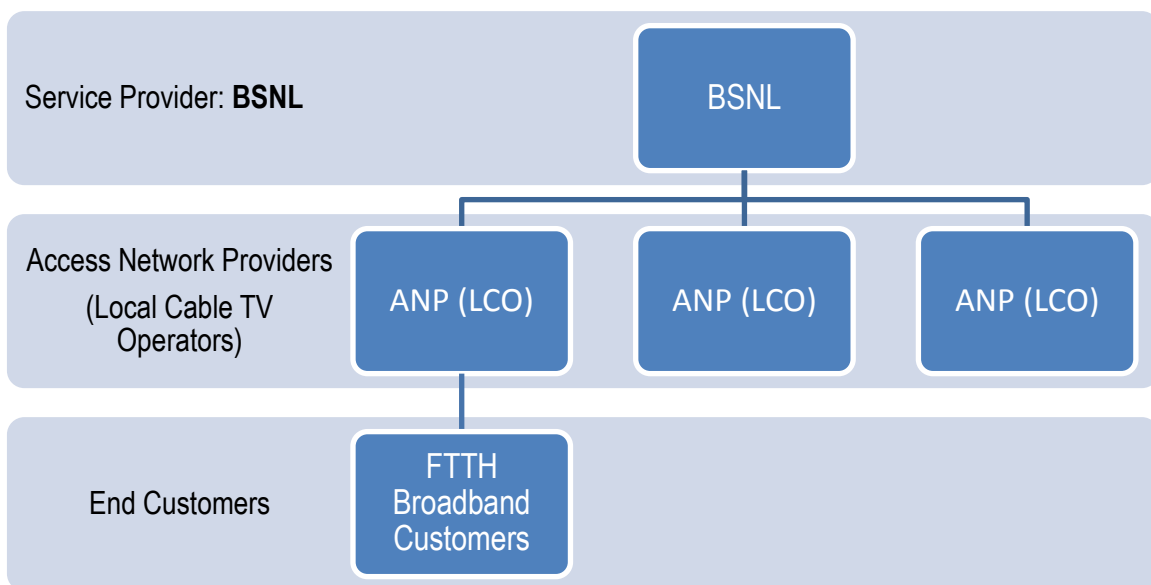
Therefore BSNL can directly enter into business contract with local cable TV operators. As the intermediary role of MSP is suggested to be eliminated, a mutually beneficial revenue share model between BSNL and LCOs can be developed. This will help BSNL to get rid of the major difficulty in the last mile fibre optic connectivity. BSNL can design and realise a win-win business relationship with local cable TV operators to provide cost effective FTTH broadband services.

9.   Limitations of the study

The local cable TV operator (LCO) selected for the case study belongs to *Kerala Vision*, the cable TV network of KCCL (Kerala Communicators Cable Limited). The business processes and network nomenclature may be different for other cable TV providers in the state or elsewhere.

10. **Findings**

  ➢ RailTel initiated a three tier business model to penetrate FTTH broadband connections in the country, including rural and remote villages. The business partners in this three tier system are RailTel, Managed Service Providers (MSP), and Access Network Providers (ANP). RailTel has identified the overhead fibre optic access network of Local Cable TV Operators (LCO) as the potential last mile reliable media. The existing cable TV network deployment is highly conducive to provide FTTH broadband services with minimum capital investments. The LCOs are chosen as the access network providers for RailsTels's FTTH broadband retail business.

  ➢ The BSNL concentrates the provisioning of FTTH broadband services mainly in urban and semi-urban areas. BSNL experiences many operational bottlenecks in the development of optical access network. The pricing of BSNL FTTH services are comparatively high and the service delivery process is not effective in the present competitive market.

  ➢ The RailTel business model is innovative and the service delivery and service assurance processes are seem to be more effective. RailTel positively differentiated their products from BSNL with competitive pricing. In Kerala, there is ample chance that, BSNL fixed line broadband internet services may slowly be substituted by RailTel FTTH broadband internet services even at rural villages. In the selected case of the present study, the LCO started RailTel - FTTH broadband retail business in September 2015. Within three months, 22 BSNL broadband connections were substituted in the area among the total 27 customers they acquired.

  ➢ Although the most preferred technology option in the wired category broadband is DSL at present, it is evident that the growth rate of DSL based broadband services are almost stagnated. Whereas the growth rate of fibre optic based broadband services conclusively predicts its bright future in India.

11. **Suggestions**

  ➢ The FTTH based broadband retail business of RailTel can be adaptable to BSNL with suitable modifications. Apart from the three tier business model of RailTel, a two tier business model is suggested for BSNL. In BSNL, it is easy to replace the MSP, the middle tier interface of RailTel, with BSNL telephone exchanges.

  ➢ The brand awareness of BSNL is very high among customers and Local Cable TV operators, BSNL can directly enter into a business contract with local cable TV

operators and can utilise their fibre optic access networks in a cost effective way. BSNL can design and realise a win-win revenue share model with local cable TV operators, which can outperform the existing RailTel model, by utilising the brand image and network infrastructure of BSNL throughout the country.

➢ As the predicted TV subscriber base in India in the year 2018 is 165 million, a visionary business partnership with local cable TV operators will be a great opportunity for BSNL to extend fibre to the homes.

12. Conclusion

The fibre optic revolution is taking place in the world of telecommunications. The unlimited and non-fading bandwidth characteristics of fibres make them inevitable in telecom networks. The long haul backbone telecom networks are predominantly fibre optic networks. The existence of telecom service providers greatly relied on their access to fibre optic networks. The wired access networks to telephone exchanges are mainly built upon copper cables. In wired segment broadband, the main focus of BSNL is in copper cable based landline ADSL broadband services. In the legacy system of BSNL, it faces difficulty to develop its own FTTH access network. Therefore utilisation of existing fibre optic access network of local cable TV operators is a potential business opportunity to BSNL. The BSNL can directly enter into business contract with local cable TV operators and can utilise the immense potential of LCO's widely available spare fibre networks. A retail business model for FTTH broadband services similar to a three tier FTTH retail business model of RailTel is suggested for BSNL with suitable modifications. Developing a fine tuned broadband retail business model, incorporating LCOs in the last mile can contribute to digital India initiatives and reduce the digital divides in the country. This business model can change the BSNL broadband business profile and may lead to fibre to the home broadband revolution in India.

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Annexure (i)

RailTel Customer Acquisition Form

Annexure (ii)

RailTel - Sample Billing Invoice

rail
wire

INVOICE-CUM-RECIEPT

RAILTEL

Username :		Invoice No. :	
SubscriberId:		Invoice Date :	
Package : FUP1Mbps_10GB		Reference :	
		Period of Invoice:2016-02-01 - 2016-01-02	

Particulars			Amounts in INR
Package Renewal - FUP1Mbps_10GB			449.00
Service Tax @14.50%		65.11	
		Invoice Total	514.11

Five Hundred And Fourteen Rupees & Eleven Paisa Only

This invoice-cum-reciept is the proof for the payment made by you towards the above services opted for the service tenure mentioned as above. Please quote the above invoice number or reciept reference number for any queries related to this transaction in future. The above mentioned services are provided by RailTel Corporation of India Limited Under ISP License #820-584/2002 The amount received is not refundable.

This is an electronically produced document and does not require any signature.

Service Tax No.: AABCR7176CST001
PAN Card No.: AABCR7176C

RailTel Corporation of India Limited
RailTel Corporation India Limited
2nd Floor, B-Block, Rail Nilayam,
Secundrabad - 500071

ഓണാശംസകൾ

Special Onam Plans

Port Speed	Data Usage	Speed After FUP	Monthly Rental
4 Mbps *	3 GB	Nil	Rs 299
4 Mbps *	10 GB	512 Kbps	Rs 649
10 Mbps **	15 GB	512 Kbps	Rs 749

Special Onam Plans valid till 31st August 2015   * Available only in selected location
Contension Ratio - 1:4   Excluding Tax

Home Unlimited Plans

512 Kbps	1 Mbps	2 Mbps	4 Mbps
For Just Rs 499	For Just Rs 899	For Just Rs 1399	For Just Rs 2499

Excluding Tax

Home FUP Plans

Port Speed	Data Usage	Speed After FUP	Monthly Rental
1 Mbps	10 GB	512 Kbps	Rs 449
1 Mbps	20 GB	512 Kbps	Rs 549
2 Mbps	10 GB	512 Kbps	Rs 599
2 Mbps	20 GB	512 Kbps	Rs 699
4 Mbps	30 GB	512 Kbps	Rs 799
4 Mbps	40 GB	512 Kbps	Rs 899
8 Mbps	40 GB	512 Kbps	Rs 999
10 Mbps*	40 GB	1 Mbps	Rs 1099
10 Mbps*	60 GB	1 Mbps	Rs 1249

* Available only in selected locations
contention Ratio - 1:4   Excluding Tax

SME Unlimited Plan

1 Mbps	2 Mbps	4 Mbps	8 Mbps	10 Mbps
For Just Rs 1699	For Just Rs 2899	For Just Rs 5799	For Just Rs 9999	For Just Rs 12,999

Contention Ratio - 1:4   Excluding Tax

SME FUP Plan

Port Speed	Data Usage	Speed After FUP	Monthly Rental
10 Mbps*	60 GB	1 Mbps	Rs 4650

Excluding Tax

* Available only in selected locations
contention Ratio - 1:4

Top up Plan Data Boosters

5 GB	10 GB
For Just Rs 149	For Just Rs 249

Excluding Tax