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On The Road to Digitization: The Case of Kerala

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IIMK CASE STUDY

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Abstract

There has been a major emphasis on digitization in India in recent times. Though India is high on Internet usage, it is lagging behind as a nation when it comes to internet penetration. In spite of all the challenges faced by India, the digital programs by the state of Kerala in India has been exemplary. This case examines the various initiatives for digitization in Kerala and brings forth the various details of implementation that can help in an understanding of the success factors and the way forward.

1. Overview

The Internet age has brought about a transformation in the Indian society and the effect has been apparent in the rising figures of Internet usage in India which moved up from third in 2014 to second in 2016 in the ranking of countries in Internet usage (internetlivestats.com, 2017). Digital services have caught up in India more so now with increasing figures of adoption by citizens for convenience. With the recent demonetization an additional push towards digitization was inevitable for the rural regions as well. However, it is also a fact that though increase in internet users in a year are the highest for India, it lags behind in penetration than many other countries at 34.8% (internetlivestats.com, 2017). While internet penetration in India is likely to double by 2020, there are major roadblocks in realising the vision of Digital India according to a joint study by Assocham India (India's Internet population likely to touch 600 million by 2020: study, 2016). According to the report, as of now, 27 out of 100 Indians log on to the internet, because of 3G and 4G connectivity. In absolute numbers, this represents 343 million users of the net. By 2020, the number is expected to increase to 600 million. According to a recent report on rural consumers (98% of connected rural users men; 79% from the city: report, 2016) "more than half of new Internet users in India is from rural communities, and rural users constitute almost half (48%) of connected users in India by 2020." The report goes on to state that "number of Indian rural Internet users will increase from about 120 million in 2015 to about 315 million in 2020, registering close to a 30% y-o-y growth." The statements are based on a study by Boston Consulting Group. Further mobile phones have a major role to play in the rise in Internet usage in India. In the joint study by ASSOCHAM and Deloitte (India's Internet population to reach 600 million by 2020: ASSOCHAM-Deloitte study, 2016), India is the second largest mobile phone market globally with over 1 billion mobile subscriptions. Of this, smartphone users account for approximately 240 million subscriptions which is expected to grow to 520

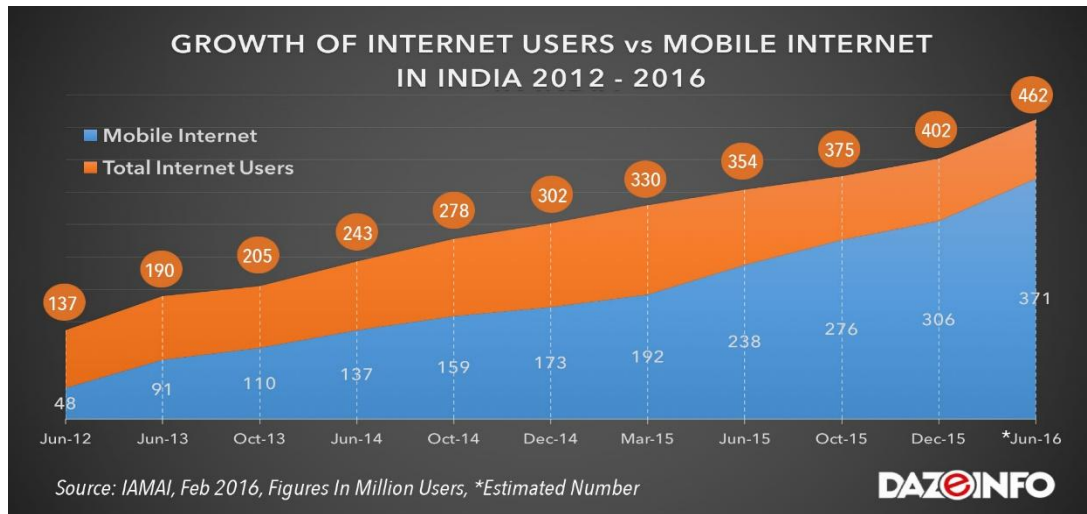million by 2020, adds the study. Statistical data of internet usage in India is depicted in Exhibit 1.

Exhibit 1: Statistical data of mobile internet users over total internet users in India

1.1 Digitization in Kerala

Aside from all the digitization challenges faced by India, Kerala has chalked out a trailblazing path for other states to learn from. Kerala has 37% Internet penetration according to reports (98% of connected rural users' men; 79% from the city: report, 2016). Another report in 2015 (Data Shows Kerala is Well Ahead of Other States in e-matters, 2015) states Kerala has the highest mobile penetration with more than 30 million connections for a population of 33 million, with a rapid increase in the usage of smart phones. It also has high Internet penetration, covering about 20 per cent of the households through broadband and another 15 per cent through mobile, as per the TRAI's (Telecom Regulatory Authority of India) latest figures. Other statistical data of internet usage in Kerala is listed in Exhibit 2.
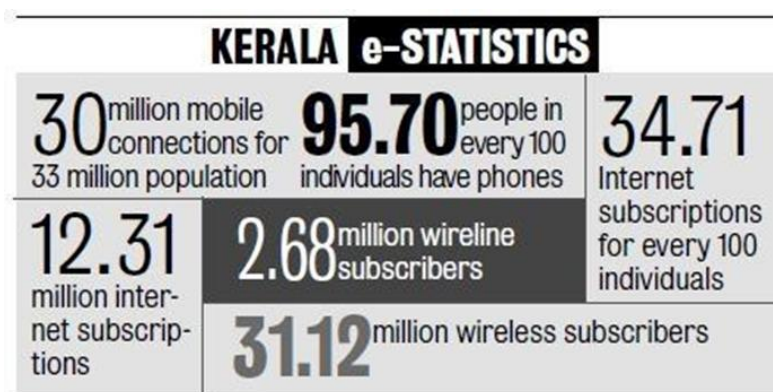

Exhibit 2: Statistical data of internet usage in Kerala. Src: The New Indian Express (http://www.newindianexpress.com/states/kerala/2015/aug/08/Data-Shows-Kerala-is-Well-Ahead-of-Other-States-in-e-matters-796453.html)

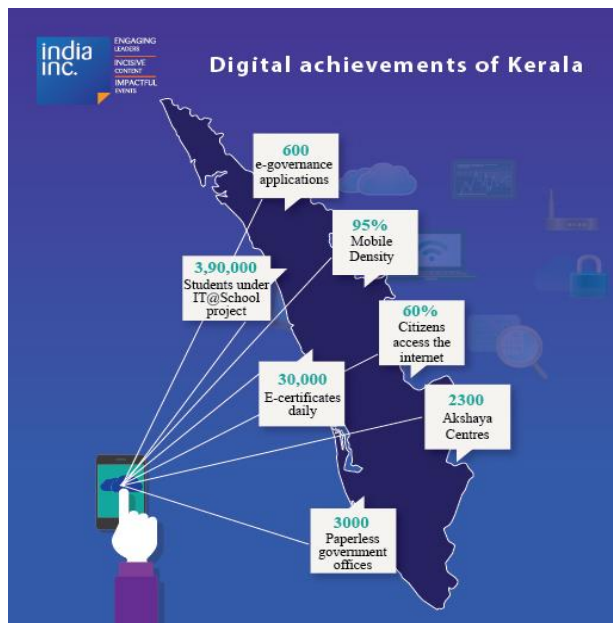Exhibit 3 illustrates some digital achievements of the state.

Exhibit 3: Digital achievements of Kerala. Src: IndiaIncorporated.com (http://www.digitalindia.indiaincorporated.com/digital-kerala-leads-the-way-to-tech-glory/)

Some of the future plans for Digital Kerala as listed in the India Inc. website are depicted in Exhibit 4. The next sections discuss the various initiatives in Kerala that has enabled it to achieve digital success.

Exhibit 4: Future Digital Plans of Kerala. Src: IndiaIncorporated.com (http://www.digitalindia.indiaincorporated.com/digital-kerala-leads-the-way-to-tech-glory/)

2. Digital India

The increasing realization of the benefits of digitization and the challenges faced by India the Modi government has started of many initiatives out of which some of them are mentioned in the following sections.

Digital India program is a flagship program of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. The major program pillars of Digital India comprises of broadband connectivity in rural areas of the country which is undertaken by the BBNL

As a part of providing awareness to potential users their active participation is necessary for digital technology to be successful. Towards that end Digital India week was launched by the Prime Minister Shri Narendra Modi on 1st July 2015, with a view to empower the people of the country through the Digital India Program.

The vision of Digital India program also aims at inclusive growth in areas of electronic services, products, manufacturing and job opportunities etc. It is centered on three key areas of -

(i) Digital Infrastructure as a Utility to Every Citizen
(ii) Governance & Services on Demand and
(iii) Digital Empowerment of Citizens

2.1 Digital India initiative in Kerala

BharatNet was implemented in Kerala as a part of the Digital India initiative. Two Grama Panchayat Aymanam in Kottayam District and Nedumbasery in Ernakulam District were selected out of 30 Grama Panchayat for Video conferencing to the Venue at Indira Gandhi Indoor stadium. Panchayat president, members and other audiences witnessed the inaugural function at the GP's, through BharatNet connectivity and Video Conferencing software by NIC (National Informatics Center). Around 200 people attended the function at Aymanam and 150 people attended the function at Nedumbasery. In Kerala State all the 977 Grama Panchayat and Block Headquarters have been connected with Hi speed Broadband under the Digital India program.

Digital India Week was celebrated from 2-7-2015 to 7-7-2015 with various activities pertaining to e-Governance, e- education, e-Health, e-Commerce, e- Agriculture. Pamphlets were distributed among the Grama Panchayat, District Collectors office at Ernakulam and importance of BharatNet was explained to them. CGM, Sri Roy M Jacob also explained to Secretary Gram Panchayat about the various tariff structure of FTTH for continuation of service after September 2015. A Wi-Fi hotspot was made at Anad Gram Panchayat and familiarized the staffs and the public for utilizing this service through their mobiles.

3. BharatNet

Bharat Broadband Network Limited (BBNL) is a telecom infrastructure provider, set up by the Government of India for the establishment, management and operation of National Optical Fibre Network. BBNL is a Special Purpose Vehicle (SPV) set up under Companies Act by Government of India with an authorized capital of Rs. 1000 Cr. It has been mandated to create the National Optical Fibre Network (NOFN) in India. On 25 October 2011 the government of India approved the NOFN to connect all 2, 50,000 Grama Panchayat (GPs) in the country. This was to be achieved utilizing the existing optical fibre and extending it to the Grama Panchayat. Later on NOFN was rebranded as BharatNet. This project is in line with the Digital India initiative that would further enable digital services and inclusion of the interiors of India.

BharatNet has been envisaged to provide high speed broadband connectivity to over 2.5 lakh (2,50,000) Grama Panchayat (GPs) and link 600 million rural citizens of India spread over the 2.5 lakh Grama Panchayats, 6600 blocks and 631 districts by utilizing Universal Service Obligation Fund (USOF). The ultimate objective of the scheme is to deliver e-governance, e-health, e-education, e-banking, internet and other services to rural India. This is to be achieved by utilizing the existing optical fibre cable network from three Public Sector Undertakings (BSNL, Railtel & Power Grid). This project will enable the Government of India to provide various services nationally up to the Gram Panchayat level. The BharatNet Project is a giant leap which aims at bridging the digital divide in India by linking all Grama Panchayat through a common platform i.e. optical fibre cable. The project highlights include-

- World's largest optical fibre rural broadband connectivity project
- All 2.5 lakh Gram panchayats in India to be connected through optical fibre
- Minimum 100 mbps bandwidth at each Gram Panchayat.
- BharatNet to be non-discriminatory access infrastructure for all service providers
- Approximately 6 lakh kilometres of new incremental optical fibre cable to be laid
- Indigenous equipment design and manufacturing under " Make in India"
- High capacity Network management System and network operation Centre

BharatNet would be used by the Panchayats for Panchayat Management, Community Participation, Knowledge Dissemination, Delivery of Citizen Services, and for Developmental planning.

Given the large scale of the project, the implementing agencies have been facing several challenges related to its roll-out. These include the slow speed of execution due to the difficult geographical terrain; the limited number of executing agencies; shortage of equipment; obtaining right-of-way (RoW) permissions; and lack of industry participation. The government has taken several measures to counter these challenges. For example, the implementing agencies are exploring new technologies for digging and trenching to fast-track work in difficult terrain, and more manpower was being deployed to speed up work. The

government involved more manufacturers to ensure that gigabit-capable passive optical network equipment is available at all the Grama Panchayat. It also signed RoW agreements with various states, and is promoting BharatNet as a non-discriminatory platform, providing equal access to fibre to all service providers. As a result of these efforts, the three executing agencies – BSNL, RailTel and Power grid – have managed to complete survey and planning work across all 250,000 Grama Panchayat.

Through the connected Grama Panchayat, the government aims to widen the scope of effective and efficient citizen service delivery. Internet and broadband connectivity across Grama Panchayat that will help drive the adoption of e-governance, e-healthcare, e-banking and e-commerce services, among others. The government aims to provide citizens easy access to critical services online. The citizen-led services to be delivered through BharatNet include access to land records, and birth and death certificates; quality education through digital literacy programmes; access to affordable health care services through online medical consultations with doctors; access to a host of banking services through online transactions; payment of utility bills; and provision of employment opportunities through BPOs and rural internet service centres. The project is also aimed at boosting the economy. The states are expected to witness a growth of 1.08 percentage points for every 10 per cent increase in the number of internet subscribers. Further, the country stands to gain economic benefits of $10 billion to $45 billion upon the commissioning of BharatNet.

3.1 BharatNet in Kerala

Exhibit 5 and 6 illustrates information on Kerala. BharatNet has been envisaged to provide high speed broadband connectivity to all 14 Districts of Kerala covering 152 Blocks and 977 Grama Panchayat of Kerala and link 18 million rural citizens of Kerala, spread over 1129 Grama Panchayat and Block Panchayat offices by utilizing the USOF; with an ultimate objective of facilitating delivery of e-governance, e-health, e-education, e-banking, internet and other services to the citizens in rural Kerala. This is achieved by laying incremental optical fibre cable of 813 km and utilizing the existing optical fibre cable of 9081 km from BSNL. This project will enable the Government of Kerala to provide various e-Governance services up to the Gram Panchayat level by linking this network with KSWAN[1] (Kerala State Wide Area Network) at district level by point to point leased line.
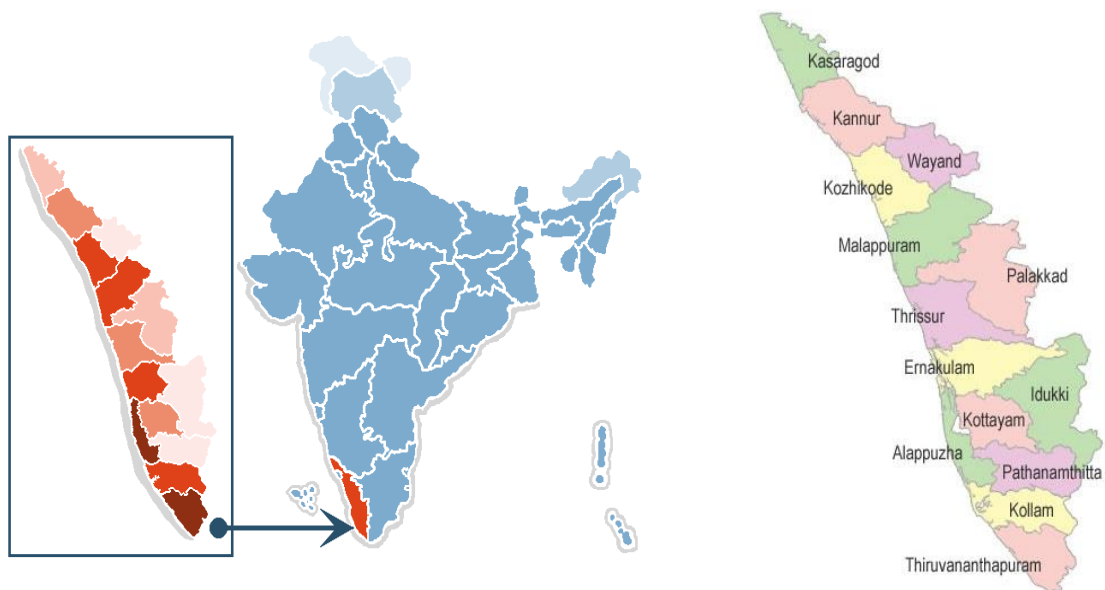
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[1] Backbone of the State Information Infrastructure

Exhibit 5: Map of Kerala (Source: Wikipedia)

List of major cities in Kerala				
No.	City	District	Population	
1	Thiruvananthapuram	Thiruvananthapuram	752,490	Thiruvananthapuram
2	Kochi	Ernakulam	601,574	
3	Kozhikode	Kozhikode	432,097	
4	Kollam	Kollam	349,033	
5	Thrissur	Thrissur	315,596	
6	Kannur	Kannur	232,634	
Source: 2011 Census of India				

Exhibit 6 : Population of major cities of Kerala

In Kerala, the executing agency of the project is BSNL. BSNL has completed the survey and laid the incremental fibre of about 812 Km in time, and the network is now active. The HSI bandwidth to each Gram Panchayat is increased and hence e-applications are being handled with high speed. The next step after laying the OFC is provision of services, which is achieved by setting up last mile connectivity infrastructure in GPs and villages. On this infrastructure hinges the realization of the objectives of Digital India.

3.2 Launch of BharatNet in Idukki, Kerala

BharatNet under its previous brand name, NOFN (National Optical Fibre Network) was commissioned as India's first Hi-Speed Rural Broadband Network (BharatNet) in Idukki District, Kerala, under the "Digital India Mission" at an inaugural function held at Travancore Hall, Techno Park in Thiruvananthapuram on 12th of January 2015 at 06.00pm by the Hon'ble Minister for Communications & IT, Shri. Ravi Shankar Prasad. Smt. Aruna Sundararajan, Administrator, USOF (Universal Service Obligation Fund) & CMD, Bharat Broadband Network Limited (BBNL) when presenting the report on [BharatNet] said-"*The establishment of [BharatNet] will open up new avenues for access service providers like mobile operators, cable TV operators etc. to launch next generation services and spur creation of local employment opportunities encompassing e-commerce and IT outsourcing, as well as e-banking, e-health and e-education.*"

The project in Kerala is being executed by BSNL. A key feature of the project was that the GPON (Gigabit Passive Optical Networks) equipment used in the project has been indigenously designed and developed by C-DoT and manufactured domestically. GPON is a point-to-multipoint access mechanism. Its main characteristic is the use of passive splitters in the fibre distribution network, enabling one single feeding fibre from the provider's central office to serve multiple homes and small businesses. Primavera Software monitored the progress of the project. In the first phase the network was extended to cover 50,000 GPs, with the remaining 2,00,000 GPs was planned to be covered in a phased manner.

4. Public Wi-Fi Services

Public Wi-Fi is considered as Wi-Fi that is made available to the general public. The service is usually provided free of charge (at least for a specific time or download limit) and is not targeted to any specific group of people. With emerging public Wi-Fi enabled services the GPs need to reach out to serve the community through W-Fi services. Public Wi-Fi can help to create new opportunities for community engagement and collaboration, provide new services, and as a means of encouraging people to spend more time in retail premises.

Public Wi-Fi is entering a network infrastructure investment phase, where government and telecommunication carriers are building the infrastructure required for more widespread adoption and use of Wi-Fi. Public Wi-Fi service offerings continue to grow primarily by the dramatic increase in mobile data consumption and telecommunication carriers looking to offload traffic to Wi-Fi alternatives, subsequently reducing the need for 4G mobile data infrastructure investment. In addition to offloading mobile data traffic, telecommunications carriers are also looking to Public Wi-Fi for delivering location based services (LBS) and to augment satellite TV offerings. One of the greatest challenges though for telecommunications providers in delivering Public Wi-Fi is getting access to infrastructure in the right locations for mounting Access Points. This provides an opportunity for local areas that own infrastructure in such locations to work together with telecommunications carriers to provision Public Wi-Fi services for their communities at low or no cost. The opportunities opening up due to emerging need and benefits of Public Wi-Fi needs to be tapped into by

BBNL where BharatNet connections to GPs can be used to provide public Wi-Fi services for the citizens.

Some of the objectives that can be attained by implementing public Wi-Fi are as follows:

- Reducing Digital Divide – Underprivileged sections or sections that cannot afford to have their own internet connectivity either in their households or through their mobile phones can have access to the internet through public Wi-Fi.

- Enhanced access to information – With public Wi-Fi citizens will more freely be able to access information through the Internet hence benefitting from the power of information. A higher level of transparency can be achieved in terms of removing information asymmetry across various involved parties of a transaction.

- Collaboration and communication – With better communication technologies over the Internet public Wi-Fi can enable citizens to connect to each other at much reduced prices than otherwise.

- Other services – Other Wi-Fi based services can be a starting point for small shops in rural regions to think of Wi-Fi enabled location based services that will enhance the consumer's experience when trying to locate places (vegetarian restaurants, temples for worship, hotels etc.), avail promotional offers (where shops can push their specific promotions to the citizens mobile when they are in the vicinity), GIS services (for newcomers in the area to be able to find their way around) etc.

In order for the above to be achieved a clear plan needs to be chalked out on the Why, Where, What and How.

Further benefits that government can get through Public Wi-Fi include

- Achieving government's current vision of encouraging entrepreneurship which can be achieved with proper Wi-Fi infrastructure. A proper constructive environment with free flow of information for entrepreneurs to be able to think creatively can be achieved.

- Understanding of citizen's behavior – With proper standards of maintaining privacy the government can use citizen's information access behavior for providing better services. This information can also help in social science research.

In order for a successful Wi-Fi service the following is important

- Partnership – Different stakeholders involved in the rural space who will be effected from such a free Wi-Fi service to the public need to be consulted and partnerships should be formed so responsibilities can be shared based on expertise. Public-Private-Partnership models should be considered.

- Ownership - With multiple stakeholders in the picture there has to be clarity of ownership. An ownership would mean the 'owner' of the service will be accountable for any responsibility for further improvements based on ground-realities. The users or the citizens who are using the service are well aware of the service provided by which party.

- Community network –The local self-governance body can take ownership of the Wi-Fi service and BBNL provides the back-end support. The local body would then also be responsible for supporting/developing different Wi-Fi enabled services.

4.1 Wi-Fi initiatives by the Government of India

Wi-Fi Chaupal is an initiative taken by the government of India towards developing a rural Wi-Fi infrastructure and hoist of suitable applications enabling and empowering it towards a "Smart Village." Major services provided by Wi-Fi Chaupal are Wi-Fi village, they create a Wi-Fi coverage zone in the village so as to cover all inhabited areas of the village using low-cost Wi-Fi equipment. In order to avoid powering issues, alternate modes of powering (solar) has been adopted. Internet at home mainly focus on subscribers who have higher and exclusive usage in a village. Internet for offices and business extends BharatNet not only to the general villagers but also provided to the 5 P's Post Office, Police Station, Primary Health Centre, Panchayat Office and Primary (Secondary) School.

RailTel, the telecommunications arm of the railways that provides internet services as RAILWIRE using its fibre network in collaboration with Google. The Wi-Fi facility can be accessed by selecting 'RAILWIRE' network on a mobile's Wi-Fi setting and opening the browser to railwire.co.in then the user need to enter his/her mobile number on the screen and click on 'receive SMS' once the four-digit key received through SMS is entered, the user will get a checkmark on the screen, signaling connectivity to the high speed public Wi-Fi network over a range of 400 meters.

4.2. Public Wi-Fi in Kerala

Kerala has enabled public Wi-Fi services in some Panchayats a summary of which is provided. Eraviperoor Panchayat in Pathanamthitta district is the first Gram Panchayat in Kerala to facilitate free Wi-Fi to the general public. The local body had provided free Wi-Fi facility in one-kilometer radius of the Panchayat. The rural areas of Kozhimala, Vallamkulam, Othera, Nannoor, and Eraviperoor had come under free Wi-Fi network. The Panchayat has set up Wi-Fi hotspots at the Grama Vijnana Kendram at Vallamkulam, Panchayat office at Kozhimala, Ayurveda dispensary at Nannoor, Primary Health Centre at Othera, and children' park at Eraviperoor. The Wi-Fi is instituted with the technical support of Active Infocom limited. The initialization was forwarded with 4, 17,000 rupees. Panchayat has given priority to e-governance at the grass roots level. There is a restriction on certain sites and proper security restrictions are also provided by the Panchayat. Exhibit 7 − 9 illustrates pictures from the Eraviperoor GP.

Exhibit 7: Wi-Fi hotspot inauguration photo Eraviperoor GP Src: Personal communication with Active Infocom

Exhibit 8: Wi-Fi hotspot on the wayside in Eraviperoor GP. Src: The Hindu

Figure 4.9: A Free Wi-Fi board outside a park. Src: Personal communication with Active Infocom.

Also citizens of Trikaripur village in Kasaragod district of Kerala now have access to free Wi-Fi connectivity on their mobile phones as per a report in Nov 2014. The report stated that about 20% of the village's 42,000 population have already been provided access to Wi-Fi connectivity, and the rest were expected to get it in the subsequent three months. BSNL is providing the service through its optical fibre network. Users had to log into the Trikaripur village council website on their phones, following which a password will be sent to them, which will allow users to access Internet for 15 minutes or consume 100 MB data. The connection will be terminated after this and users can re-login after a 10 minute gap. The service will remain free irrespective of how many times a user logs in during the day.

Kumarapuram Gram Panchayat in Alappuzha provides public Wi-Fi, the installation was done recently as communicated over telephone by the GP on Mar 2017. The equipment are provided by BBNL and the connection is provided by BSNL. The availed speed is 2Mbps.The usage for the public is limited on a timely basis both morning and evening six to eight and the Wi-Fi range is about 40-45 metres.

The only GP using BBNL network connection for providing public Wi-Fi is Narikkuni of Chelannur block, Kozhikode district. The steps taken to connect to the public Wi-Fi are depicted in Exhibit 10.
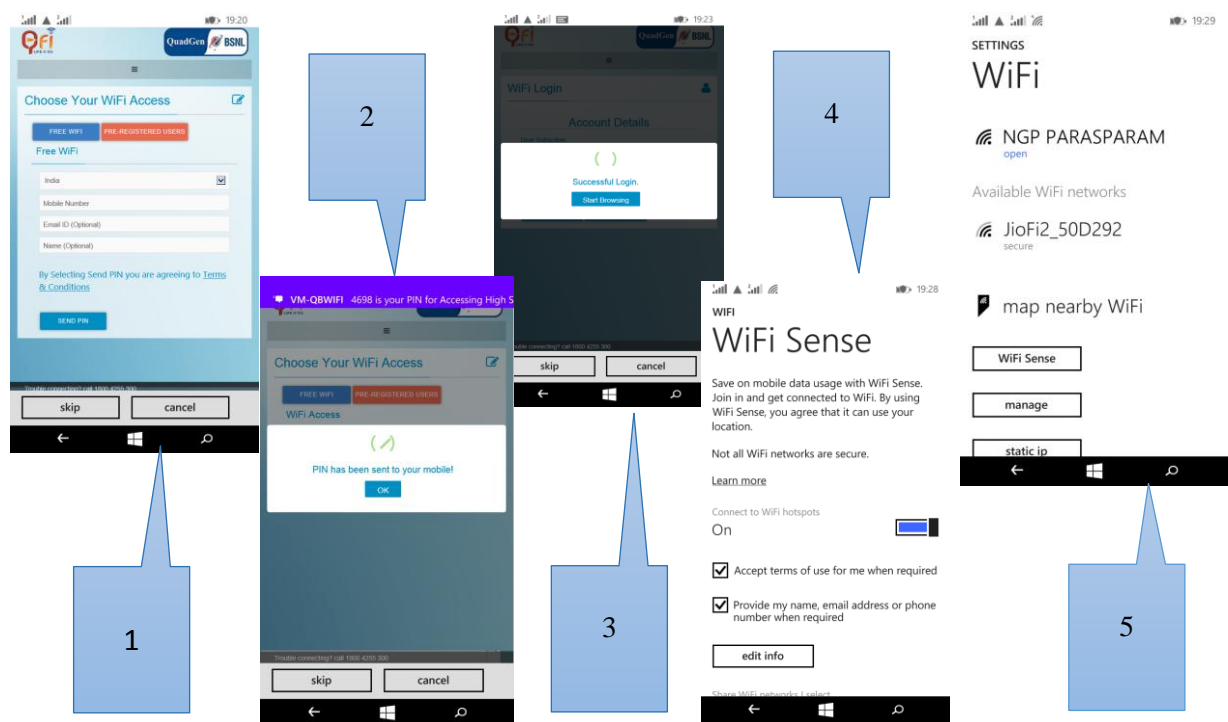

Exhibit 10: Steps to connect to Public Wi-Fi at Narikkuni GP

A step forward in implementing public Wi-Fi in Kerala is BSNL's contract with QuadGen Wireless Solutions Pvt Ltd for setting up Wi-Fi hot spots at public places across India. The public Wi-Fi project is on a revenue sharing basis between BSNL and QuadGen Wireless

Solutions. A good number of public are having smart mobile phones who are requesting for enabling the Wi-Fi service. The ONTs are having Wi-Fi provision with a very limited premises coverage. BSNL has rolled-out Wi-Fi services and Mobile Data Offload services (MDO) in 96 major locations in Kerala Circle and updated the latest list of Wi-Fi locations installed in Kerala State. BSNL already installed high-speed 4G plus i.e. 4.5G Wi-Fi Hotspots in Tourists places and major towns running successfully, where BSNL user can access free Wi-Fi service without any restrictions by following registration process.

There are three different types / categories of Wi-Fi hotspot services from BSNL which are:

Parameters	Type1:Small Hotspot	Type2:Mid-size Hotspot	Type 3: Large Hotspot
Locations	Cafe, Lounge, Food Court etc.	Malls, IT Parks, Resorts, Hospitals, etc.	Campus, Very Large Malls, uncovered Broadband Semi-urban and rural areas.

5. Akshaya Centers in Kerala

Common Service Centers (CSC) have been a common way to reach across to the citizens who may not be self-sufficient in fulfilling their digital needs. Akshaya centers in Kerala are the CSCs that were part of the state's first district-wide e-literacy project which acts as an instrument in rural empowerment and economic development and that makes it the largest rural e literacy training project world-wide. The project is a catalyst in creating massive economic growth and creation of direct & indirect employment in the state focusing on the various facts of e-learning, e-transaction, e-governance etc. The Akshaya e-centre imparts basic training that not only familiarizes people with the basics and the scope of IT, but also ensures hands-on-skill in operating a computer and using the Internet. Malappuram, a backward district of Kerala was selected for piloting e-literacy and project was launched on 18th November 2002 by our former honourable President Dr.APJ Abdul Kalam.

Following are the objectives of Akshaya:

- Creating and expanding economic opportunities.
- Awareness about e-learning, e-transaction, e – governance.
- Rural Empowerment of individuals and communities through enhanced access to information.
- Integrating communities through creation of e-networks.
- Creating awareness of ICT tools and usage.
- Generating e-content useful to the common man in local language.
- Generation of service delivery points even in the remotest areas.
- Generating at least 15,000 job opportunities.

Services provided by Akshaya are as follows:

- E-Pay (electronic payment of utility bills like electricity, land phone, drinking water, university fees etc.)
- E-Krishi (providing online agriculture trading and information portal to farmers)
- E-Vidya (advanced IT learning for e-literates and others)
- E-Ticketing (online train, flight, bus ticket reservations)
- Online registration of PMRY and passport.
- Online communication providers for expatriate Indians.
- Online medical transcription course.

The learnings from the case of Akshaya can enable BharatNet to consider similar CSC models in other states depending on the context. Following are some of the facts of Akshaya:

- There are more than 2,000 Akshaya centres in Kerala with around 130 in each district which are distributed according to the population of the district.
- There might be 2 or 3 distributed in rural Panchayats and around five to six in an urban corporation based on population density.
- Akshaya centres are open from 8.30 AM to 10 PM, though the official timings are from 9 AM to 5 PM.
- Each Akshaya e-centre is located within a distance of 2 km from respective Gram Panchayat and from every household.
- The bouquet include 23 services - mostly comprising of issuing of all kinds of certificates such as caste, nativity and marriage - by the revenue department under e-District project and the citizens have to pay for their services at Akshaya centres. Figure 4. 14 has the tariff rate.
- The 2000 Akshaya centres have enrolled 1.25 crore people for the Aadhaar. They have provided digital literacy to 32 lakh families since their inception and enrolled 1.2 lakh students in the Intel education programme. They have provided 15 lakh e-district certificates to citizens and 5 lakh e-grants scholarship to SC/ST students.
- Broad band connection is available in Akshaya e centres with a speed of 8 Mbps, and they rely on private connection for backup.
- Wi-Fi is enabled through current connection in majority of Akshaya e-centres. There are 5 to 6 computers availed in each Akshaya centre in rural areas and it may vary up to 12 or 13 in urban areas.
- Rate of usage of current n/w is up to 4GB in rural areas and 16 to 30 GB in urban areas.
- According to The district coordinator of Akshaya Kozhikode and some Akshaya e centre owners, they are willing to switch their connection from broadband to BharatNet, if BBNL is ready to provide an uninterrupted connection with high speed in affordable tariff.

5.1 Implementation of Akshaya

Akshaya project was implemented in two phases: e-literacy phase and product launch phase. In the initial phase the focus was placed on educating one person in each family to be e-literate. The e-literacy programme imparts basic keyboard and mouse skills in 15 hours of training. In addition, it introduced windows and word processing to the trainees. In 2007 Akshaya moved into phase two of the project rendering new G2C (Government to Citizen) and Business to Consumer (B2C) services. Akshaya e-centers brought vast improvement in the lives of citizens through e-pay, e-filing etc. in second phase.

5.2 Management of Akshaya Project

Akshaya is considered as a landmark ICT project by the Kerala State Information Technology Mission (KSITM) to bring the benefits of this technology to the entire population of the State. Following are the main stakeholders of the Project;

1. Kerala State IT Mission
2. District Functionaries
3. Local Self Government Institutions
4. Entrepreneurs (also known as Village Level Entrepreneurs or VLE for CSCs)

KSITM provides all the facilitation required to sustain the project by way of e-literacy, training fund, connectivity, advanced courses, content CDs software, e-governance and various others services. It also focuses on creating effective market mechanisms for demand – driven delivery of services in a Public Private Partnership (PPP) framework.

Akshaya e-centre is conceived as a public private venture at the grass root level. The entrepreneurial experience gained by the young persons of society by setting up e-centers have a far-reaching impact on the social mind set. The entire recurring expenditure for running the e-centre is also borne by the entrepreneur. It costs around Rs. 3 lakhs for setting up an Akshaya e-centre with five to ten computers, printers, scanners, webcam, other peripherals and necessary software. The project opens up immense opportunities for women participation at various levels as entrepreneurs, master trainers, social animators and finally as trainees etc.

The Local Self Government institutions (LSGI) under the three-tier Panchayat System have given the impetus to the setting up of Akshaya e-centres. They anchor these centres at the grassroots level. Local ownership fosters the success and resilience of ICT and e-governance projects hence reducing the need for outside control and hierarchical or top-down approaches which often waste resources endangering their sustainability. In the case of e-governance projects the local administration and political machinery need to be involved in the implementation of the project, or otherwise the chance of failure is almost certain. Therefore the role of LSGIs is envisaged in the project even from its conceptual level.

The functional role of LSGIs in the project are:

1. Selection of locations for e-centres
2. Selection of entrepreneurs

3. Sourcing of e-literacy fund
4. Monitoring of e-literacy activities
5. Campaign activities
6. Engaging of social animators
7. Implementation of post e-literacy phase and e-governance activities.

5.3 Akshaya and Connectivity

Considering the scale of operations it is involved in and its goals connectivity of these centers are important. They had initially started with dial-up connectivity. Due to various challenges they faced connectivity issues through PSTN which led the IT Mission and the Akshaya team to consider broadband connectivity through a Wi-Fi-based district wide Intranet.

At present around 2000 Akshaya centres, many government offices and few schools and colleges are connected in a LAN environment, which, in turn, is connected to a network operating centre (NOC). The NOC has direct connectivity with the Internet backbone through optic fibre cable and provides the necessary bandwidth. All network traffic flows through this central access point. Next to the NOC stands a radio tower that provides wireless internet access to 17 POPs (Point Of Presence). Each POP is a radio tower on a hill. It provides access to local Akshaya centres, and also relays access through to the next tower.

5.4 Connectivity Requirements of Akshaya

The broad connectivity requirements are:

* The connectivity should support data and voice.
* It should support applications like Internet browsing, Voice over IP, Multimedia, Video conferencing, E-learning etc.
* Minimum bandwidth requirement of each of the Akshaya centres: Maximum Information rate (MIR): 64kbps, Committed Information Rate (CIR): 16kbps
* Free download limit per month: Minimum of 500 MB per Akshaya centre.
* It should be possible for any of the Akshaya centres to enhance the bandwidth and download limit on request.
* Minimum two email IDs per Akshaya centre with 2MB space each.

Based on an understanding of the Akshaya model and assessing its various achievements and challenges we further suggest that BharatNet can provide a way for enabling these centers to have better connectivity through its optical fibre cables. Since the distance of these centers from the Panchayats may be an issue to do so, we recommend that one center be housed within the premises of the panchayat that will enable support from the BharatNet connectivity to the GP.

6. e-Governance related opportunities in Kerala

The state government in Kerala has been highly proactive in achieving digital success. Through a vision long established they have been instrumental in driving success in digitizing in Kerala as compared to many other states in India. The BharatNet project has also enabled them to provide better FTTH services through the optical fibre network. Looking at the initiatives of the IT Mission wing of the Kerala government it is advisable that the BharatNet services work in synergy with the state government in providing better governance to the citizens in Kerala.

Some of the services provided by the state IT Mission (Kerala State IT Mission, 2017) involve:

e-District: Aims to target aggregate services delivered at the district level and to undertake back-end computerization for enabling the delivery of citizen services through Akshaya Centres.

e-Office: A Digital Workplace Solution that comprises of various modules like File Management System (eFile), Knowledge Management System (KMS), Collaboration and Messaging Services (CAMS). It is hosted at the State Data Centre, Techno Park and access to the application is made available in private network. Connectivity to SDC is essential for users to access e-Office.

Citizen Call Center: This is a single window IT enabled facility of Government that act as an intermediate between citizens and Government to interact effectively through telephone. KSITM is planning the enhancement of CCC with the objective to increase the services rendered to citizens and also to improve the interaction with the participating departments.

Other services include

Service Plus - A generic metadata based frame work that can be used to configure and launch e-services quickly using its flexible workflow and provision for dynamic design of application forms.

SSDG - Fulfils the vision of providing easy and convenient services to the citizens through remote access primarily through Common Service Centres (CSCs). And there by enabling the State Portal by implementing the key components State Portal viz. SSDG, electronic Form (e-Forms), Application and Computing Infrastructure.

m-Governance - Besides the above Kerala was quick to realise the importance of mobile in addressing the digital divide and has worked towards providing a comprehensive solution in the form of plug and play kind of interface for the state departments to provide mobile enabled services through a common platform. Such a platform enables citizens to get in touch with all the departments (90 as per the website) of the State Government by a convenient tap(s) on their phone. The success of this project is commended well.

7. Digital Literacy in Kerala

A direct antecedent to the success of e-Governance is reducing the digital divide through digital literacy. It is important that citizens be trained and educated about digital services in

order for an effective outcome of the government initiatives. Kerala has been declared a 'complete digital state' (Kerala to be first digital State, 2015).

As a measure for digital literacy for the citizens, the following initiatives are taken up by the State Government.

E-Jaalakam - The project (About e-Jaalakam, 2014; e-Jaalakam, n.d.) aimed at promoting e-Governance literacy among citizens in general and women in particular so as to enhance their capacity to live in an e-society. It focused on enabling people to access those e-Governance services which may prove useful to them at various stages in their life cycle. The project, launched in 2012, has evolved in a phased manner and has produced various citizen engagement tools for promoting e- Governance learning.

As per the e-Jaalakam website some of the future plans includes -

- Creation of a chain of e-Governance Master Trainers in higher educational institutions throughout Kerala

- Periodical workshops for updating them in e- and m-Governance

- Creation of short animation films for each service which will further simplify access

- Radio sessions to answer public queries related to accessing various services

- Inclusion [of e-Jaalakam] in IT syllabus - People to get familiarized at an age when they have the time and maximum learning capacity.

Kerala State IT Mission has been approached to include it as a part of the IT syllabus taught at various Women Resource Centres they have established in colleges.

8. e-Learning opportunities in Kerala

Maintaining its high position in the list of literate states in India, efforts are underway to retain a similar spot in terms of e-learning. Digitalizing of educational institutions in Kerala is undertaken in the General Education Protection Mission (Pothuvidyabhyasa Samrakshana Yajnam) project (General Education Protection Mission, 2017). The project aims to make Kerala a fully digitalised state in education sector. The state government is facilitating all necessary physical, academic and digital contents which are required for implementing this programme. This programme is closely monitored and evaluated by the Panchayat-Constituency-District-State level mission teams. As a part of this project digital board has been provided even in schools located at remote areas. Preparations are going on to make the classroom digital. Model questions uploaded by DIET (District Institutes of Education and Training) for high schools and higher secondary can be accessed from corresponding schools. Other facilities have been developed to provide digital learning materials. Kalippetti is such a facility for students. This project includes the facility of providing a laptop to each teacher so that the students can access internet for their needs with the help of teacher. Most of the govt. schools are getting Wi-Fi extension from 10 to 5.

Another e-learning initiative is called the Mikavolsavam which is a Sarva shiksha abhayan project conducted in schools to express the talent of student in all ways. Some of the activities under this project include training teachers, providing basic facilities to students, digital text books, smart classroom and laptop. According to correspondence with Shri. Vigneswaran, The head master of AMMALP School, Padiyil, Kozhikode, the Children are so familiar with the usage of computer and internet that the IT exams conducted in schools can be eliminated in future. He added that the internet facilities available to higher secondary and high schools is less compared to primary schools. According to correspondence with Shri. Jalush, The VHSE (Vocational Higher Secondary Education) principal of GVHSS (Government Vocational Higher Secondary School) Nadakkavu Kozhikode, Chrome book, interactive panel board and Digital library are some other digital solutions that would enhance the digital-based learning for the students.

The IT@School is another initiative by the Government of Kerala that seeks to equip all the schools in Kerala with the necessary IT required for better quality learning. IT@School Project was started in the year 2001, to augment the IT education in schools and enhancing the quality of IT education towards a complete ICT enabled educational system.

9. eHealth in Kerala

Kerala government's eHealth project envisages an effective IT enabled integrated framework to ensure efficient service delivery to the common citizen and provide a centralized database of healthcare information allowing close monitoring and control measures. This is a robust and sustainable IT solution supporting nearly 30,000 healthcare service personnel consisting of doctors, paramedics and other non-clinical staff at the Primary, Secondary and Tertiary care centres maintained by the State Government. The ultimate vision is about building an Integrated Healthcare Cloud which will hold the complete healthcare data about all the citizens in the state. In doing so bandwidth will be an essential component. According to the project the three important components of the framework are as follows:

1. A Central Repository of Demographic, Public Health and Healthcare data pertaining to the State which will get dynamically updated. Each citizen record in the demographic data repository will be uniquely identified which will be used by all the services provided by e-Health Kerala.
2. Centralized Healthcare Information System which has the functionalities of an Integrated Hospital Management System, Disease Surveillance, Management Information System and Healthcare Planning.
3. A high Bandwidth reliable Network connecting all hospitals (in Public Sector) in Kerala and also linking them to Central Healthcare Data Repository and the Central Demographic Data Repository

9.1 Telemedicine

With shortage of doctors and hospitals in rural areas of the country, telemedicine solutions have become an attractive option to reach quality healthcare everywhere. It has been used to transfer medical data (photographs, x-ray images, audio, patient records, videoconferences, etc.) from one site to another via the Internet, Intranets, satellites, or videoconferencing telephone equipment in order to improve access to health care. One of such telemedicine center is set up in Kerala at the Sabarimala pilgrimage centre, with technical assistance from JIPMER, Pondicherry, and ISRO, to provide specialist medical consultation round the clock to pilgrims who might require emergency care. The project is promoted by the Union Health Ministry and ISRO as part of efforts to utilise space technology in governance and development. With increasing ownership of mobile phones various applications ranging from relatively easy health awareness applications to location based medical services are also provided. It is targeted towards mobile users to create health awareness and assist them to easily locate nearest health services.

Another award-winning mobile based app is MoSQuIT developed by C-DAC which is a disease surveillance system for malaria using mobile platform. It enables effective data-collection/updating/collation for a centralized repository, thereby reducing the time required for information proliferation and initiation of appropriate action by State Health department. MoSQuIT connotes the systematic and continuous watch/vigil over the status of malaria in the community. It helps monitor, plan for control measures, and will help detect both spatial and temporal changes in the long run. It triggers an early warning system in identifying potential outbreaks which frequently occur in this region. In particular, the system helps prevent and control malaria in the community.

MCare is another mobile-based solution used by mobile devices to provide a health management system that could enhance the quality of health care provided by the health workers. The product has two major components: Handheld device based data collection module and Web-based Health management information infrastructure module. The system maintains a centralized demographic and public health data, which can be used for analytics.

10. e-banking and its scope in Kerala

The recent demonetization has impacted e-banking. More and more demand on digital transactions has led to increase in e-banking activities such as use of credit or debit cards at merchants POS, more use of m-wallets for making small payments for auto rides, transactions in small shops or making offerings to temples. There is increased online transfers and e-transactions as a substitute for cash transactions. More citizens who preferred cash to electronic are now considering the digital medium. With the government emphasis more on digital transactions conditions for e-transactions are being made more feasible. With ease of e-transactions there is a conducive environment for e-banking.

Banks and payment players now have to be 'e-ready' in order to harness the increasing e-banking. Some of the off-shoots of the e-banking has been surges in POS machines at shops, unified payment interfaces (UPI) by banks for the customers and mobile payment platforms

such as paytm, freecharge etc. for the digital users. The Government of India launched BHIM (Bharat Interface for Money) which is a UPI based mobile app for making instant bank-to-bank payments and which can enable payment and collection of money using just Mobile number or 'Virtual Payment Address'.

According to a report (Demonetisation: In Kerala, many back cashless drive but political opposition remains concern, 2016) in Kerala small traders and vendors in the retail sector and local transport facility providers, have started to switch over to a cashless system. The report emphasizes on the role of Akshaya centers in doing so with the 'Go Cashless' campaign to promote digital payment platforms among merchants and the general public. The centers were trying to familiarize people with digital payment platforms by organizing live demonstrations. At the training sessions, participants were also given tips on enhancing security for online banking. The initial focus was on debit/credit/prepaid cards issued by banks, USSD (Unstructured Supplementary Service Data), Aadhaar-enabled payment system (AEPS), UPI (Unified Payments Interface) and e-wallet. The e-wallet system was most preferred by the people. The total digital transactions in the state, according to the report, is estimated to be around 30 percent as of Dec 2016.

According to reports Kerala achieved 100 percent bank account coverage for all the household way back in 2011. The state now has one bank branch for every 5,900 persons as against all India average of 11,000.The growth of digital payments in petrol and diesel sale in Kerala came to around 20 per cent as of Dec 2016.

Some other accolades that favor Kerala's e-readiness is that it became India's first complete digital state in 2015 after it achieved 100 percent mobile density, 75 percent e-literacy, highest digital banking rate and broadband connection up to panchayat level. The state has implemented e-district programs in all districts and has linked Aadhaar card with bank accounts.

Even in Sabarimala, Kerala the temple administration have started using a swipe machine for offerings. The facility, has been installed by Dhanlaxmi Bank. Some of the newspaper reports on e-readiness of Kerala is presented in Annexure 1, 2 and 3.

11. K-FON
The recent State budget 2017 plans to provide internet access free to around 20 lakh poor families. The proposed rollout of Kerala Fibre Optic Network (K-FON) which will be established with support of KSEB. New optic fibre-cables will be laid parallel to the KSEB electric power network to provide internet to all. This is in line with keeping up the digital image of Kerala. With the K-FON access to the internet will be the right of every citizen through computer and mobile phone. This will also provide easy access to government and non-government services for the citizens.

A new optical fibre network has been proposed to take Internet services to every household.

According to reports, to provide internet connections, K-FON will have to collaborate with the existing service providers. BBNL can thus explore possible partnership with the state in providing K-FON solution. The state government is open to PPP to implement the project. It is also open to partnership with the government for laying down of fibre optic network.

It is planned that Wi-Fi transmission centres would be established at Akshaya centres, Janasevana Kendra's which are the single window utility bill payment centre, government offices, libraries, and public places through K-FON for citizens to access Internet facilities.

12. Other services

With growth in digital products and internet usage as mentioned before ecommerce activities have increased. The digital infrastructure using and K-FON and BharatNet opportunities for good quality Audio/Video streaming for entertainment with private service providers are ample.

Employment and glamour draw rural youth to the cities that has led to massive exodus from the villages and overcrowding of cities. Better employment generation can be made possible through working from home model where the rural educated population can be engaged in work of national importance such as translation services, transcription services, scanning books of national, cultural importance. Projects such as creating a digital library of books can be undertaken where there is a need for manpower and expertise.

The rural youth can be engaged in crowdsourcing for ideas related to improvement of their localities and environments. This can also be helpful in deciding the best suited business models for businesses who are looking at ways to expand in the rural areas.

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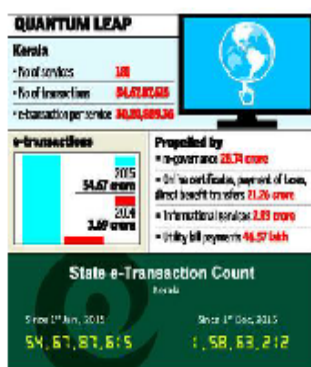Annexure 1: News "State ranked third in e-transactions"

THE HINDU

State ranked third in e-transactions

T. Nandakumar

Registers 54.67 crore e-transactions this year, a 15-fold growth over last year's

erala has registered a quantum leap in the number of electronic transactions since the start of the year, displacing 10 States to occupy the third position in the national tally.

As on Thursday evening, Kerala had registered 54.67 crore e-transactions this year, representing a 15- fold growth from 3.69 crore transactions in 2014. Andhra Pradesh with 111.88 crore transactions, tops the list, followed by Telangana with 87.34 crore transactions, according to the National e-Transaction Count maintained by the Electronic Transaction Aggregation and Analysis Layer (etaal) under the Union Department of Electronics and Information Technology. In 2014, Kerala was ranked 13.

Mobile governance

The phenomenal growth in e-transactions in Kerala this year was propelled largely by mobile governance services (28.74 crore transactions) and issue of online certificates, payment of taxes, and direct benefit transfers (21.26 crore).

Informational services like railway enquiry, passport status, and exam results and downloading of forms and tenders amounted to 2.93 crore transactions, while utility bill payments accounted for 46.57 lakh transactions. Business to citizen services like banking and mobile recharge registered 16.55 lakh transactions.

With 180 e-services, the State is ranked fifth, behind Andhra Pradesh (263), Telangana (225), Madhya Pradesh (206) and Gujarat (195). Last year, Kerala had only 139 e-services.

Interestingly, Andhra Pradesh retained the top slot with a 10 fold growth in the number of e-transactions despite a fall in the number of services from 413 to 263. Gujarat, Haryana, Maharashtra, Rajasthan, Tamil Nadu, and Uttarakhand registered a drop in the number of services and transactions while West Bengal recorded an increase in e-transactions despite a marginal fall in the number of services.

Kerala is also placed third in the number of transactions per service (3020856.65), behind Andhra Pradesh (4254020.69) and Telangana (3882052.76).

Aadhaar-enabled services

Director, Kerala State IT Mission K. Mohammed Y.Safirulla told *The Hindu* that efforts were on to increase the number of Aadhaar-enabled services, equip all the 2450 Akshaya centres with banking kiosks and introduce a single mobile app that would enable citizens to avail of a variety of government services.

These initiatives, he said, would be a game changer for the State in the race for the top slot.

FROM AROUND THE WEB

Source: The Hindu, Dec 2015

Annexure 2: News "E-transaction: State Makes a Proud Leap to Fifth Position"

E-transaction: State Makes a Proud Leap to Fifth Position

The position of the state is reflected in e-taal, a web portal for disseminating details of e-transactions of e-governance projects

Express News Service

Kozhikode: In a significant achievement, the state scaled up to the fifth position from the 13th in terms of the total number of electronic transactions made this year. A total of 135 e-services were delivered by the state government this year.

The position of the state is reflected in e-taal, a web portal for disseminating the statistics of e-transactions of e-governance projects and Mission Mode Projects at the national and state levels.

It receives the transaction

According to the recent statistics furnished by the e-taal web portal (etaal.gov.in), the state has recorded 3,88,35,416 transactions between January 1, 2015 and May 9, thus repositioning itself in the fifth position from the 13th.

Andhra Pradesh topped in the ranking list with 44,99,12,433 transactions, followed by Gujarat (22,77,34,345), Uttar Pradesh (15,15,24,379) and Tamil Nadu (6,26,67,496) for the period.

"When compared to other states with a larger surface

tance of the e-government apps among the public," says Abhilash, a managerial official at the Kerala State IT Mission.

As per the directive from the central government, government offices under all departments have been instructed by the state government to connect their respective e-applications to the e-taal web portal for disseminating details of e-transactions so that completed transactions would reflect in the portal. In the total number of 135 e-government apps of the state government

Source: The Indian Express May 10 2015

Annexure 3: News "E-leverage: Kerala Set to be India's 1st Digital State"

E-Leverage: Kerala Set to be India's 1st Digital State

by Rajesh Abraham

Kochi: Propelling itself ahead of other states in e-initiatives, Kerala will be declared India's first 'Digital State' on August 15. This will be followed by the launch of several projects including high-speed Internet and Wi-fi services in government schools and e-office in all government offices. The government will also unveil 'Digital Literacy-Phase II' as part of its Vision 2020 programme.

The state will also tap into central government's Bharat Net project, to be established by 2017. Government also plans to develop a single mobile application covering a variety of government services.

Another big initiative is 'Electronics@School', a unique scheme in which the IT department will provide electronic kits to class 8 and 9 students. Also in the works under Vision 2020 is plan to turn Akshaya centres into e-

E-VISION KERALA
- One mobile app to avail all govt services
- Wi-fi hotspots in govt schools
- All govt offices to be paperless by 2016-end
- Digital Literacy - Phase II

THE COUNTDOWN BEGINS

banking kiosks, connecting rural households to banking services.

Chief Minister Oommen Chandy will declare the state as 'Digital State', a feat realised through the "visionary measures of the government to open up the doors of digital literacy to its citizens to make God's own country the first 'e-literate' state", according to the blue print of the plan seen by Express.

Source: http://www.itmission.kerala.gov.in/digitalkerala-news.php

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