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Architecting the Digital India Landscape for Inclusive Growth in Rural India

Introduction

As per the last census, more than 70 percent of the Indian population lives in the rural areas and earns its livelihood through agriculture and allied means of income. Good governance should be participatory, transparent and accountable in character. Socio-economic concerns in a nation can be addressed within the framework of good governance so that the lives of the marginalised people are ameliorated. As our Prime Minister (PM), Shri Narendra Modi has stated, “**Minimum Government, Maximum Governance**” is of prime importance. The usage of Information and Communication Technology (ICT) for good governance and sustainable development in rural India is, therefore, an inevitable and vital initiative. In a vast nation like India, this has deeper significance since the ICT enabled services can be used as an alternative to the government services, where the latter cannot reach the citizens directly.

In 2006, the Government of India launched the National e-Governance Plan (NeGP) with 31 Mission Mode Projects covering



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Key Points

1. ICT enabled services can be used as an alternative to the government services, necessitated due to India's vast geographical expanse.
2. ICT can be leveraged for better governance, poverty alleviation, remote education, cost-effective healthcare, agri-services provision and job creation.
3. Digital India, a GoI initiative, aims at providing government services to citizens electronically, thus mitigating paper work, time and effort, as also increasing transparency and accountability.
4. The paper suggests a model that is cost-effective, scalable / replicable and can be implemented swiftly.
5. An architecture from the federal level to the state, district and village level is outlined.
6. The article also highlights the importance of various stakeholders from veterans and corporates to NGOs and Government departments.

The Centre for Land Warfare Studies (CLAWS), New Delhi, is an autonomous think-tank dealing with national security and conceptual aspects of land warfare, including conventional and sub-conventional conflict and terrorism. CLAWS conducts research that is futuristic in outlook and policy-oriented in approach.

Architecting the Digital India Landscape ...

various functional domains. Despite the successful implementation of many of these e-governance projects across the country, e-governance as a whole has not been able to make the desired impact and fulfil all its objectives. It is felt that greater thrust is required to ensure e-governance in the country to promote inclusive growth that covers electronic services, products, devices and job opportunities. Hence, in July 2015, in order to transform the entire ecosystem of public services through the use of ICT, the Government of India launched the Digital India programme with the vision to transform India into a digitally empowered society and a leading knowledge economy. In the last few months, the PM has personally spearheaded this mission. His recent visit to the USA to meet the head honchos of ICT businesses has energised top tech companies to invest in this massive and noble undertaking. Google, with its Wi-Fi on railway platforms, Facebook with its internet.org initiative (free / affordable internet for rural areas) and Qualcomm with its start-up fund are just a few mentionables.

Before we embark on defining the architecture for the Digital India programme in rural India, it will be pertinent to comprehend the advantages of ICT implementation in attaining inclusive growth.

Benefits Derivable from ICT Implementation

Nelson Mandela had rightly said, “Eliminating the distinction between information rich and information poor countries is critical to eliminating other inequalities between North and South and to improving the quality of life of all humanity.” Need-based application of ICT will empower the rural citizenry and those living at the bottom of the pyramid, thus, enabling them to enthusiastically participate in the development process of the nation. ICT offers an excellent platform to introduce new services and applications into rural areas or as a force-multiplier for the existing services. This is especially applicable for a vast nation like ours, where building infrastructure takes time to reach the

masses in the rural areas, but ICT with the inherent advantage of lower investment (as compared to physical infrastructure like roads, etc.) is a game changer in the upliftment of the downtrodden. ICT can contribute in fostering empowerment and participation, making government processes more efficient and transparent by encouraging communication and information sharing among the rural and marginalised people.

Some of the major benefits accrued by using ICT are:

- **Empowerment Through E-Governance:** Improved governance by using ICT can have a direct impact in reducing poverty and improving the environment. Various documents like marriage certificates, birth and death certificates, paper work for pension plans, caste certificates, etc and for tax payment and bill payment are some of the primary features of e-governance. In addition, it can work as a potent tool to implement the Right to Information (RTI) Act by providing people access to various governmental issues. A shining example of this initiative is *Project Gyandoot* which was aimed at creating a cost-effective, replicable, economically self-reliant model for taking the benefits of ICT to the rural population. It is an intranet network set up in the year 2000 in 5 blocks with 21 kiosks, each catering to about 15-20 villages in the tribal Dhar district in Madhya Pradesh. The project provides various types of government documentation and important local information to the villagers. Documents like domicile certificate (*mool niwasi*), caste certificate, landholder's passbook of land rights and loans (*bhoo adhikar evam rin pustika*), rural Hindi e-mail, public grievance redressal (*shikayat nivaran*), forms of various government schemes, below poverty line family list, employment news, rural matrimonials (*vivah sambandh*), rural market (*gaon ka bazaar*), rural newspaper (*gram samachar*), advisory module (*salahkar*), E-education General Provident Fund; and *Khasra Nakal Avedan* can be easily accessed.

Apart from providing easy access to various types of documentation, it has revolutionised the attitude of the people concerned – it has enabled the villagers to avoid the common practice of bribing officials. The success is largely due to targeting the information interest of the people. The same information was earlier not available to the villagers either because of the effort involved in travelling to reach the district / state department offices, or due to hesitation on their part or because of corrupt officials demanding bribes for the information or service. With the information now available on ICT platforms, it (information) is now unshackled from these *babus'* domains.



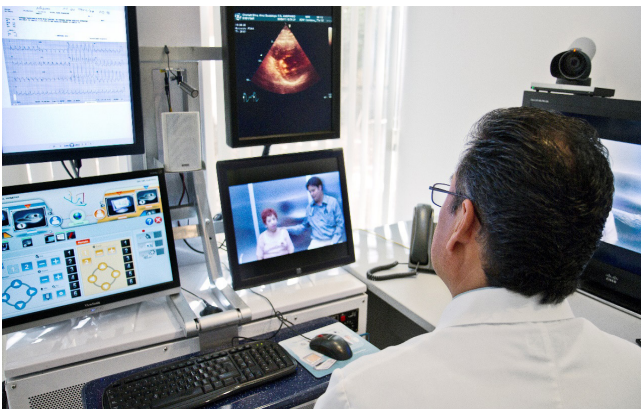
- **Agriculture Related Services:** A vast majority of the rural poor derive their livelihoods directly or indirectly from agriculture. ICTs can create a measurable impact in agriculture by delivering useful and actionable information to farmers like weather data, data and guides on better / alternative technologies and techniques used by their counterparts elsewhere around the globe, fertiliser and feedstock inputs, crop maintenance, pest control, seed sourcing and updated market pricing of their produce and more. Kiosks in various projects like the ITC e-chaupal, n-Logue, etc have enabled thousands of small farmers to track the crop prices. As a result, they are no longer vulnerable to the dynamics of large trading centres or *mandis*. The power of information is, thus, transferred to these poor

farmers and they can negotiate crop prices in the wholesale market more confidently. Thus, ICT is resulting in improved trade for the grassroots traders. Similar helping bodies have been formed in the other states. Organisations like STAR: (Simplified and Transparent Administration of Registration), Chennai, and SETU – Integrated Citizen Facilitation Centres of Maharashtra serve the same purpose.

- **Poverty Alleviation:** One of the major factors responsible for low crop yield and other similar miseries is lack of funds for investing in advanced tools and techniques that are available in the market. Farm subsidies can carry this burden only so far. Better and modern farming technologies for irrigation, seeding and fertiliser application require financing, which is either not available with the rural population or they are vulnerable to the village money-lenders who charge excessive, immoderate amounts (farmer's suicides are a manifestation of these oppressive lending practices). Although banking availability (PM's Jan Dhan Yojana) can address this issue partially, ICT can be used as an effective tool to expand microfinance. The Swayam Krishi Sangam, a microfinance institution in the Medak district of Andhra Pradesh has shown impressive results of the usage of information technology in its transactions with the farmers of the villages. All these transactions take place through smart cards. This organisation has been inspired by the group lending model developed by Bangladesh's Grameen Bank. Earlier, the high cost of delivering services to its target clientele was a major problem facing this organisation. All cash transactions would take place at the village meeting, where each case would be discussed and, finally, the decision was taken, followed by documentation which took up a lot of time and effort. With the introduction of smart cards, this process has become faster and requires less effort. Each smart card holds the history of the client's credit. Thus, it lowers the cost of delivering services by reducing the errors and

fraud, eliminating unnecessary paper work, and, finally, speeding up the procedure.

- **Delivering Cost-Effective Healthcare:** Healthcare is one of the most vital areas for a better living index. ICTs can be used to facilitate remote consultation, diagnosis and treatment using advanced telemedicine technologies available. Delivering healthcare with ICTs enables healthcare professionals and institutions to address the critical medical needs of rural communities, especially those in remote locations who are unable to avail of medical services due to lack of qualified medical personnel. The midwives in Andhra Pradesh now use hand-held computers which enable them to better serve the patients in the villages. These midwives had to deal with a large amount of data entry and paper work. The computers provided under the InfoDev (a development body of the World Bank)-sponsored India Healthcare Delivery Project, automated the documentation, thus, allowing them to devote more time to the patients. According to a report by the World Bank, it has saved 40 percent of the service time of these midwives and enables them to give more time and better attention to the patients.



Likewise, Sisu Samrakshak, a joint initiative by the Government of Andhra Pradesh and UNICEF (UN International Children's Education Fund) is based in both Andhra Pradesh and Karnataka. It has a pilot project running to make use of ICT for integrated information for early childhood development. Sisu Samrakshak has been able to make positive changes

by providing access to rapid, precise and up-to-date information on issues of child health, maternal care, HIV/AIDS, water supply and sanitation. Moreover, it provides information and vocational training support intermediaries such as *anganwadis*, Auxiliary Nursing Maids (ANMs), teachers and other workers in healthcare.



- **Education:** Some of the challenges of providing educational services in rural India include lack of adequate teaching infrastructure as well as availability of trained teaching staff, both of which can be addressed through apposite use of ICTs, thus, fostering integrative and contextual teaching and learning and furthering information literacy. ICTs, therefore, improve the efficiency of the delivery of education in rural educational institutions, improve the quality of teaching and learning as also democratise the access to education. An example of this MOOC (Massively Online Open Course) are web portals like Coursera.org, edX.org which provide higher education (management, technology, sciences, etc.) to the masses all over the globe for free... and the content for which is created by reputed universities, including Harvard, Stanford, Yale, Wharton, etc! Similar projects, when set up by government institutions, will deliver high quality education to the rural poor at very low cost.
- **Employment Opportunities:** The rural poor do not get adequate opportunities for employment

The screenshot shows the 'babajob' website interface. At the top, there are navigation links for 'SEARCH JOBS', 'HIRE', and 'BABAJOB NEWS', along with a 'SIGN IN' button. The main section is titled 'Search Jobs in Pune' and displays 337 active openings. On the left, there are filters for 'Sort by' (Best Match, Freshness, Highest Salary, Lowest Salary) and 'Filter Results' (Salary Range, Gender, PINCODE, TIMINGS, EXPERIENCE, JOBS POSTED WITHIN). The job listings include details like location (Pune), salary (Rs7500/month), and experience requirements. On the right, there is a sidebar with a 'Are you an employer?' section and a 'SPEAK TO THE EMPLOYER' button.

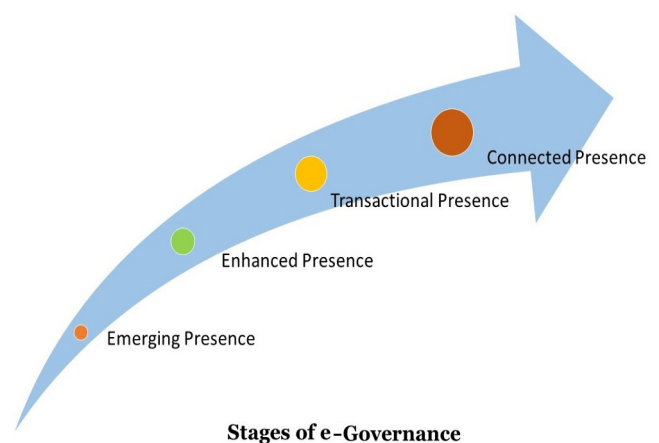
An Online Job Exchange for Blue Collar Workers

because they often do not have access to information about them. One use of ICTs is to provide online services for job placement through electronic labour exchanges in public employment services or other placement agencies. Moreover, online jobs available on the internet open up another avenue for such people.

- **Increased Efficiency and Accountability:** There is a reduction in the number of intermediaries that citizens need to interact with in order to avail of government services. Thus, governments can reduce the number of employees or redeploy them in more productive tasks. When information about various government processes and public budget expenditure is disclosed, it brings in transparency and improves audit functions, thus, plugging leakages, and increasing revenue for the government. Moreover, data captured using ICT systems enables better monitoring of employee productivity as also reduces corruption. The less the corruption, the better is the investment climate, which spawns more jobs and increased economic activity. *ICT usage in e-governance can*

significantly reduce costs (paper, storage, etc) and delays. Reduction in the administrative burden of decision-makers is a significant benefit as it releases time for important issues of policy and decision-making. Further, there is a significant *reduction in the cost of transactions* between the government agencies and the citizens.

Evolution of e-Governance



There are four main stages of evolution of e-governance. These are:

- **Emerging Presence:** In the emerging presence, e-government is limited, offering basic information online. It represents the simplest and least expensive entrance into e-government, but it also offers the fewest options for citizens. A typical example is a basic website that lists cursory information about an agency, such as hours of operation, mailing address, and/or phone numbers, but has no interactive capabilities. It is a passive presentation of general information. Some observers refer to such sites as 'brochureware,' suggesting they are the electronic equivalent of a paper brochure. Various government websites provide sources of past and current public policies and governance information such as policies, laws and regulations, reports and newsletters. Some examples of websites of these types are <http://www.tnrd.gov.in>, <http://www.smart.ap.gov.in>, etc.
- **Enhanced Presence:** In enhanced presence, e-government provides not only greater sources of information, but also e-tools and e-services. Interactions are relatively simple and generally revolve around information provision. Such initiatives are designed to help the customer avoid a trip to an office or make a phone call by making commonly requested information and forms available round-the-clock. e.g. downloadable forms, downloadable databases, e-mail communication, etc.
- **Transactional Presence:** Two-way interactive applications provide citizens with opportunities for online, financial and non-financial transactions. These initiatives are more complex than simple information provision and embody the types of activities popularly associated with e-government. They enable clients to complete entire tasks electronically at any time of the day or night. These initiatives effectively create self-service operations for tasks such as licence renewals, paying taxes and fees, and submitting bids for procurement contracts. Although the level of interactivity is of a higher magnitude

than second stage initiatives, the activities still involve a flow of information that is primarily one-way (either to the government or to the client, depending on the activity). The electronic responses are generally highly regularised and create predictable outcomes e.g., online filing of taxes, payment for public utilities, applications for ID cards, birth certificates, licences, e-voting, etc.

- **Connected Presence:** At this stage, the way the government operates fundamentally changes, with consequences of better coherence, integration and coordination of processes and systems within and across government agencies. The government transforms itself into a connected entity. All stages of transactions are electronic. Initiatives at this level utilise the full capabilities of the technology to transform how government functions are conceived, organised, and executed. Such initiatives would have the robust citizen relationship management capabilities required to handle a full range of questions, problems, and needs. Currently, in our country, there are no examples of this type of initiative, in part due to administrative, technical, and fiscal constraints. The success of the Digital India mission will be transformative in nature and will help our nation achieve this stage. One of the distinctions of these initiatives is that they facilitate the seamless flow of information and collaborative decision-making among federal, state, local, public, and private partners. In other words, transformative e-government initiatives often seek to remove the organisational barriers that promote agency-centric solutions and, instead, promote customer-centric solutions.

Challenges of ICT Proliferation in India

There is a distinct disconnect between the noble objectives of NeGP and the actual implementation because of the challenges of deploying the ICT services. Some of the challenges are:

- **Low Penetration / Reach of the Network:** While the state-owned MTNL and BSNL are largely responsible for provision of network connectivity to the country, it will be unfair and impractical to burden these companies for such an intensive task, as it involves colossal resources in terms of network infrastructure and the manpower required to maintain it. The solution is to get the private sector to invest in the infrastructure, based on a Build-Operate-Transfer (BOT) model similar to road infrastructure. The private sector, with the inherent advantages of high productivity, better technology and faster implementation will enthusiastically participate in this project. The dramatic expansion of cellular networks across the nation means that affordable telecom services are now available for the first time in many areas. Although most cell networks do not yet provide high-speed connectivity in rural areas, they can support a number of low-bandwidth applications like e-mail, agricultural information, e-governance, etc, which are easy to use, powerful and sustainable. As these networks expand and are upgraded, they will provide crucial connectivity for a large number of rural communities and will be better able to support data-intensive applications.
- **Human Resource Limitations:** Considering the demographic dividend the nation has in terms of young, impressionable minds, this factor is not only a challenge, but an opportunity too. By providing adequate training to village youth, it will not only generate employment, but also ensure that the villagers are comfortable in using the services with the help of a familiar person. Some of the constraints are as follows:
 - (i) Inexperienced computer users.
 - (ii) Lack of trained technical support.
 - (iii) Uncoordinated or absent governance mechanisms.
 - (iv) Inadequate incentives for IT workers.
- **Lack of Adequate Electricity:** Lack of consistent and affordable electricity is the single greatest

challenge in designing an ICT infrastructure for the rural areas. The vast expanse of rural India has no electricity mains and, where available, it is usually unreliable or so unstable that it poses a threat to unprotected electronic equipment. Among off-grid options, diesel generators are one common source. But high fuel costs and on-going maintenance problems mean that generators are seldom run for more than a few hours a day and are prone to abrupt and unannounced failure. Alternative energy sources such as solar panels and windmills, though cost prohibitive, can be deployed to support standard computing hardware. One logical immediate answer to this challenge lies in low power consuming hardware, which again requires collaboration with the private sector and the scientific community.

- **Environmental Challenges:** The physical environment in most rural and remote settings is characterised by a combination of heat, dust and humidity, each of which is a challenge for standard computers. High speed CPUs generate large amounts of heat that, if not properly dissipated, reduces performance or can render these systems inoperable. Dust threatens sensitive electronics by shorting circuits and impeding air flow and heat dissipation. Humidity leads to condensation, corrosion and even mould, all of which can cause electrical problems and possibly shorten the equipment's lifespan. In controlled environments in urban areas, these concerns are addressed. One solution to this obstacle is having power-efficient computing devices which generate less heat and, with appropriate thermal design, can be deployed without fans. This allows computer enclosures to be better sealed against these threats. Fewer moving parts also means greater reliability and lower overall operating costs. In exceptionally remote and/or hot environments, solid-state flash memory can be substituted for hard drives, which are prone to failure in extreme heat and are a common failure point requiring support.

- **Non-Uniform Implementation:** Although the federal government had conceived the plan and the objectives, its roll-out was left to the states. This meant non-uniform plan outlays and implementation, as the states thought fit. There was a lack of, or no, oversight committees to rein in these projects. A solution is articulation of the vision as well as the execution phases with terminal objectives, homogeneous framework and equal importance to all states. During the roll-out phases, steering committees should oversee the progress for optimised performance.
- **Computer Security:** Perhaps one of the most significant challenges for implementing e-government initiatives is computer security. Some areas of weakness include security programme management, access controls, software development and change controls, segregation of duties, operating systems controls, and service continuity. For e-government activities, service continuity is critical not only for the availability and delivery of services, but also to build citizens' confidence and trust. However, the risks of fraud and misuse of sensitive data are concerns as well.
- **Fiscal Support:** Financial backing is essential for any ambitious project such as Digital India. While business and industry will be involved in this mission, various ministries and departments of the government must invest part of their budgets in Digital India. Poor planning, fear of losing significance, fear of increased accountability / culpability, etc may make the *babus* tighten their purse-strings and, consequently, the noose around Digital India. The bureaucrats have to be educated on the achievable objectives and their vital contribution to nation building. Moreover, it is the top hierarchy which must drive the initiative within its sphere of influence.

The Digital India Paradigm

To effectively address the above mentioned challenges and push reforms to the last man in rural

areas, PM Modi announced the visionary “Digital India” initiative. Digital India aims at ensuring that the government services are made available to citizens electronically by reducing paper work. Digital India will transform citizen service delivery, catalyse new economic activity, and a whole slew of start-ups offering new jobs by leveraging technology in an integrated manner, with robust last mile connectivity and massive process improvements. The initiative also includes plans to connect rural areas with high-speed internet networks. Digital India is centred on three key areas:

- **Digital Infrastructure as a Utility to Every Citizen:** Provisioning of high-speed broadband connectivity as a utility to citizens, with priority for the rural areas. It envisages citizens with a unique digital identification that is lifelong, online and can be authenticated. This will be aided by the push for a secure and safe cyber space in the country.
- **Governance and Services on Demand:** Seamless integrated services across departments, will be made available on web and mobile platforms. This, coupled with electronic / cashless transactions, will transform the rural landscape. Moreover, the Global Information System (GIS) will be leveraged for decision support systems and development.
- **Digital Empowerment of Citizens:** For effecting growth, easily accessible digital resources like documents, certificates will be available on the digital infrastructure. Collaborative digital platforms will be used for participative governance. All these resources will be in Indian / local languages.

Potential Changes Effected by Digital India Project by 2019

- Broadband internet access in 2.5 lakh village with 4 lakh community Wi-Fi access points in the rural areas.
- Job creation: Immediate 1.7 crore and Oblique at least 8.5 crore.

- It will facilitate the nation to be an innovator in ICT usage in rural development.
- Net zero imports by 2020.
- Availability of e-governance and e-services. This itself will be a game-changing paradigm for the upliftment of the disenfranchised masses of the nation.
- Digitally motivated people, which will enhance public reasoning and awareness.

Blueprint for a Model Digital Village

The ideal model for a digital village would have the following characteristics:

- **Scalability and Replicability:** Using a modular approach for easy addition / deletion, the model should be easy to replicate across the nation and also be able to scale up / down as required.
- **Cost-Effective:** Although initial investments in the roll-out will be of a higher magnitude, the wholehearted participation of private sector enterprises should ensure better ROI (Returns Over Investment) not only in terms of long-term financial gains to all stakeholders, but also other intangible benefits to the rural population and the nation as a whole.
- **Swift Implementation:** The model should be able to be deployed quickly, since any delays or project overruns will result in obsolescence of

technology which will hasten the projects' decay and downfall.

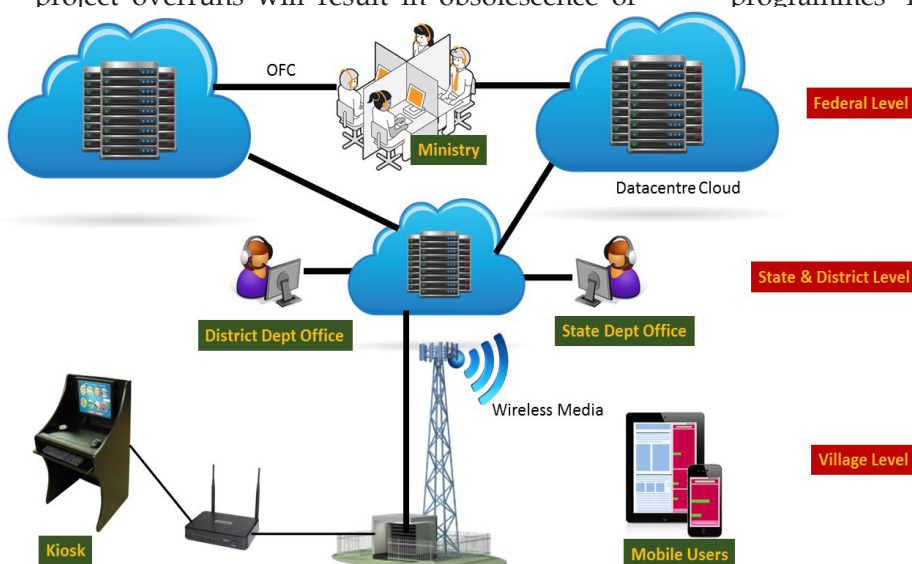
Proposed Architecture

Based on the above, the architecture for a 'model digital village' is divided into the following components:

- **Connectivity:** This is a voice and data network using a combination of wired [Optical Fibre Cables (OFC)] and wireless (cellular) technology. A district-wise mapping of this connectivity must be carried out for a planned implementation. While voice telephony will be useful for connecting the rural population with each other, it will also help them communicate with, say, a service / call centre for a specific service e.g. agri-info like weather forecast, crop prices, etc. The data sub-component of the network will be for extending broadband internet access, over which will ride the multitude of services like e-governance portals, communication (e-mail, social media, etc), healthcare, education, and so on. While the focus is on providing broadband connectivity to 2.5 lakh *gram panchayats* by 2017, the urban areas will also see a change of the existing regulations to mandate inclusion of communication infrastructure in new real estate developments. Integration of existing programmes like the National Optical Fibre

Network (NOFN), State-Wide Area Network (SWAN) and National Knowledge Network (NKN) is being proposed to create a unified National Information Infrastructure (NII) by March 2017. Efforts should also be made towards increasing mobile network penetration and covering gaps in the present mobile connectivity by bringing 42,300 villages under mobile connectivity by 2018.

- **The Cloud:** All of this will be



driven by cloud data centres, which will be at the heart of Digital India. Data centres are the engine for digital services, and all the services, offerings, envisioned through Digital India to transform India will only be as good as the cloud data centres powering it – from a scalability, speed, as well as security perspective. Cloud computing or simply ‘the cloud’ provides users with various capabilities to store and process their data in third-party data centres. It relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network. The cloud comprises multiple ICT components in a single, optimised computing package. These components of a cloud include servers, data storage devices, networking equipment and software for various services available on demand. The advantage of having IT (web and mobile) services on the cloud is resource optimisation and lower costs. While the National Informatics Centre (NIC) under the Ministry of Telecom and IT (Information Technology) will continue to operate the data centre or cloud infrastructure at the federal level (it needs massive infusion of funds and technology for ramping up the existing operations), there could be cloud infrastructure at state levels and not district levels. Undue decentralisation will be one of the factors for rapid dilution and decline of the project. While it may be argued that a large enough national data centre is good enough for this, the diversity of the country in terms of languages is a major factor for this regional cloud. Each data centre / cloud will have the following sub-components:

- (i) **Servers:** For hosting and computing of various services and applications like databases, identity management, e-governance portal, e-learning portal and e-healthcare, etc. Any application or service already available through other means should not be included in this application package – this includes e-mail and social media which are already available and widespread.
 - (ii) **Storage:** These are secure networked storage devices which safely store the data of all citizens. This is the ‘*digital safe*’ for all their information and documents.
 - (iii) **Network Sub-Components:** These are devices that facilitate the networking of servers and storage to the users through wired / wireless media. These devices include network switches (for connecting and switching), security devices like firewalls and optimisation devices like load balancers, etc.
 - (iv) **Allied Sub-Components:** These include power conditioning devices like the UPS (Uninterrupted Power Supply), power generators, fire alarm and protection systems, environmental systems for maintenance of optimal temperature, humidity and reduced dust levels.
- **User End Terminals:** While the rapid proliferation of cellular telephony will ensure that the villagers have access to mobile phones, for a large mass of rural poor who may not be able to afford these devices, a central digital service access kiosks (Digital Sewa Kendras) should be created.



These kiosks should be equipped with at least one computer with associated peripherals like UPS, printers, web-camera, etc for a population of 1,000 villagers. This requirement can be scaled up after the initial set-up which itself will cost anything between Rs 60,000 to 70,000 per kiosk (translating to Rs 4,000 to 5,000 crore nationally), plus the maintenance and operating costs. A Digital Sewa Kendra could also allow Wi-Fi access to the rural population. The next phase should convert these access centres to ICT distribution centres, so that ICT services can be made available to rural schools, healthcare centres, *panchayats*, commercial establishments, etc.

- **Software:** All systems, whether it is the cloud / datacentre or the kiosks will require software for various services. Due to the magnitude of this project, procurement of licensed proprietary software will amount to massive investments – enough to derail the entire project. This cost can be offset by using Open Source Software (OSS) like Linux and its associated technologies from the servers, applications to desktops. Since OSS is free (of cost), the only financial implication will be configuring and maintenance, which can be absorbed by the project outlay. Moreover, OSS developers, due to their non-profit leanings, will contribute to this noble cause at no cost i.e. gratis. One only has to browse software projects on <http://www.SourceForge.net> to see the power of the open source movement – all software is available for free download.
- **Skinware:** While ICT training of the rural youth is one of the objectives of Digital India, it is an accepted fact that ICT skilled manpower or skinware will be required for the data centres and the end terminal kiosks. Trained manpower for data centres / cloud will be from the NIC or state IT Department. It is the kiosk manning which requires gainful employment of trained staff. One of the possible sources for this comprises the veterans (ex-Servicemen) of the armed forces, who are not only ICT aware (basics to advanced), but also have other nation-building

traits required to make this project successful. Other sources of trained staff are the numerous computer training institutes, that can be given the SME (Small and Medium Enterprise) status so as to enable more entrepreneurs to set up such institutes. It is estimated that there will be an immediate requirement of about four lakh such ICT trained personnel, which, in later years, will only increase. Thus, the project will generate direct and indirect employment, and be a source of revenue generation for millions of Indians. With a target of creating jobs in the IT sector for one crore rural youth, this programme aims to provide vocational training to people in the smaller towns and villages. It also calls for setting up of Business Process Outsourcing (BPO) operations in the northeastern states coupled with training of delivery agents to run viable businesses delivering IT services. The telecom service providers within the country are also expected to train a predominantly rural workforce to enable expansion of mobile services in the rural areas.

Role of Corporates and NGOs

Since the government agencies or departments do not have the staff and capability to implement the entire project, it is imperative that the corporates and Non-Governmental Organisations (NGOs) be taken on board to play a vital role in the above implementation model. NGOs should be engaged for generating basic ICT awareness of the citizens and facilitating ease of digital identification of the population. During the implementation stage, NGOs should be employed for planning of content and services in the local language and as per requirements of the region.

Digital India, with an active participation of the private sector and regulatory oversight by autonomous institutions, can become a template for participative policy implementation in the country. Whether we like it or not, it is a fact that platforms

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like Facebook's Internet.org, Google's Loon project and Microsoft's White Spectrum project will be at the forefront in taking internet access to the yet unconnected across the globe, and not governments. They will be involved in engineering the sub-projects / components related to their core expertise as well as in roll-out and maintenance. As mentioned earlier, a Build-Operate-Transfer (BOT) model will be ideal for this project. India's top industrialists, including Cyrus Mistry, Mukesh Ambani, Anil Ambani, Kumar Mangalam Birla and Sunil Bharti Mittal have applauded the government's Rs 1.13 lakh crore Digital India programme, saying it has the potential to bridge the digital divide and benefit billions of people through digital solutions in the education, healthcare and irrigation sectors. Reliance Industries Chairman Mukesh Ambani said his company would invest Rs 2.5 lakh crore across different Digital India heads, which have the potential to create employment for over five lakh people. Kumar Mangalam Birla, Chairman of the Aditya Birla Group, which owns the telecom

company Idea Cellular, said it would leverage its network of 165 million subscribers across 350,000 towns and villages in India to provide mobile-based healthcare and education services as well as weather forecasting advisories and *mandi* prices to over one million farmers.

Conclusion

The Digital India initiative of the present government will be a game changer in the effort to uplift the disenfranchised population of rural India. Not only will the populace benefit economically, it will also result in changed social attitudes, thus, actually reaping the benefits of the demographic dividend of having the largest population of under-25 youth. This will create further opportunities for the people and will result in inclusive growth of a strong, vibrant and modern India, which our forefathers dreamt of. It will be a fitting tribute to our nation's founding fathers when the results of Digital India are there for the whole world to see and acknowledge.

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