DISRUPTING DEMOCRACY

POINT. CLICK. TRANSFORM.

How Connecting the Last Mile Can Change India

By Osama Manzar and Udita Chaturvedi

In the last 25 years, the internet, as we know it today, has come a long way. In India, public internet entered a few years later — in August 1995[1] — and has since then largely remained a luxury. However, in the last few years, a change is visible, courtesy of mobile internet. While the mobile phone has been the fifth source of mass communication in terms of evolution (after radio, newspapers, television and computers), it's the first tool of communication for many across the world (including India) in terms of access. More and more people are coming online in India but there's still a long, long way to go to truly reach last mile connectivity.

One major reason for this lack of connectivity is insufficient and inefficient fiber optics to reach rural and remote locations of India. The other is lack of interest on part of the Internet Service Providers (ISPs) who do not see any profit in establishing a tower or extending their connectivity in unconnected parts of the country. The third is a lack of contextualization of the digital literacy curriculum and failure in the strategy of teachers/trainers who view this unconnected population as information consumers and not as information producers.

Given India's distant and wide geographical and socioeconomic divide, it might be difficult to get every individual online within the next couple of years. However, why not look at connecting India institutionally?

Unconnected Village Councils

There are 650,000 villages in India that are governed under almost 250,000 panchayats or village councils, which further come under 6,000 blocks and 672 district — 250 of which have been classified by the government as backward districts[2]— across 36 provinces, including Union Territories of India.[3] Every village council is made up of five to 17 members, adding up to about three million village councilors. Of these, about one million are expected to be women.

The village councils act as local self-governance bodies at the lowest level of

#selfiewithdaughter

One particularly good example that comes to my mind of use of information communication technology (ICT) by a village council member — at an individual level — is of Sunil Jaglan, the head of village council in Bibipur, Haryana — a state notorious for female foeticide and female infanticide. Jaglan launched a campaign called #SelfieWithDaughter in his village, which later spread across the nation and was even endorsed by Indian Prime Minister Narendra Modi, to motivate society, especially fathers, to feel proud of their daughters.

governance. These village councils are responsible in their jurisdiction for as many as 29 subjects, ranging from agriculture, land reforms, irrigation and husbandry to cottage industries, rural housing, roads, education and social welfare.[4] If an institutional approach to connectivity is adopted by the government in India, it would be able to benefit a larger population — and holistically — rather than an individual-centric approach. Take, for example, the village councils. Delivery of government services should be efficient to ensure that the maximum number of citizens in a region is able to avail itself of benefits and entitlements. At a village level, a good majority of citizens are dependent on government infrastructure and schemes. These village councils are also the source of communication between the government (state and central) and the citizens. Therefore, it is extremely crucial to have an efficient, transparent and accountable service delivery system. For this purpose, provision of connectivity should be seen as a basic infrastructure goal to bring all the 250,000 village councils online for a two-way communication process.

These quarter of a million village councils and its councilors represent the poorest of the poor in India — the more than



300 million individuals who fall under the category of below poverty line (BPL) who, by definition, earn less than a dollar a day.[5] This is the same share of the population that directly depends on access to government schemes or entitlements for some of their most basic needs.

Every year, a certain amount of budget is allocated to the village councils under various heads and subjects. If all the village councils are online, they can share the budget with the citizens who cannot only view the subject-specific allocation but also hold the village council and the government accountable for misappropriation or lack of utilization of funds. Further, every village council is supposed to hold a monthly meeting with its members but it's not always executed for various reasons, including the availability of the members on a particular date. In a scenario where all village councils are online, council members will be able to conduct their meetings through videoconferences, with public viewing options. This will ensure that all matters discussed in the meeting are documented/recorded, which will result in transparency in the local governance system. Additionally, if all village council websites hold a repository of information on the local demographics, needs, grievances, solutions offered and projects implemented — besides a clear listing of the village council's roles, responsibilities and progress — imagine the quantity of relevant data that will be available online for citizens and governments to access.

Digitally Devoid Education System

If a person invests in one's education today, its results will be visible 20 years later. That is how the education system works, as a student is taken through kindergarten and middle school to high school and college. However, unless our schools become smart, our country will not be able to create smart citizens in the future.

GIS@SChool

GIS@SChool is an app implemented by the state government of Madhya Pradesh across all its 125,000 government schools in the state. The crowd-sourced Android-based mobile app allows students, teachers and government authorities to capture geotagged and time-stamped photographs and information about existing, non-functional and missing infrastructure or amenities — such as drinking water, separate toilets for boys & girls, clean kitchens for mid-day meals and boundary walls, among others — to ensure schools comply with the various provisions of the Right to Education Act of 2009.

There are about 1.4 million government schools in India with over 227 million students enrolled.[6] For this vast population of students, there are only seven million teachers. According to a World Bank study, based on unannounced visits to 3,700 schools, researchers found 25 percent of teachers absent.[7] These rates varied from 14.6 percent in the state of Maharashtra to 41.9 percent in the state of Jharkhand. According to the same report, teachers who don't show up to work cost India $1.5 billion a year. A UNESCO study, meanwhile, states that as many as 47 million students dropped out of school by tenth grade in India.[8] While there are several social and economic reasons that contribute to this high percentage of school dropouts in India, teacher absenteeism is also a reason. So is the lack of proper infrastructure. For



example, many young girls drop out of school after they hit puberty due to lack of proper toilets.

India has a 40 percent dropout rate in elementary schools.

Schools have the moral, social and economic responsibility of engaging India's children in learning to nurture and encourage them to become part of India's future workforce and contribute to its growth. Economist and former prime minister of India Dr. Manmohan Singh, in a recent interaction with media, stated that India needs to create 10 to 12 million jobs annually.[9] Call it its strength or weakness, India has a vast population that can and should be skilled in digital tools and technology — even if at a basic level — to meet today and tomorrow's need so that our young population is prepared to serve India and the rest of the world — which has a high demand for India's skilled labor.

With the internet having access to unlimited information and learning material in varying formats, it should be the need of the hour to ensure that all teachers at government schools are digitally literate. At the moment, even school headmasters and headmistresses are not digitally literate in most schools; a computer lab in every school is a distant dream. If schools are made smart and equipped with digital labs and broadband connectivity, students and teachers will be able to access content, learning material and "edutainment" resources on the internet for a better and more engaging learning experience. Currently, India has a 40 percent dropout rate in elementary schools, indicating the poor quality of our education system and lack of incentives to finish school.[10] Like several

private schools today, if all government schoolteachers would be able to use tablets, mobile phones and other smart tools for lessons, it would greatly influence the students' motivation to attend classes. Further, teachers' attendance should be geo-tagged and time-stamped, and all facilities and physical infrastructure in schools should be monitored via a crowd sourced app or geo-tagged data collection software application. Teachers, students and visitors should also be able to geo-tag facilities — such as toilets or water coolers — in real time to update information about its functionality.

Mobile Academy

Mobile Academy — a training course developed by BBC Media Action to improve communication skills of Community Health Workers (CHW) and expand their knowledge of 10 life-saving health behaviors. Under this project, a mobile phone-friendly audio course was delivered via Interactive Voice Response (IVR) technology. This eliminated the need for CHWs to travel long distances to receive training. To compliment this training, a multimedia service called Mobile Kunji was also created to combine the IVR service with a printed deck of cards that were designed to resemble a mobile phone. Each card came printed with a unique mobile short code, which corresponded to a specific audio health message on a toll-free number.

Not At the Cost of Health

One cannot but question the quality and services offered by the health workers when India's infant mortality rate stands at 37.9 per 1,000 live births[11] and maternal mortality ratio stands at 170 per 100,000 live births.[12] These figures reflect the poor state of affairs in India's health care system.

At the village level, the health care system is divided into sub-centers, primary health centers (PHCs) and community health centers (CHCs). The Sub-Center is the first point of contact between the primary health care system and the community. A PHC is the link between village community and medical officers; these have been envisaged to provide curative and preventive health care to rural populations. CHCs form the third tier of the rural health care network and act primarily as referral centers to make modern health care services available to rural populations and to ease the overcrowding of district hospitals. According to government data of 2015, there are 5,396 sub-centers, 25,308 PHCs and 153,655 CHCs across 36 provinces of India.[13] Ideally, every sub-center is meant to cater to a population of 3,000 to 5,000; a PHC is meant for 20,000 to 30,000 people; and a CHC covers four PHCs. However, at hundreds of sub-centers and PHCs, health care providers are unavailable, adequate health facilities are lacking and even an expert's visit is rare. CHCs, too, are facing a major shortage of staff across the country.

In a scenario where every sub-center, PHC and CHC is connected to the internet and interlinked with each other and the nearest district hospital, the gap between health care seekers and health care providers can be considerably bridged. A simple infrastructure can be put in place to connect local health centers with district-level hospitals on a weekly basis via videoconference to make quality medical

Chanderiyaan

Chanderiyaan is a project initiated by DEF in the handloom cluster of Chanderi in the Indian state of Madhya Pradesh. In the last six years, DEF has been able to introduce various interventions in the areas of digital literacy, digital designing, digital cataloguing, digital skilling, digital archiving, digital market linkages and e-commerce. Hundreds of weaver families in the cluster have given up manual paper-based designing for specialized design software like CAD/CAM; learnt to use e-commerce platforms; and adopted social media tools for sales and marketing. Additionally, households have subscribed to wireless broadband to enjoy its benefits. Young people have even set up small enterprises, offering digital services such as printing, copying, typing and internet surfing. Over the years, the results have been impressive. What was a Rs. 650 million ($10.07 million) industry in 2009 is now worth more than Rs. 1.5 billion ($23.25 million), according to a research study on Chanderiyaan by the Institute of Rural Management Anand and the Indian Institute of Technology – Calcultta.

services available to rural and marginalized patients who require specialized consultation. Further, if a PHC or CHC can also digitally link its supply and stock register, it can electronically communicate to the concerned department in real-time to order depleting medicines or equipment and track the progress of its request.

Further, there are about 860,000 frontline health workers (or ASHA workers) and 1.8 million Aanganwadi workers (or Courtyard Shelters that have been designed as mother-and-child care centers to combat child hunger and malnutrition) in India that have been deployed at the village and hamlet level. These workers, all of whom are women, are essentially hired by the government to maintain maternal and child health care.[14] Their tasks include ensuring women in rural India give birth in hospitals under proper medical supervision, ensuring pregnant and lactating women follow a nutritious diet, ensuring infants receive timely immunization and vaccination, and ensuring children grow up in a clean and healthy environment.

Health workers will be able to access relevant information via a simple Google search.

If a common mobile application is developed for all Aanganwadi health workers across the 36 provinces of India, it will enable these health workers to list their tasks, roles and responsibilities on a daily, weekly, monthly and annual basis. This will set their goals straight, and both the health workers and the relevant health department will be able to monitor their progress. Further, this app should come with built-in interactive and multilingual audio and video files that the Aanganwadi workers can hear/view to train themselves

and to create awareness among women in the community. Additionally, with an internet-enabled mobile phone or tablet, the health workers will be able to access relevant information in a timely manner via a simple Google search as well. Since a lot of diseases are preventable in nature rather than curable, services like these can go a long way to educate men, women and children about health, hygiene, nutrition and lifestyle, thereby creating a ripple effect of preventive health care knowledge.

Local Entrepreneurs and Artisans Have Restricted Markets

There are over 156.4 million micro, small and medium enterprises (MSMEs) in India that employ more than 930.9 million people.[15] As many as 2,000 of these are cluster-based enterprises dealing in handloom, handicraft, leather and craft, among others — most of them are offline. In a scenario where they have access to the internet, each MSME can have its own website and e-commerce portal that will give it access to state and national-level markets, and even global markets for many. The online presence of MSMEs will also assist public procurement, as the government will then be able to interact with them in real-time basis with electronic records of all communication, bringing in more accountability and transparency to the system.

Access to the internet will also give MSMEs a chance to access information related to their sector and trade. Often, most MSMEs live in information darkness with little or no knowledge of market trends and market prices. What they sell at nominal prices to local vendors or in local markets is sold in other markets at much higher prices. Take the handloom sector of India, for example. A simple cotton saree that a weaver makes in four days for a meagre weekly wage of Rs. 350 ($5.46) — in Nuapatna town of Odisha state — is sold in the nearest major city Bhubaneswar for no less than Rs. 1200 ($18.6).[16] With access

Goonj

Goonj is a New Delhi-based organization that is one of the first organizations in India that highlights clothing as a basic need. A completely crowdsourced initiative, people from all over India send their discarded and underutilized material to Goonj, that then distributes it in rural India or as relief material during natural calamities. The organization deals with over 3,000 tons of clothing material annually through an online and offline network, and a major chunk of its funding is received through online donations. Further, the organization runs active social media campaigns throughout the year, which has helped in the expansion of its outreach in terms of crowdsourcing material, spreading the word, building partnerships, raising funds, sharing stories from the ground, sensitizing communities and raising awareness about clothing as a basic human right. Additionally, products under Green by Goonj, a brand built around reuse and upcycling of material received by the organization, are sold online through its official website and social media channels. Over time, Goonj has gained a social-media following of almost one million.

to digital tools and the internet, weavers can access relevant information about raw materials, market trends and market prices in a timely manner; design their own patterns rather than be dependent on middlemen for designs; promote their products through social-media channels, including WhatsApp; sell their products through existing and popular e-commerce portals or exclusive websites; find out information about government schemes and entitlements available in their sector; and access global markets.

Civil Society Faces Threat of Lack of Transparency

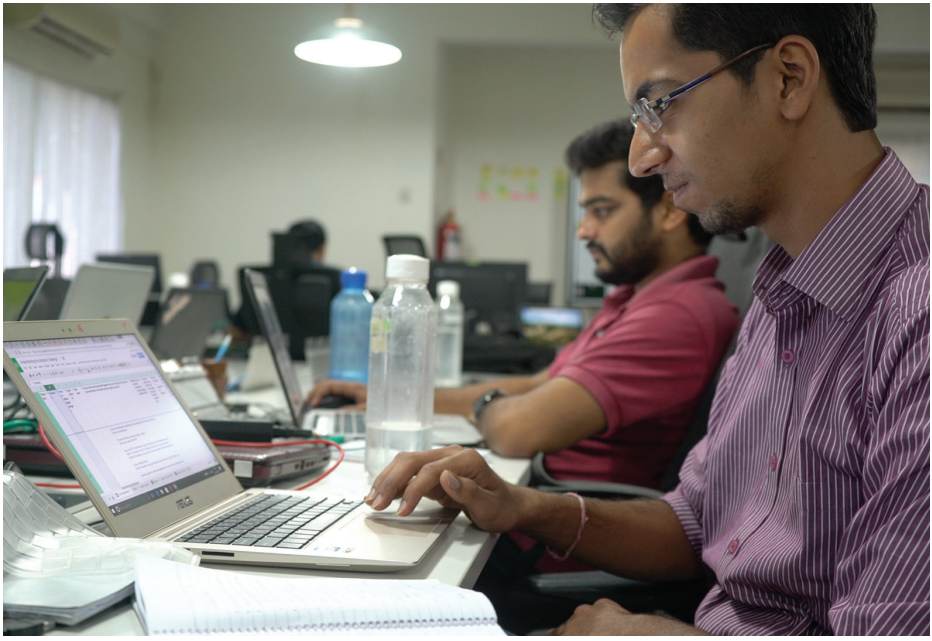
The civil society is representative of the challenges in a society. In India, there are more than 3.2 million non-governmental and voluntary organizations; and less than 10 percent of them file tax returns.[17] Most of the other 90 percent of organizations are offline; they do not have a Web presence and the staffers and volunteers at most grassroots organizations do not know how to operate a computer, let alone access the internet. If every NGO comes online and sets up an exclusive website, it will firstly bring in a greater sense of transparency and accountability for the civil society — a challenge that India has been facing for the last couple of years with the ongoing government crackdown on civil society. Through their websites, the NGOs can share their registration certificates, financials and annual reports in a public space. Once trained in digital content creation, representatives of NGOs will be able to share updates about their activities and progress with a larger audience and be appreciated for their efforts, and at the same time receive feedback and suggestions to improve. An online presence also opens doors for NGOs to access institutional funding, donations and crowdfunding campaigns. This can be especially motivating for grassroots NGOs that operate on very small budgets and have limited access to large and credible funders.

Post Offices as Potential Public Spaces for Access

India has the largest postal network in the world with over 154,882 post offices, of which 89.86 percent are in rural areas.[18] While all are supposed to have an internet connection (and be digitized by the end of this year), internet connectivity is non-functional at hundreds and thousands of the post offices, especially those in rural areas, which are largely disconnected from mainstream communication tools. The government-operated institution employs over 466,000 people; and offers a range of mail and monetary exchange facilities.

Plantix

Plantix is an app developed by the International Crops Research Institute for Semi-Arid Tropics to allow farmers to identify pests and diseases using their mobile phones or tablets. Farmers can upload a photo of their infected crop and wait for the app to process the information to offer diagnoses, mitigation and preventive measures. Odaku is another mobile app that caters to the fishing community. Its GPS-enabled, easy-to-use interface allows fishermen to store data in the cloud, navigate without internet connectivity to ensure they don't cross international sea borders, access an online market to sell their catch, buy/sell used boats and even access weather updates about seas levels and chances of rain.



With such wide and fairly well-connected networks (especially in rural India) meant to serve areas of about 20 square kilometers and populations of around 8,200 people, it would be ideal if post offices could have access to functional internet connectivity and bandwidth to not just carry out traditional services offered at a post office but also to transform itself into entitlement offices. This way, every post office will also act as a government center that provides citizens with information on various government schemes and entitlements, and enables access to the same by downloading relevant application forms for the schemes, assisting rural communities in filling out the forms and submitting the forms online on behalf of the beneficiaries.

Farmers are Living in Information Darkness

Over 58 percent of the rural households depend on agriculture as their principal means of livelihood.[18] Agriculture, fisheries and forestry together form one of the largest contributors to India's Gross Domestic Product (GDP). As many as 250 million people are engaged in this sector, according to the Planning Commission of India. Millions of these farmers are living in extreme poverty in remote and underserved regions of India. Simple access to the internet on their mobile phones can open a world of unlimited information for the agriculture community.

With access to the internet, farmers can gain information about market prices, the latest agricultural trends, technological innovations in the sector, suitable transportation channels, weather updates and direct access to the market. The internet will also give them direct access to experts with whom they can share their queries and receive solutions or responses.

In several smaller pockets, innovators have come up with brilliant mobile applications in regional languages to benefit the

farming and fishing community. At the moment, due to lack of awareness, lack of connectivity and lack of digital literacy, these apps — and several others like them — are used by a very small segment of India's farming and fishing community. An institutional approach to digital literacy can help in the adoption of such apps on a mass scale.

We Need a Targeted Approach to Digital Literacy

The Government of India, under the leadership of Prime Minister Narendra Modi, launched an ambitious program in 2014 called Digital India.[20] While the Indian government is trying hard to push digital adoption and penetration, its efforts are not targeted strategically to create a ripple effect or a cascading effect for beneficiaries. With the intention to promote the adoption of Digital India, the government launched the National Digital Literacy Mission (NDLM) the same year with a target to make four million Indians digitally literate.[21] Last year, the government raised its goal to 60 million additional individuals; and, unfortunately, implementing partners have been working day and night to meet numbers and not the vision.

If a more institutionally-targeted approach is adopted by the government in India, it will help make our government officials, government representatives, school teachers, frontline workers, civil society representatives, agricultural community and other institutional members digitally literate, who can then utilize this knowledge to bring efficiency and transparency to the government service and delivery system and, at the same time, share the knowledge with others. This will not only create a pool of digitally literate individuals and institutions, but also incentivize the adoption of digital tools and technology, thus creating a cascading effect.

Excluding the Excluded

Lack of access to the internet means lack of access to information; and this is the reason a large population of India continues to be marginalized. Lack of connectivity restricts a majority of India's population from receiving their entitlements, submitting their grievances, accessing government notices, finding appropriate markets and accessing the thousands of services that the government has now moved online under its Digital India program — thus leading to further exclusion of those already excluded.

Further, India's 1.25 billion population cannot rely on ISPs for mobile internet either since they don't see any return on investment in setting up a tower or extending their connectivity to parts of the country that are still unconnected. This only increases the cost of accessing information or a service online that is much more expensive for the people at

Community Network

In the Baran district of Rajasthan, DEF in partnership with the Internet Society (ISOC) has established a 200-km community network and connected it to a local server, enabling both internet and intranet services to the community. This way, even if the internet is down, the community can share content and access content through the local server, thus creating a system of intranet or community network. This has also encouraged the community to create a localized database and archive for their oral and traditional knowledge, art and culture.

the bottom of the economic pyramid than for those who have both easy access and financial means to access the same services in semi-urban or urban locations. Further, even in areas where mainstream ISPs are available, the cost for mobile internet is too high.

Lack of access to the internet is the reason a large population of India continues to be marginalized.

One simple example to illustrate this would be accessing the service of a printer/copier machine. Unlike urban locations in India, where a printer/copier service is available to people in their homes or a few blocks down the road, people in rural India have to often travel up to 20 km or more to reach the nearest digital services shop. A significant percentage of those in rural India is engaged in the unorganized labor sector. So, to access the service shop, a person would lose the equivalent of a day's wage (average Indian wage is Rs. 200 or $3), pay Rs. 40 ($0.62) to travel to the nearest village/town that has this service to offer and then pay another Rs.10 ($0.16) to get a one-page document photocopied — adding up to a total of Rs. 250 ($3.88). The same service in urban India would not cost more than Rs 2 or 5 ($0.03 to $0.08) because the facility would be available at a walkable distance for much less due to the demand of the service.

This is the reason we need to democratize and decentralize infrastructure and adopt community networks on a large scale.



Establishing Community Networks

Community networks allow public and private institutions — such as village councils, NGOs, community radio stations, small and medium enterprises, entrepreneurs — to buy internet connectivity from ISP and then distribute it within a community. Community networks engage consumers and community members (or depend on grants from funding organizations to meet the cost of infrastructure) to act as participants and help build and use the network by utilizing frugal technology, free and unlicensed spectrum, and alternative equipment like radios and relay boxes and share towers and infrastructure.

The institution or individual who buys the connectivity from the ISP becomes a franchisee for the ISP to sell the service on behalf of the ISP to individuals, households and smaller institutions on a chargeable basis — this could be on a monthly rental basis or a per hour use charge.

This community-driven, community-managed and community-owned infrastructure replaces the classic top-down operator-driven paradigm with a bottom-up approach to access. However, infrastructure established through grant money or through alternate technology — such as wireless mesh or Point-to-Point — may not be as robust as fiber optic lines but is more than adequate to provide network services in the access and information-deprived areas of India. Further, the government and the private sector need to allow permission to share existing infrastructure of all kinds and open up ISP licenses to a wide range of institutions such as NGOs, community radio operators, small and medium enterprises, panchayats and even entrepreneurs who can further transform themselves into public wi-fi hotspots.

A public wi-fi system can address the gap of digital access perfectly in India. Just imagine a scenario in which all 250,000 village councils, 1.4 million schools, 600 district libraries, 184,359 health centers, 156.4 million MSMEs, 3.2 million NGOs and 154,882 post offices of India turn into public wi-fi hotspots (or local/rural ISPs) for millions of individuals across India.

Access is a prerequisite for better governance and information. With institutions connected to the internet, there will not only be a better exchange of information within the government department and ministries, but citizens, too, will have more access to information, schemes, rights and entitlements. This will greatly reduce marginalization and exclusion of individuals, and magnify government institutions' role as hubs of connectivity.

A Consultation Paper on Proliferation of Broadband through Public Wi-Fi Networks released by the Telecom Regulatory Authority of India[22] (TRAI) cites the examples of Digital Empowerment Foundation[23] and AirJaldi[24] as the only two organizations in India that are already leading projects in this area by implementing wireless mesh networks through unlicensed 2.4 GHz and 5.8 GHz spectrums to provide internet connectivity in remote areas of the country.[25] The same paper also suggests ideas on how public wi-fi can be converted into revenue-generating models.

Access Opens a Window of Opportunities

Over the years through our work in rural, remote and underserved regions of India, we've seen some beautiful stories of connectivity which cannot be measured in monetary terms, but hold so much value. We've seen children in Rajasthan traveling the world though Google Images; girls



in Puducherry taking online courses to become beauticians; women in the slums of Karnataka watching make-up tutorials on YouTube; men learning about organic farming in Andhra Pradesh; tribal communities demanding their rights in Tamil Nadu; weavers digitally designing sarees in Odisha; boys selling craft items through WhatsApp in Uttar Pradesh; women looking up recipes on Google in Bihar; men running online campaigns for better public infrastructure in Assam; and so much more. We've witnessed and collected hundreds of such stories of digital impact.

Further, social-media penetration is rising in India, both in urban and rural areas. Though it cannot be denied that social media penetration in urban India is greater than in rural India, Facebook has become a popular communication tool in rural India as well. Ministries, too, have realized the importance of their digital penetration and communication through social-media channels. Take the Indian Railways, for example: the Indian Railways ferry 23 million people across the country every year.[26] Last year, Twitter opened a special service called Twitter Seva for Indian ministries and government departments. This service, a grievance redressal mechanism, has been particularly well-adopted by the Indian Railways and now handles 4,500 to 5,000 tweets per day.[27] This allows passengers to tweet their grievances and receive responses/action in real-time. Several other ministries and departments — such as the Ministry of External Affairs, the Ministry of Commerce and Industry, the Uttar Pradesh Police — are leveraging the power of social-media, especially with the government being gung-ho about the Digital India initiative. However, unless infrastructure and connectivity go geographically

deeper into India, its full potential will not be realized and its services will only be accessible to a restricted few.

Access to the internet not only opens access to information, rights, entitlements and possibilities of a better livelihood but also enables behavioral and social changes in communities. While the paradox of India and Digital India continue to exist together, it is expected that India may soon make a technological leap to become the most populous connected country, riding the ongoing wave of mobile penetration. All it needs, perhaps, is functional and effective broadband connectivity on mobile phones.

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Note: The views of the author do not necessarily reflect those of the Bertelsmann Foundation.

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