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Netting India's villages

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Abstract

For nearly a decade, India has been deploying various iterations of its ambitious broadband expansion plan, looking to bring those in the country's remotest areas online. While private sector expansion and proliferation of cheap smartphones gave it a boost, the recent double whammy of the novel coronavirus disease (COVID-19) pandemic and escalating territorial tensions with key trade partner China has put a spanner in the works of the project that has already suffered several delays. Updates to the project now must consider alternative sources of equipment, while ensuring that those at the margins don't miss the digital bus.

Author's profile

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Netting India’s villages

"No telephone / No modem / Internet at your Door step though fibre optic cable" Seen in Kolkata, India. Photo by Anirvan

Early this August, India’s Andaman and Nicobar islands got their first taste of high-speed internet after years of patchy, low-speed connectivity. The 2,312 kilometres (km) long submarine optical fibre link facilitating this runs from Chennai in the southern mainland to the capital of the group of 572 islands, Port Blair. Only 37 of these islands are inhabited. The optical fibre further connects the capital to seven other major islands of the archipelago. Situated eastwards of the Indian peninsula, Port Blair is 1,362 km away from Chennai. The island capital is, by contrast, just 876 km away from Bangkok in Thailand. During the British colonial rule in the 19th century, it was the chosen site of the infamously isolated Cellular Jail, where political activists and freedom fighters would be imprisoned. In the 21st century, it advertises luxury holidays to pristine beaches.

On 15 August 2020 – India's Independence Day – Prime Minister Narendra Modi announced that the union territory of the Lakshadweep islands to the west of the peninsula would also get a similar optical fibre connection within 1,000 days.

These two projects are parts of a larger, almost decade-long Indian programme to connect the most remote parts of the country with broadband internet using optical fibre cables. Over the years, the connectivity programme, called BharatNet, has faced slowdowns, hit roadblocks, missed targets, and finally managed to meet some goals under repeatedly revised deadlines as communication technologies made steady advances globally. The issues and events impacting this programme are as numerous as they are complex. They include a rapidly growing online market, private sector investment and a complex regulatory matrix of ministries, central government departments, and state-controlled service providers.

In 2020, the project was hit by the double whammy of a raging global pandemic, and a military escalation along India's northern border with China, the source of the bulk of India's telecom and internet infrastructure equipment. Here, we'll look at a brief history of BharatNet, issues leading to its delays, how India's hostilities with China are influencing India's broadband internet ambitions, and what it all means for the average internet user on the ground.

The story so far

The inception of India's broadband expansion programme dates back to 2011, when it was called National Optical Fibre Network or NOFN. It was renamed BharatNet in 2015 (Bharat is the name for India in several Indian languages). At the time of the programme's inception nearly a decade ago, it was the norm for the average Indian mobile phone owner to turn off data services when not in use to save money. Much has changed in the consumer tech landscape since. The world leapt from 2G mobile internet connections to 3G, which has now been replaced by 4G, even as trials for 5G are underway. Video calling, earlier a fancy nice-to-have, is today's essential. The Internet of Things (IoT) has become a reality, as have voice-based home assistants. Augmented Reality technology became part of a viral mobile game while Virtual Reality headsets went on sale online.

The number of India's internet subscribers kept up with these changes. According to the Indian government's own data, the percentage of internet subscribers among Indian inhabitants went up from 13.45 per cent in March 2013 to 48.48 per cent in March 2019.

Cheap smartphones that filled the domestic market in recent years spurred these developments on. Many of these mobile phones would either be manufactured in China or have components sourced from China and assembled in India. Chinese mobile devices dominate the Indian market even today, with manufacturers such as Oppo, Vivo and Xiaomi cornering 72 per cent of the market share in India in 2019.

Mobile internet saw a significant boom in September 2016, after the launch of a new telecom company called Jio from business behemoth Reliance Industries Limited. This started a nationwide price war among internet service providers in India, who gave data away nearly for free just to stay afloat. While lowering prices for the consumer, such competitive pricing exacerbated the already deteriorating financial situation of private telecom players.

As of May 2020, the country's top three telecom companies were under a collective debt of Rs.3.9 trillion (EUR 45.37 billion). At least 16 telecom companies have shuttered India operations in the last ten years. The capacity of telecommunication companies (Telcos) to invest in fibre expansion was adversely impacted.

On the political front for India, its relationship with neighbouring China has rapidly deteriorated in the last few years. After the last major flashpoint in 2017, the simmering tensions along the Indo-Chinese border escalated to a full blown physical confrontation on 15 June 2020. Troops of the two countries clashed in the strategically significant border region of the Galwan valley in Northern India's Ladakh. Many soldiers died on both sides of the border.

This escalation has had a direct consequence on India's broadband and 5G expansion plans. Much of the equipment for the same, such as optical fibres, microwave antennae or "hops" have come from China in the past – something the Indian federal government is now approaching with caution. Apart from this, other kinds of telecom equipment like base transceiver stations currently deployed in India have also come from Chinese manufacturers.

Thrown into this mix of business and politics is the novel coronavirus disease (COVID-19) pandemic, which has intensified the already growing demand for stable, high speed internet.

Increasing numbers have taken to remote work, with school classes to big-ticket conferences all shifting online for the foreseeable future.

This is the outer framework of events and developments within which BharatNet has made its slow and arduous progress over the last decade. As for the programme itself, its evolution is a tedious labyrinth of inter-departmental operations, albeit comprehensible when one starts from the very beginning.

The BharatNet project – origins, delays and progress

The programme as envisaged in 2011 was meant to connect 250,000 Gram Panchayats, which are village-level administrative units or village councils, with optical fibre cables capable of delivering 100 megabytes per second (mbps) broadband internet connections within two years. Under the Union government, an organisation called Bharat Broadband Network Limited or BBNL was created with the exclusive function of coordinating with other state-run organisations responsible for laying the optical fibre and operationalising broadband internet in the Indian hinterland.

The programme could not meet its initial two-year target for completion. By the end of 2013, it was clear that deadlines would have to be extended by another two years.

In March 2015, a government-instituted review committee assessing the programme issued a report diagnosing its delays and making recommendations to bring it back on track.

It identified lack of planning and coordination between departments as a key problem hindering implementation. Yet another roadblock was the basic lack of electric power in some of the regions the programme targeted. “Lack of skilled manpower”, and not adequately taking into account the topography and geographical conditions of the areas where the fibre was to be laid, were some of the other roadblocks identified in the report along with “near absence of any inter-linkage with the providers of content and services” and “excessive emphasis on cost controls”.

However, the most talked about hurdle in BharatNet’s path was “Right of Way” or RoW approvals. These are required to lay fibre on government land. A go-ahead is typically required from state and/or central departments overseeing the land that has to be dug for the

cables. In 2016, the Department of Telecommunications (DoT) attempted to streamline this process by introducing new central RoW Rules. Individual state and union territory governments were required to align their local RoW rules with the central rules. However, by February 2020, only 16 of 37 states and union territories had done that.

As a result, RoW issues continued to persist. In one such RoW conflict in 2018, the Union Ministry of Road Transport and Highways refused permission to the DoT to carry on fibre-laying work until it paid up license fees as prescribed by a central law governing the use of national highways, while DoT cited the 2016 Rules, saying only a one-time fee needed to be paid. The two reached such a state of stalemate that the case had to be escalated to the Prime Minister's Office.

By July 2015, optical fibre cables had been laid in 23,604 Gram Panchayats. After the review committee's recommendations that year, the deadlines and numbers stood rejigged. The programme was rebranded "BharatNet". Now Phase I of the programme would aim to reach 100,000 Gram Panchayats, Phase II would account for the remaining Gram Panchayats, and Phase III would focus on upgrading existing infrastructure.

Phase I reached completion by December 2017, connecting 109,926 Gram Panchayats with optical fibre. Of these, 101,370 were claimed to be "service ready" at the time. In 2018, non-profit Digital Empowerment Foundation independently audited 269 of these "service ready" Gram Panchayats and found that barely 11.5 per cent of these had functional but slow internet. The same year, a report from news website The Wire showed that the number of Gram Panchayats with functioning commercial broadband connections was a humble 5,010. Progress on this front was slow. In January 2020, newspaper The Indian Express accessed internal documents pertaining to Phase II of BharatNet from the Union Ministry of Electronics and Information Technology (MeitY). It found that only 7.45 per cent of Phase II's 150,000 Gram Panchayats were "service ready" at the time.

Despite the programme's recalibrated avatar, Phase II remained on a rocky road. Delays and anomalies with issuing tenders cropped up. In the southern state of Tamil Nadu, for example, an optical fibre cable project worth Rs.2,441 crore was put on hold in May this year after an anti-corruption activist flagged irregularities in the tendering process. Terrain obstacles were unaddressed still. In the Northeastern region of the country in particular, the central government cited hilly terrain and prolonged monsoon as reasons for delay in cable laying

work. In 2017, a fresh deadline of March 2019 was set for Phase II, which was later pushed to August 2021.

Figure 1. NOFN/BharatNet timeline

October 2011: NOFN project approved by the Union Cabinet. Aim for completion by 2013
February 2012: A special government undertaking called the Bharat Broadband Network Limited or BBNL incorporated to manage and implement the NOFN programme across the country
2013: Deadline missed, internal projections estimate reaching 100,000 Gram Panchayats by March 2015
December 2013: Definition of broadband changed to minimum download speed of 512 kilobytes per second (kbps)
Jan 2015: NOFN review committee instituted
March 2015: NOFN review committee recommends 2017 deadline and renames project BharatNet. Suggests improvements in project
September 2016: Reliance Jio launched
November 2016: Central government notifies new Right of Way rules
December 2017: BharatNet Phase I complete, overshoots target of 1,00,000 Gram Panchayats to reach 1,22,908
August 2018: Vodafone-Idea merger
August 2019: Internet services cut off in Jammu & Kashmir after the region is stripped of statehood. 2G and fixed line services restored in January 2020. 4G still suspended in the region barring two districts (situation as of 21 September 2020)
March 2020: Deadline for Phase II missed, new deadline for August 2021 set
September 2020: MeitY says Phase II will be further delayed due to the pandemic

(Key: Developments pertaining to BharatNet
Other key events and developments concerning the internet in India)

At the time of writing, the latest official update was that completion of Phase II would be further delayed due to the COVID-19 pandemic.

Given the current exigencies, further delays, though undesirable, are inevitable. That leaves a couple of significant factors to look out for: The first is the technological advancements that the programme will have to keep up with, with every year of delay; the second is the extent to

which BharatNet's future iterations will depend on international markets in general and imports from neighbouring China in particular.

Neighbours and fences

After the Galwan valley clash in June 2020, the Indian political class reacted with appealing to nationalistic passions, calling for a boycott of Chinese goods. Electronic equipment and the internet turned out to be the turf where this quasi battle against Chinese goods would be fought, although, at the time of writing, there isn't an outright blanket ban.

For the layperson, this stance was most clearly felt with the government banning over 200 popular Chinese apps including TikTok, PubG, and CamScanner over the course of a few weeks. Until the ban, TikTok's parent company Bytedance had been on an aggressive hiring spree in India. The number of subscribers of its flagship app had swiftly overtaken that of incumbent Alphabet's video-sharing app YouTube. Things were looking good for them. However, by August 2020, TikTok's India operations began to see a chunk of its senior management leave – many of them for similar short-video platforms built in India.

There was more action when it came to backhaul infrastructure that makes access to these apps possible. Following a probe into allegations that China had been "dumping" aggressively cheaper optical fibre cable in India to harm local manufacturers, Indian authorities decided to impose a 10 per cent "safeguard duty" on single mode optical fibre. As opposed to multimode optical fibre cables, single mode optical fibre cables are used to carry signals over long distances, which is exactly what BharatNet needs. It didn't end there. A few weeks after the Galwan valley clash, DoT barred government-owned telecom operator Bharat Sanchar Nigam Limited (BSNL) from procuring Chinese-made equipment for its 4G expansion, citing security concerns.

The app bans, calls for boycott, and the security concerns expressed over BSNL's 4G equipment created an environment of doubt and caution when it came to sourcing electronics. Given this atmosphere, there was talk, and even expectation, of further directives from the DoT to bar Chinese equipment for other internet and telecom infrastructure projects. In this political climate, BSNL found no bidders for its tender pertaining to maintenance work for optical fibre cables laid under BharatNet.

While the intent of making a political statement with these actions is well-understood, their potential for actual financial impact has been contested. For starters, India has a massive trade deficit with China. In the financial year 2019-20, China accounted for 5 per cent of total Indian exports. Imports from the country, by contrast, stood at 14 per cent.

Indian telecom companies already deploy a fair amount of equipment imported from China. By the Ministry of Electronics and Information Technology's own admission, 10 per cent of the mobile network equipment of state-run Mahanagar Telephone Nigam Limited (MTNL) is from "Chinese equipment manufacturers" while BSNL has 44 per cent of its mobile network equipment from ZTE and 9 per cent from Huawei.

It isn't just about internet and telecom. Chinese venture funds have made massive investments in a broad range of Indian startups and online businesses in the last few years. A February 2020 report from think-tank Gateway House points out that 18 out of 30 Indian "unicorns" – tech startups with over USD 1 billion valuation – have Chinese investors, who are believed to have invested nearly USD 4 billion (EUR 3.4 billion) in Indian startups.

The foreign investment story took an important turn this year when it came to an establishment player in the Indian market. In April 2020, Facebook invested Rs.437.5 billion (EUR 5.07 billion) into Jio Platforms – the internet and digital services arm of Mukesh Ambani's Reliance Industries Limited. This gave the social media giant a 9.99 per cent stake in the company owned by India's richest man. Google followed suit in July 2020, announcing an investment of Rs.337.37 billion (EUR 3.9 billion) into Jio Platforms. Market watchers are looking at these investments in the light of India's attempt to consolidate with other economies against Chinese domination of the sector.

Governments too appear to be keen to forge international alliances to similar effect. To counter China's growing influence in the technology infrastructure space, the UK recently decided to form a "5G club" of ten democracies. Called the "D10", the grouping includes G7 countries along with South Korea, Australia, and India, and has the stated aim of cooperating to create and maintain alternative sources of 5G equipment manufacture. There are still unanswered questions about the exact mechanism of cooperation of the D10, and how the focus on "democracies" would ultimately manifest itself in the use and deployment of technology. However, the move has formalised the countries' positions with respect to China.

To fit in with these peers, India would not only have to step up its game in the sphere of equipment manufacture, but also in efficient bureaucracy and an empathetic and socially inclusive determination of access. Self-reliance for manufacturing optical fibre and laying it across the country would count for little if different administrative departments can't coordinate well enough or if the internet doesn't reach the most vulnerable and the most marginalised.

Who is connected?

There is already a heavy appetite for the internet and online services in India's rural regions. But as with most other resources, socio-political factors can be powerful determinants of access.

The situation is complex in Jammu and Kashmir, where the Union government temporarily disabled internet access in August 2019, following a decision to convert the militarily sensitive region into two union territories of Jammu and Kashmir, and Ladakh. The 2G mobile internet services and fixed line internet were restored in January 2020. According to the Union government, these measures were put in place due to "national security" concerns. At the time of writing, 4G mobile data was not yet restored in the region, save for two districts.

When assessing social aspects of internet access in India, the gender divide and the urban-rural divide are routinely tracked and measured. Similar research and surveys on other kinds of social divides such as caste are not as frequent.

The divide between urban and rural users is stark. According to official government data for the quarter January-March 2020 released in September 2020 by the Telecom Regulatory Authority of India (TRAI), total rural internet subscribers in India stood at 285.97 million, while their urban counterparts numbered 457.23 million.

On another count, rural India fared better. An external report by industry lobby group Internet and Mobile Association of India (IAMAI) and data analytics firm Nielsen suggests there were more "monthly active" rural internet users (227 million) than urban ones (205 million) at the end of November 2019. "Users" are distinct from "subscribers", as a household can have one subscription used by multiple people. This is true of internet usage on mobile phones as well.

The amount of data consumed adds more details to this picture. After the nationwide lockdown in March in the wake of the COVID-19 crisis, rural internet usage in India saw a sharp increase. This was on account of daily wage migrant workers returning to their villages from the cities. Reports accessed by The Indian Express show that data usage under BharatNet rose to 0.55 million gigabytes (GB) in the annual quarter April-June 2020 from 0.25 million GB in the previous quarter.

Following the global stay-at-home norms of the year 2020, the gap between the digital appetite and availability was even more palpable – especially when it came to schooling and education.

Most schools have moved online, as have some exams. In a matter of weeks, access to the internet became the basic minimum requirement for access to education. A widely cited report from India's National Statistical Office (NSO), which surveyed household consumption on education in 2017-18, provides the context in which to see students' access to the internet, and thereby education. The survey found that only 15 per cent of the rural households had access to the internet as opposed to 42 per cent in urban areas. Not all of these students would attend their classes on a swanky, fast desktop or laptop. A mere 4.4 per cent of the rural households had a computer. Students attending school remotely ended up borrowing phones from adults in the house. Urban areas fared better by comparison, but still had gaps. The survey found that only 23.4 per cent of the urban households had computers.

We see the limited access to devices and the internet manifest itself in the burdens students have had to take on. There were reports of schoolchildren in an Uttarakhand district trekking a few kilometres away to catch a signal when they needed to attend classes or submit assignments. In the more poorly connected rural areas of the Northeastern state of Sikkim, teachers took to visiting students one-by-one, and teaching them in person. In the national capital, New Delhi, where things are significantly better, only 60 per cent of the students of Delhi government schools are reported to have been able to attend online classes in the first two months of the lockdown.

Apart from the rural-urban divide, a key factor determining digital access is gender. The number of women accessing the internet has increased in absolute terms over the years, though in relative terms, they still lag behind. Needless to say, women in rural areas face

double the barriers. The IAMAI report mentioned above measures internet usage along the binary ideation of gender. In November 2019, it found the nationwide ratio of male to female internet users to be 65:35. In rural areas, this was 69:31 while in urban areas it was 60:40.

The gap translates into smartphone ownership as well. According to a 2020 report on the “Mobile Gender Gap” from the Global System for Mobile Communication Association (GSMA) – where again, gender was considered along a normative binary – 31 per cent men owned mobile phones as opposed to 14 per cent women in India.

Despite prevailing social divides more or less transplanted into internet access patterns, there is room for cautious optimism going forward. Rural connectivity and women’s internet usage today is much higher than it was 10 years ago. Content and services in local Indian languages have already found a promising number of takers in recent years. With more inclusive strategies, one can expect to find opportunities to close these gaps in India, be they in a landlocked state or a far-flung island.

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