How do we create inclusivity in a digital future?

Building a better world with broadband technologies

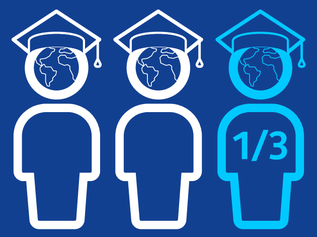
Contents

What is the digital divide?

Imagine how it would feel to be cut off from everything in the world. Unable to meet or see your family and friends, go to school or work, visit the shops or even watch the entertainment that you want. This is not a picture of an endless lockdown or living under a repressive regime. This is a scenario that's being played out every day – from New York to sub-Saharan Africa.

According to the ITU, 3 billion people are offline[1]. As many as 18 million Americans do not have access to high-speed internet. This includes remote farming communities, where it is not commercially viable to build out networks, and low income families in Manhattan who cannot afford internet service.[2]

Beyond the developed world, the numbers are more stark. UNICEF estimates that a third of the world's school children – 463 million globally – were unable to access remote learning when Covid-19 closed schools.[3]



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1 Click here for source

2 Click here for source. CNET, August 2020

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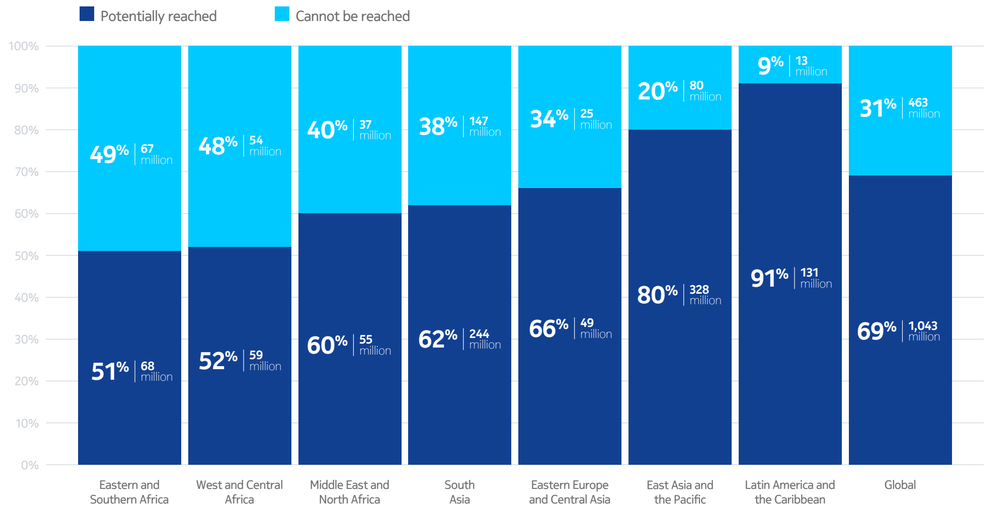
Figure 1 Share and number of students potentially reached and not reached by digital and broadcast remote learning policies, by region (pre-primary to upper secondary)[4]



Source: UNICEF
i) Figures are calculated using weighted averages based on the number of students across countries.
ii) The high potential reach in Latin America and the Caribbean does not indicate that children in the region had more access to communications assets in the household. It reflects that the policies in the region targeted technologies that are available in most households.
"Reached" indicates potential maximums; "Cannot be reached" indicates minimum, which are likely much higher.

The pandemic highlighted many inequalities in health- and social-care, but it also showed the importance of digital infrastructure as a means of keeping in contact with loved ones using video calls, accessing online education and telemedicine, using collaborative tools to work from home, ordering home delivery of goods, services and meals, and accessing on demand gaming and TV content.

Analysis from the United Nations Conference of Trade and Development (UNCTAD)[5] shows the pandemic has accelerated the uptake of digital solutions, tools and services. However, it has also exposed the chasm between the connected and the unconnected.

Remote and rural communities, as well as urban poor in G7 nations, have found themselves distanced socially, economically, and educationally due to poor or non-existent broadband services. This is the digital divide.

4 Click here for source (p8)
5 Click here for source. UNITAD, April 2020

What are the benefits of digital inclusion?

The balm to the digital divide is digital inclusion. The objective is that everyone has access to high-speed broadband internet services and devices and understands the benefits of using the internet and online services. It means having the skills to use the internet, access to local language content and public information and importantly, how to stay secure and protect online data. There are many studies that demonstrate how higher broadband penetration levels not only improve household and business access to information, work and education, they also increase a nation's GDP.[6]

6 An Ofcom-commissioned study from 2018 confirmed that over a 15-year period (2002-2016), there was a positive relationship between broadband investment and economic growth across 35 OECD countries
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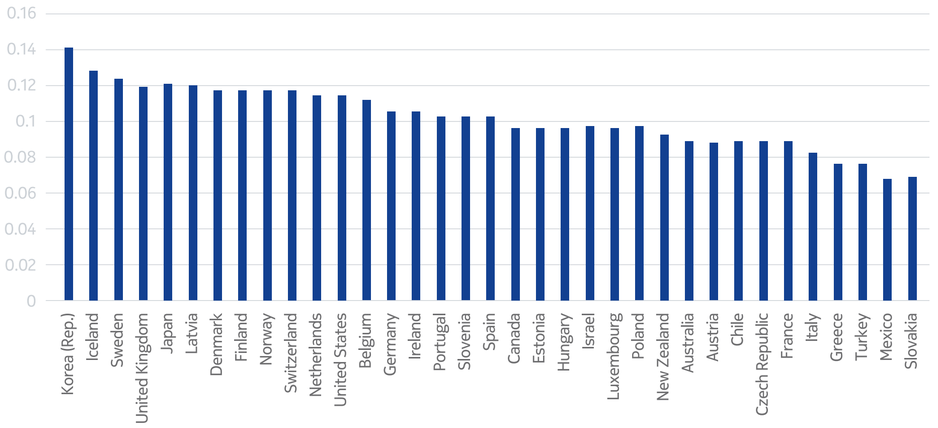
What are the benefits of digital inclusion?

Figure 2: The annual GDP impact of broadband by country[7]



While economic activity and productivity have plummeted during the pandemic, high-speed broadband connectivity has kept automated factories productive and white-collar workers online. It has provided continuity in education for students and helped maintain the mental well-being of workers, furloughed staff and families, by allowing them to connect to virtual versions of their sports, hobbies, enrichment activities and support groups.

Digital inclusion for education is universally important as it forms the bedrock of future societies and economies. By providing schools with connectivity, devices and digital skills, countries are literally investing in their own future. For example, the Kenyan government, local communications service providers (CSPs), UNICEF, Nokia and other partners provide an inspiring example of what can be achieved by empowering unconnected and underprivileged children. Kenya's Digital Literacy Project has already distributed more than one million computer tablets in schools.

The government's objective is to connect all 40,000 schools in Kenya.[8]

Looking at rural communities again – this time through the lens of agriculture – presents another compelling case for broadband connectivity. With the planet's population north of seven billion and increasingly frequent extreme weather events adversely impacting harvests and crop yield, automation and monitoring are vital to boosting productivity. Some 50,000 farmers across 10 districts in the states of Madhya Pradesh and Maharashtra in India are set to benefit from Smart Agriculture as a Service launched by Nokia and the Vodafone Foundation. More than 400 sensors deployed over 100,000 hectares of farmland will collect data for analysis by the solution's cloud-based smart agriculture app. Sensors include soil probes, weather stations, insect traps and crop cameras. Insights from the data will help farmers to improve soy and cotton crop yields, as well as reduce their impact on the environment.[9]

7 An Ofcom-commissioned study from 2018 confirmed that over a 15-year period (2002-2016), there was a positive relationship between broadband investment and economic growth across 35 OECD countries. Click here for source (p12)

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What needs to change?

High speed broadband access roll-out is determined by the CSP license and whether it makes commercial sense for them deploy their infrastructure. Cities, business districts, transport hubs, and other high population concentrations get the fastest broadband speeds first, delivered via fiber optic or cable technology. Meanwhile rural communities are left unconnected.

The World Bank leads "The Broadband Commission Working Group, called 'A Digital Moonshot Infrastructure for Africa." It estimates that the cost of closing the digital divide in Africa by 2030 is around $100 billion. Nearly 80% of the required investments to achieve universal access is tied to the roll out and maintenance broadband networks.

The path forward is to use alternative technologies to make more viable business cases and ensure that regulation and other policies support broader population coverage and quality broadband access.

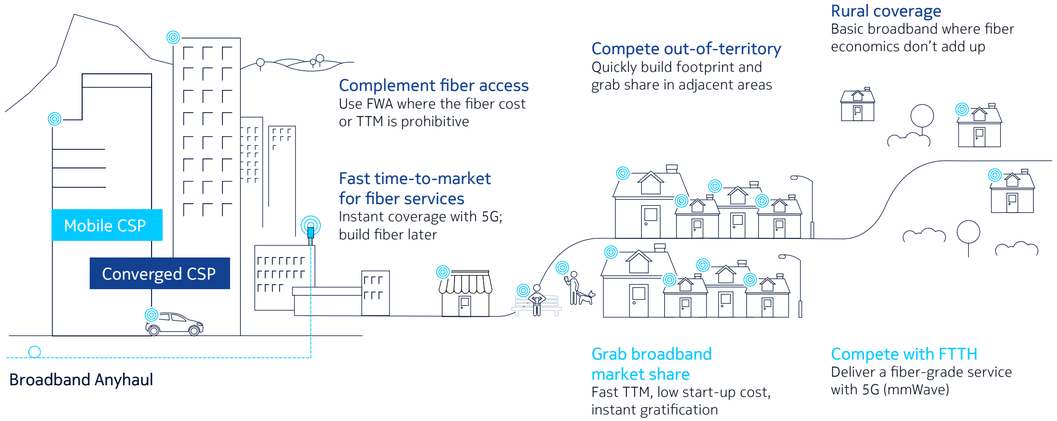
Alternative technology

The most common fixed or wired infrastructure types for broadband include copper (xDSL), (coaxial) cable, microwave, optical fiber (FTTX) and, less frequently, broadband over power lines. Alternatives and/or complementary technologies for consideration include mobile radio and fixed-wireless access technologies (5G, 4G, Wifi or Wimax), satellite broadband, high altitude platforms or internet balloons (Project Loon) and low earth orbit satellites (LEOs).

The key is to future proof technology and where possible, provide high-speed broadband so that all households and businesses play an active part in the digital economy. National government broadband plans might fund or subsidize cable or fiber optic, but 5G fixed wireless access (FWA) technologies complement mobile and optical fiber technologies by providing the last mile to ensure gigabit speeds reach more households.

Alternative technology

Figure 3 Fixed wireless access (FWA) has multiple use cases[10]



This is a practical solution for small urban areas, but in areas of low population density or hostile and remote terrains – think sub-Saharan Africa, the Australian outback or mountain communities – more creativity is required. High Altitude Platform Services (HAPS) provide an alternative.

Project Loon[11] is part of Google's broadband-to-the-planet policy. Equipping a series of balloons in the stratosphere with wireless connectivity will provide coverage for hundreds of miles in remote areas. SoftBank Corp, its subsidiary HAPSMobile, Intelsat, Nokia and others are working with Loon. Junichi Miyakawa, CTO, SoftBank Corp sees this Loon as a means to "connect all people and things around the world... bridging the digital divide."

For CSPs "HAPS represents a strong addition to telecommunications infrastructure thanks to its resilience in times of natural disasters and its wide-area connectivity from the sky, which enables drone utilization, IoT applications and 5G deployment."[12]

In 2017, following severe floods and landslides in Peru, Loon was deployed in conjunction with Telefonica Peru to provide connectivity over a 40,000 square kilometer area that included the capital, Lima.[13] In the same year, Loon was deployed in Puerto Rico to provide voice and data connectivity following the devastation of a category 4 hurricane.[14] Elon Musk's company SpaceX has launched over 400 Starlink satellites (1Q20). They will be part of a constellation of 40,000 Starlink satellites providing service to places where internet is "unreliable, expensive, or completely unavailable."[15]

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Regulation and policy changes

Connectivity infrastructure funding has predominantly come from the private sector including operators, tower companies, and investment commercial banks.

Public sector investment in ICT remains low compared to other types of infrastructure projects. For instance, between 2012 and 2016 multilateral development banks invested only 1% of their total investments in ICT.[16]

Government intervention is the most direct way of investing where it is most needed. For example: In the US, the FCC's $20.4 billion Rural Digital Opportunity Fund aims to bring high speed fixed broadband service to rural homes and small businesses.[20]

In the UK, Community Fibre [21] is a registered supplier of the UK Government's Broadband Connection voucher scheme that delivers affordable high-speed internet for London's social housing, and free gigabit connections to community centers and libraries in London boroughs.[22]

16 Xalam Analytics for Alliance for Affordable Internet Click here for source

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21 Community Fibre is an internet provider rolling-out ultra-fast full-fibre optic networks. It aims to bring full-fibre connections to 500,000 properties across London by 2022. Click here for source

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Regulation and policy changes

In 2016, the EU published its paper outlining its “Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society.” It stated that all European households, rural or urban, will have access to internet connectivity offering a downlink of at least 100 Mbps, upgradable to Gigabit speed by 2025. It states that “the targets set by the Digital Agenda for Europe have become a reference point for public policy” and, although non-binding, most member states' National Broadband Plans have embraced those objectives.[23]

In Australia, the National Broadband Network (NBN)[24] comprises fiber optic, fixed wireless and satellite infrastructure to provide a consistent high-speed internet service. It provides services on its local access network to all retail service providers. The network was funded by the government, which estimated that it would invest some A$18billion between 2009 and 2015.[25]

There are other policies that can drive digital inclusion. Permitting network sharing reduces deployment costs. For example, in South Korea, the three main cellular operators are working with the government to deliver 5G (high speed mobile broadband) to rural and low population density areas by allowing network sharing. The intent is that each operator will set up communication networks in designated areas, which can be shared with the other two.[26]

Governments should also reduce private-investment risks to attract more capital in digital infrastructure investments that serve a public need. And where conditions are not commercially viable, they can provide growth capital on those projects to attract private investors.

It is important to note that these activities should extend to include those responsible for development programs and budgets to prioritize digitalization, such as the IMF, World Bank, international banks and development agencies of large economies.

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Conclusion

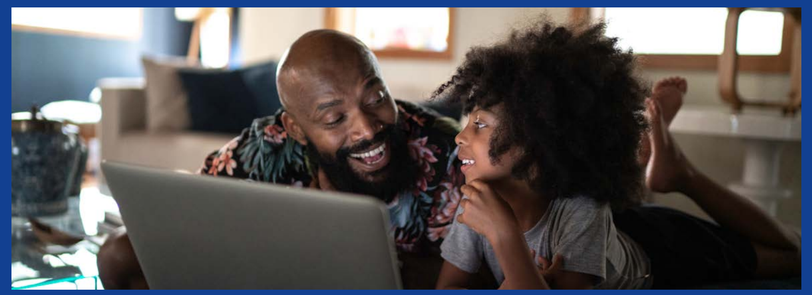
At Nokia, we are committed to connecting the unconnected and to the ethical principles of doing business and supporting equality.

We support the 2025 targets set by the The Broadband Commission for Sustainable Development[27] that aims to 'connect the other half'[28] in the next five years. There are seven targets calling for national broadband plans that address affordability, access and digital skill levels by region, demographic and gender. It also calls to connect small businesses and extend e-finance services to the unbanked.

A fair and equitable society requires access to infrastructure (secure and affordable access and devices) and the capabilities to use the infrastructure (education, knowledge).

Nokia provides solutions for all access technologies, covering the entire network, helping our customers to bridge the digital divide by enabling the building of the required infrastructure (coverage, capacity, data speeds), but it is more than that. We are also working with partners, governments and international organizations, to ensure digital skills go hand in hand with digital access.

Connectivity should be considered as a necessary service, like water, electricity and gas. When it comes to living a full life (both online and offline), universal broadband access will help to ensure that no one is left behind.



27 Commission was set up by ITU and UNESCO in response to UN Secretary-General Ban Ki-Moon's call to step-up UN efforts to meet the Millennium Development Goals (MDGs)

28 Broadband Commission for Sustainable Development 2025 Targets: "Connecting the Other Half". Click here for source

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We create the technology to connect the world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers with the industry's most complete, end-to-end portfolio of products, services and licensing. From the enabling infrastructure for 5G and the Internet of Things to emerging applications in virtual reality and digital health, we are shaping the future of technology to transform the human experience.