In collaboration with
Boston Consulting Group

WORLD
ECONOMIC
FORUM

Accelerating Digital Inclusion in the New Normal

PLAYBOOK

JULY 2020

Contents

Executive summary

The COVID-19 crisis has thrown into sharp focus the importance of digital connectivity in daily life. As many countries underwent lockdown periods, digital infrastructure was critical to mitigate the impact of stay-at-home restrictions. Connectivity players have contributed by taking short-term actions to ensure continued access during the crisis. More importantly, their long-term investment in infrastructure over the past 20 years has driven a step change in the level of fixed and mobile coverage and technology. This has enabled the continuation of key activities digitally, such as remote working, healthcare and education, and underpinned the growth of sectors such as e-commerce while supporting adjacent industry players at a critical time.

At the same time, the crisis has also exposed even more clearly the gaps that still exist in digital access. When essential services such as health, education or simply being able to continue one's professional activity depend on connectivity, the inequalities became exacerbated. There remains a divide in access to high-speed fixed and mobile connectivity. Even among fixed broadband subscribers, many do not get sufficient speeds for effective remote work, telemedicine or study, including in developed countries. Beyond coverage, there is a bigger divide in adoption where those with coverage may not use the internet due to lack of affordability, digital skills or relevant content in the local language. Furthermore, these issues extend to businesses that faced similar challenges during the crisis. In particular, small and medium-sized enterprises (SMEs) lag behind large corporations, rendering them more vulnerable to closures and job losses in an environment where digital is increasingly key.

The post-COVID-19 "new normal" will likely see an increase in speeds, devices and budgets required by households and businesses, exacerbating existing divides. As such, connectivity must become the top priority and stakeholders must aim for United Nations targets: by 2025, broadband internet[1] user penetration should reach 75% worldwide, and by 2025, broadband should cost no more than 2% of earnings. It will also be important to implement the UN Secretary-General's Roadmap for Digital Cooperation. To achieve this, stakeholders should aim to drive adoption of high-speed internet beyond coverage targets and take a "tech agnostic" approach, where traditional business cases are insufficient – this incorporates terrestrial and non-terrestrial infrastructure options for providing access to high-quality fixed broadband, wireless and satellite networks.

At this watershed moment, telcos and industry verticals, multinational corporations, governmental and non-governmental organizations must mobilize to develop strategies to accelerate digital inclusion. This playbook builds on past efforts by the World Economic Forum and other groups (e.g. GSMA, Broadband Commission) and highlights further key recommendations across three pillars:

Growth

How can the public and private sectors stimulate growth in the industry to accelerate digital development in unserved and underserved regions?

– Accelerate current efforts, particularly on increasing adoption through improved affordability and digital skills

– Set up horizontal national digital strategies and disburse unused funds via efficient mechanisms

– Collaborate across sectors and governments to facilitate the digitization of SMEs through end-to-end "digital SME in a box" solutions, as a key revenue growth driver

Financing

How can the public and private sectors best finance the infrastructure and digitization required to enable high-speed internet in unserved and underserved regions?

– Accelerate relevant partnerships and regulatory actions identified

– Involve more non-telco actors in infra-sharing discussions

– Creatively and assertively seek access to outside funding available for digitization and connectivity; explore ways to earmark recent recovery funding

– Collaborate with government to address bureaucratic hurdles of to speed up roll-out

Technology
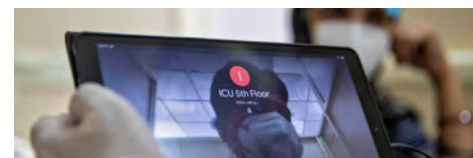
What combination of existing and emerging technologies can efficiently and sustainably deliver affordable connectivity?

– Continue optimizing for the right mix of technologies across fixed, wireless and new non-terrestrial technologies across contexts

– Accelerate the digitization of existing operations through smart planning, automation, new architectures and ways of working, to improve the cost base and viability of investments in underserved areas

(1) Role of connectivity in the time of COVID-19

> The COVID-19 pandemic has highlighted a newfound sense of urgency to the digital inclusion agenda. While the crisis has enabled hundreds of millions to work, learn and connect digitally, it is easy to see how it has also exacerbated the situation for far too many people in vulnerable situations around the world. Now, more than ever, connectivity should be at the core of all national and international priorities – from healthcare, education, government services and beyond. This new normal presents an unprecedented opportunity for cross-sector collaboration to bridge the digital divide and enable unforeseen growth opportunities for the economy and society.
>
> Mauricio Ramos, Chief Executive Officer, Millicom, USA; Chair, Digital Communications Industry Community, World Economic Forum

The ongoing COVID-19 crisis has generated a fundamental change in the context connectivity and tech players operate in, as societies are increasingly recognizing the critical importance of digital infrastructure and services. By end of April 2020, 70% of countries globally were faced with some level of stay-at-home requirements, a majority of which were strict lockdowns. During this period, internet use grew by as much as 70%, the use of remote desktop by 40% and the use of virtual collaboration tools by more than 600%.[2] Connectivity and tech players have played a key role in supporting this crisis with short-term response actions, as detailed in the Digital Development Joint Action Plan and Call for Action published in April 2020 by the World Bank, International Telecommunication Union (ITU), GSMA and World Economic Forum.

However, beyond the instrumental role held by the industry in the short term, the most important enabler allowing the world to operate during these lockdowns has been the substantial infrastructure roll-out and investments made by the industry since the internet boom. Operators and infrastructure providers have invested trillions of dollars over the past 20 years to create the digital infrastructure coverage and capacity required to sustain lifestyles during COVID-19. From almost nothing two decades ago, today close to 45% of global households have a fixed broadband subscription, of which close to half enjoy fibre connections and speeds. In the same timeframe, mobile coverage has risen from 12% to 97% of the world's population, with more than 85% enjoying 4G technology.[3]

This solid digital infrastructure has enabled the continuation of key activities, allowing an estimated 10% of the global labour force to work remotely, supporting close to 300 million jobs. This translates to an annual impact of $8 trillion, or twice the size of the Germany's economy. A similar number of school-aged kids and university/higher education students – ~100 million and ~200 million, respectively, have also been able to maintain access to education remotely. While this represents 15-30% of the global student population, it is weighted towards developed economies.[4]

Connectivity also had a significant impact on managing health-related issues during the crisis; technology was used for pandemic planning, surveillance, testing, contact tracing, quarantine and remote healthcare. Telemedicine consultations grew more in one month than in 10 years,[5] which played a key role in keeping lines down at hospitals and maintaining patients in good health. While some sectors have been badly hit (e.g. travel and hospitality), others have been able to grow during the lockdowns, directly enabled by connectivity, such as e-commerce, food delivery and online groceries, with positive spillover effects to adjacent industry players, all of which would have been impossible 20 years ago.

② Critical gaps in the digital divide

Despite support from the industry, the current crisis has also highlighted gaps in access and exacerbated the existing digital divide, both in developing and developed markets:

– **Fixed network coverage, penetration and speeds** are still lacking in many middle- and low-income countries. Indeed, less than 10% of households in low-income countries are fixed broadband subscribers, compared to 70% and close to 90% in middle- and high-income countries, respectively. More importantly, over half of these low-income broadband subscribers have access to speeds <10Mbps. Even in higher-income economies, such as the US or European markets, 10% of the broadband subscribers still get speeds below 10Mbps and close to 30% below 30Mbps. Speeds above these levels would enable a more enhanced usage of connectivity, better simultaneous virtual communication (VC) for work and school, and an overall improved user experience. These speeds were impacted due to the recent crisis, as a result of increased network traffic, hitting lows of 5Mbps in upstate New York for example, preventing some communities, mostly rural, from accessing the internet at all.[6]

– **Mobile connectivity** coverage and capacity improvements are needed within the high-speed internet discussion, especially as 4G can bring speeds comparable to broadband in selected markets. Despite a 40% increase in the number of people connected to the internet (~1 billion) in the past five years, over 30% of lower-income country populations are not yet covered by 4G and those who are benefit from relatively poorer speeds than their higher-income counterparts. That said, an estimated additional 25% of the global population, beyond those enjoying high-speed fixed connections, can access internet speeds above 30Mbps thanks to 4G connectivity today. A combination of access technologies, including satellites, will be explored under technology.
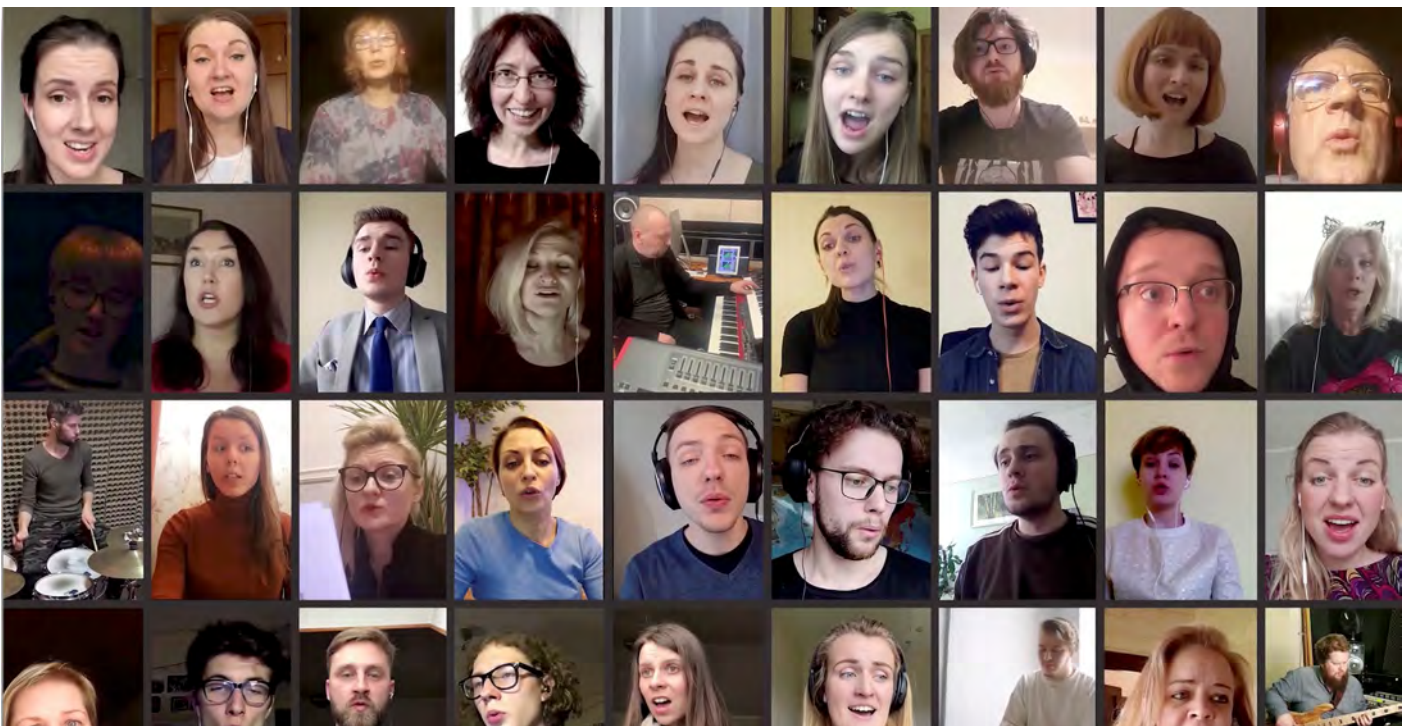
– Beyond availability of infrastructure, a wide **affordability gap** continues to exist, driving a usage gap between penetration and coverage. In low-income countries, a monthly broadband subscription costs 12% of gross national income (GNI), far higher than the UN target of less than 2% by 2025. Similarly, the cost of a basic smartphone ($150) represents more than 1.2 months' wages in these low-income countries, and at least 3-4 times that for laptops, which is becoming one of the largest barriers to internet adoption, even where coverage exists. Indeed, smartphone ownership drops to 30-60% in low-income

countries and only 21% for personal computer (PC) ownership. The ownership of PCs also remains too low in middle- and higher-income economies at 57% and 85%, respectively, driving significant limitations especially in terms of remote education during the recent lockdowns.[7]

– **Digital literacy** is an additional barrier to adoption by certain communities, both in developed and developing markets. In lower-income economies, only 32% of the population has basic digital skills (i.e. defined as the ability to copy or move a file or send e mails). Even in higher-income economies, this number plateaus around 62% and drops rapidly to 44% if standard skills (i.e. defined as the ability to use basic formula in a spreadsheet or create electronic presentations) are considered, which also creates high barriers to adopting the required digital services to enable a remote lifestyle.[8] Digital literacy is also closely intertwined with the availability of relevant use cases, localized content, products and services attractive for user consumption, or lack thereof in some markets.

These gaps do not stop at individuals and households. Businesses, specifically SMEs, have been lagging behind and are particularly exposed in this crisis, despite the critical role they play in global economies. SMEs represent more than 90% of businesses worldwide and half of global employment, and even more in emerging markets where they drive more than half of GDP.[9] However, they lag far behind larger companies in terms of ICT adoption and maturity. Less than half have fixed broadband connectivity and overall less than a quarter are digitized (offering some service online) compared to almost 100% for larger companies.[10] Therefore, at most, 10-20% of SME employees have been able to work remotely during lockdowns versus over 50% for large companies, even in high-income markets such as Japan.[11]

This obviously exacerbated the already significant impact of the COVID crisis on SMEs. They have been particularly vulnerable and at risk of suffering more job losses and closures compared to larger companies; for example, 2.5 times more redundancies/employee vs larger companies in France.[12] This gap is expected to widen as early evidence shows resumption rate post-lockdowns is slower for SMEs compared to larger companies, and a vast majority of support actions announced globally disproportionately focus on large companies. They must not be excluded from the digital inclusion discussion.

Despite billions of dollars of investments, massive connectivity progress globally and strong continued efforts across the industry, these gaps have been exacerbated in the recent crisis and are likely to persist and even worsen once the world reaches a "new normal" with pervasive digitization across all aspects of life. Individuals and businesses will become accustomed, and will be expected, to conduct key activities online, thus shifting consumer habits to more virtual lifestyles and increasing reliance on technology and connectivity.

3 A growing digital divide in the 'new normal'

Post-COVID-19, the "new normal" will likely see an acceleration of digital activities across various aspects of daily life. While not all jobs can be done remotely, and some level of in-person work is likely to resume, there is likely to be increasing use of advanced virtual conferencing in day-to-day meetings, workshops, upskilling trainings, or even team building for colleagues in different locations. Similarly, schools are likely to continue leveraging some level of online education in the future, from sharing pre-recorded lectures, launching homework collaboration platforms, or allowing students to study from home once a week. There will be increased reliance on telehealth and smart device tracking of health data as well as an accelerated shift toward digital services such as e-commerce, e-banking and e-citizenship. Furthermore, consumers may increasingly pivot towards digital social and entertainment activities such as on-demand streaming and gaming. These shifts will generate increasing requirements across all types of economies and geographies:[13]

– High-income economies, especially urban centres, are likely to increase reliance on simultaneous use of multiple devices and the Internet of Things (IoT), with ubiquitous use of VC for communication, high-definition (HD) technologies or more, and integration of augmented reality (AR) in most applications. For an optimal experience, they would need at least two devices per member (typically smartphone and PC), often with additional smart devices (e.g. watches, tablets or home appliances). This will likely necessitate reliable fixed broadband speeds approaching 100Mbps to manage daily traffic in the long run.

– Middle-income economies and even selected urban areas of lower-income economies will equally need to step up to close the digital gap. They would also likely require access to two devices for each household member, including both a smartphone and a PC to enable efficient remote working and education, and therefore reliable delivery of minimum broadband speeds of above 50Mbps.

– Lower-income economies, especially households in rural areas, might make a number of concessions on VC quality and simultaneous access to applications. Household members might share 1-2 PCs, but would likely need to own at least one smartphone each and would still need reliable broadband speeds of at least 30Mbps to conduct those activities online smoothly in the new normal.

In this new normal, total connectivity requirements (for devices and services combined) could easily exceed $4,000 per household annually in high-income economies, about $3,000 annually in middle-income countries and, even with concessions made on categories of devices purchased, approach $1,000 annually in low-income countries. This exceeds any affordability thresholds set for these families.[14] Similarly, businesses including SMEs will require significant upgrades in digital infrastructure, services, budgets and skills to adapt to the new normal.

It is quite likely that until a vaccine is developed, tested and widely administered, various parts of the world will have subsequent waves of social distancing measures and lockdowns, impacting where people can work and recreate. Therefore, it is important to maintain a playbook with key lessons for the industry. The Digital Development Joint Action Plan and Call for Action covers many potential short-term actions comprehensively, and both governments and industry players would be well advised to start creating their own longer-term contingency plans based on these emergency actions.

4 │ The future of digital inclusion

In recent years, a lot of initiatives, including those from the Broadband Commission and World Economic Forum, have been identified to address the different barriers and gaps – from access to affordability, literacy and financing models of infrastructure. As a result of these efforts, technological advances and the massive investments made by the industry, the situation has already improved substantially compared to five years ago, with increased smartphone penetration and average broadband speeds across the world.

However, it is easy to see how the new normal and the higher requirements outlined above will widen the digital divide further, especially in terms of the criticality of its impact (e.g. kids not being educated, adults losing their livelihoods, businesses shutting down). Connectivity – the connection to sufficient data, for useful services, at the right speed, on adequate devices – must become the top priority; the risk of an increased divide needs to be addressed with even more focused effort and collaboration. Fortunately, the current climate has increased global societal awareness to the need for connectivity, affordable services and devices, and digital skills, providing a strong opportunity to bring together various public and private sector actors to drive concrete action.

With the momentum at this juncture and a better understanding of what the new normal could entail, there is great value in discussing and building upon this playbook, with the aim of **accelerating or exceeding targets proposed by the United Nations to reach 75% broadband internet penetration by 2025 and have it cost no more than 2% of earnings**. High-speed internet should be tech agnostic and standards should be set at use case levels rather than specific technology roll-out levels. This imperative also goes beyond coverage targets to reflect the additional adoption challenge, as it has been established that a high-usage gap exists, driven by other limitations such as affordability or skills.

While this playbook provides a high-level framing of the breadth of priority actions to pursue, a number of them are not necessarily new and may already be covered through other efforts, which will be referred to in the spirit of collaboration. This playbook will, however, attempt to highlight further recommendations particularly relevant in the post-COVID new normal, and will address three key questions:
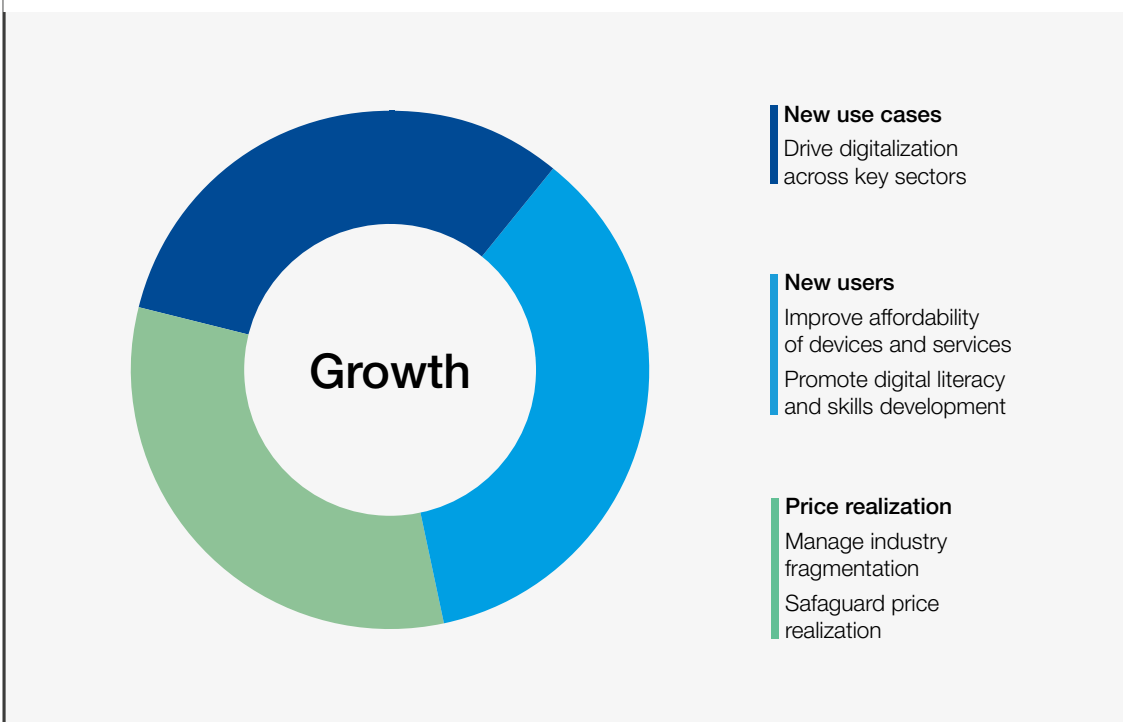
– **Growth**: How can the public and private sectors stimulate growth in the industry to accelerate digital development in unserved and underserved regions?

– **Financing**: How can the public and private sectors best finance the infrastructure and digitization required to enable high-speed internet in unserved and underserved regions?

– **Technology**: What combination of existing and emerging technologies can efficiently and sustainably deliver affordable connectivity?

4.1 │ Growth

In recent years, service revenues for connectivity have been under pressure with average revenue per user (ARPU) decreasing in most markets even as data usage rose sharply. While industry players have continued investing to provide the necessary infrastructure, this trend is unsustainable in the long term as cash flow is now constrained. For example, free cash flow margins have fallen from 17% in 2016 to 6% in 2019 and are likely to be 0 by 2025 given the current trajectory.[15] Thus, to accelerate investment in underserved and non-economic areas, it is necessary for the public and private sectors to stimulate further revenue growth in the industry, including through subsidization where required.

| **How can the public and private sectors stimulate growth in the industry to accelerate digital development in underserved regions?**

New use cases
Drive digitalization across key sectors

New users
Improve affordability of devices and services
Promote digital literacy and skills development

Price realization
Manage industry fragmentation
Safaguard price realization

Driving new use cases through digitization
The post-COVID-19 new normal will rapidly increase the need for digitization due to shifting consumer habits and a desire to be prepared for future pandemics. Thus, businesses must continue to transform to stay resilient, competitive and relevant to customers. However, various barriers remain, from infrastructure to the lack of a digitally trained workforce, particularly in smaller businesses. As such, governments and industry must help drive sector digitization as a key source of future connectivity revenue growth. This includes creating regulatory environments that promote innovative digital services across sectors.

Stimulating adoption from new users
Even as connectivity players continue to invest in necessary infrastructure to grow coverage in underserved areas, there remains a sizeable population that does not use high-speed networks (fixed/wireless) despite living in areas covered by them. The GSMA estimates this "usage gap" to be around 3.3 billion people – around four times greater than the "coverage gap" of those who lack coverage.[16] To drive adoption, the public and private sectors must continue to improve affordability, promote digital literacy, and support the development of relevant content and services for the population.

Improving monetization and price realization
Monetization has a key role to play in ensuring continued top-line growth for connectivity players so they can continue to provide digital infrastructure sustainably. Thus, downward trends in core connectivity revenue (e.g. close to a 30% drop in global wireless ARPU in the past 10 years) and margins need to be stabilized.[17] This can be done by promoting a healthy industry structure as well as preserving price realization.

To accomplish the above, stakeholders should consider the following actions:

	Key levers	Potential actions	Selected examples
New use cases	Drive sector digitization *New normal: Rapid acceleration of demand for digitization across sectors to sustain viability, incl. SMEs*	**Government-led actions (including the set-up of a conducive regulatory environment)** 🔼 Digitize government services, (e.g. online applications for permits, e-tax filing) 🔼 Incentivize digital transformation of key sectors through loans, grants, funds 🔼 Launch holistic national digital strategies across key sectors such as education, health, energy, agriculture, commerce, etc. and ensure a joint governance between ICT authorities and specific sector authorities (e.g. Ministry of Health) 🔼 Create clear regulatory regimes and horizontal standards (e.g. IP, data and security standards, guidelines for data protection and privacy, standards for telehealth and remote education, etc.) Appoint a Ministry for Digital Affairs 🔼 Streamline or remove regulatory barriers to digitization (e.g. remove high taxes on e-commerce, open up the money market to support adoption of e-financial services, remove barriers to eHealth services such as telemedicine, drive data sharing) ● Explore government-led procurement to aggregate demand across sectors and industries and procurement guarantees/capacity demand commitments in non-economic underserved areas	e-Estonia movement to digitize government services Innovation Fund offering 75% co-financing for SMEs (Denmark) Smart Nation strategy (Singapore) National Digital Health Strategy in Rwanda Digital transformation centres for SMEs (Colombia) Dedicated department to support SMEs, including digitization (KSA, Malaysia) GESAC where the Brazilian government is connecting tens of thousands of schools, clinics and government facilities by satellite Mexico Conectado where the Mexican government has connected tens of thousands of schools by satellite
		Industry-led actions 🔼 Collaborate across sectors to provide integrated solutions for SMEs lacking trained workforce to lead transformations from the inside (see "digital SME in a box")	SK Planet offering ICT, digital marketing, data solutions (South Korea) Vodafone V-Hub (resource hub for SMEs)
New users	Improve affordability of devices and services *New normal: Acceleration of connectivity demand with increased importance of affordability gap with higher urgency to address*	**Cost reduction for consumers** ● Reduce mobile sector specific taxes and fees that discourage internet usage and adoption of mobile devices (e.g. import duties) ● Design cheaper devices with basic specs for "bottom of pyramid" Set up refurbished device programmes 🔼 Provide subsidies for device purchases and broadband subscriptions	Cheaper smartphones aimed at developing markets, e.g. Transsion smartphones for ~$70 (Africa) Decree 771 to repurpose transportation assistance subsidy to Internet connectivity subsidy for low wage workers (Colombia)
		Direct provision 🔼 Directly provide devices and services through governments, schools, NGOs, social enterprise, tech, telco or infrastructure players ● Build communal Wi-Fi or computing facilities	Distribution of laptops to students by Lenovo (Tamil Nadu, India) Connect Rwanda Public access Wi-Fi networks (various) Viasat connecting millions of new users through satellite enabled community Wi-Fi Digital villages (India, Nigeria, Ghana) ICT centres (the Philippines) Vouchers to targeted households (Spain, France)
		Creative financing models ● Offer zero or low interest instalment payment schemes through coordinated approach ● Offer payment schemes for the unbanked ● Offer cheap device rentals	Safaricom Lipa Mdogo Mdogo programme offering device instalment financing at ~$0.20/day (Kenya)

	Key levers	Potential actions	Selected examples
New users	Promote digital literacy and skills development, including through local use case *New normal: Acceleration of skills gap and increased impact (on education & livelihood) with higher urgency to address*	**Literacy in schools** ⬆ Implement ICT curriculum in schools/universities ⬆ Provide teacher training on digital and remote learning skills	Seed for the Future ICT Academy Bharti Foundation free use of technology in education programmes throughout India
		Literacy in healthcare ⬆ Train heath workers on digital tools; train health data analysts ⬆ Include digital heath in medical curriculum in universities	Improving digital health literacy in Europe (IC-Health)
		Literacy in workforce ⬆ Provide subsidies for courses to upskill workers with digital skills ● Provide incentives (e.g. tax incentives) for firms to upskill workers	UNESCO-Bharti Foundation partnership providing scientific and entrepreneurial trainings in African markets
		Literacy in society ● Address gender digital divide through programmes encouraging women in ICT ● Raise awareness of Internet benefits and reduce fears about safety ● Design handsets and content for less literate users (e.g. smartphone for elderly) ⬆ Invest in local language content production and talent to support relevant use cases ⬆ Train decision-makers about connectivity/infra	Girls Who Code (USA) Smart Africa Talent Academy African Union Digital Skills for AllGSMA and mobile operators Tech4Girls initiative MISST: Mobile Internet Skills Training Toolkit Avanti Communications educating marginalised girls in 250 schools across rural Kenya
Monetization	Manage industry consolidation	● Industry to seek M&A opportunities where financially logical to serve customers more affordably and efficiently ● Governments to support healthy industry structure	Four to three consolidation observed globally (e.g. Sprint-T-Mobile)
	Preserve price realization	● Governments to revisit selected regulations that may be driving down price realization to unsustainable levels (e.g. selected wholesale deals) ● Industry to pursue price optimization strategies ● Industry to continue offering new value-added products and services	Airtel Thanks programme offering bundled products and services in India

BOX 1 | **Key recommendations**

Accelerate existing efforts on the abovementioned actions

As summarized in the above framework, many potential actions to drive growth have been well researched and documented by organizations such as the United Nations Secretary-General's Roadmap for Digital Cooperation, Broadband Commission, GSMA, World Bank, Alliance for Affordable Internet and the Forum's "Internet for All" initiative, particularly on increasing adoption through affordability, digital literacy, and the proliferation of locally relevant apps and use cases (smart city, e-government and many others). Similarly, industry stakeholders have called for continued efforts to manage fragmentation and improve monetization, supported by enabling regulatory environments. These actions must

be revisited urgently and accelerated in order to support the required infrastructure investments.

Set up cross-sector national digital strategies

At this turning point in the importance of digital for individuals and businesses livelihoods, it is critical to set up – or sharply accelerate – the development and implementation of holistic cross-sector digital strategies at national levels. Governments, education, healthcare and financial services are obvious priority sectors, yet these strategies should extend beyond to tackle all sectors, and all business sizes. These should be jointly developed and governed across the relevant ministries and should include a solid effort on implementing the right conducive regulatory environment for the respective industries to thrive digitally. For example, in order to drastically stimulate the usage

of e-financial services as a lever for connectivity, governments should aim to support and drive better interoperability across the sector.

Funding-wise, there is an unprecedented opportunity to ensure that a certain amount of the stimulus programmes that are being allocated by financial institutions, the EU and national governments, will be earmarked to digitize across sectors (including healthcare, education, SMEs and others) in order to help better prepare people and businesses for the future. Moreover, unused funds should be distributed using efficient mechanisms (e.g. reverse auctions) and administered in a timebound manner for coverage expansion projects.

These actions would have a twofold impact on demand and revenue growth for the connectivity industry. On one level, driving digital transformation across sectors directly generates more demand for connectivity and digital services from them. Beyond that, sector digitization also indirectly drives connectivity demand by launching new use cases, in turn driving adoption by new users who begin to access these services online. Thus, sector digitization can have wider beneficial knock-on effects for revenue growth and broad adoption, in turn driving further infrastructure investments by the industry.

Drive digitization of SMEs by promoting "digital SMEs in a box"
SMEs have a critical role in the global economy, but they already lag behind large organizations in digitizing their businesses. Thus, it is crucial to focus efforts on SMEs to ensure they are not left even further behind in an increasingly digital post-COVID-19 world. In addition, focusing on SMEs (including smaller "non-commercial" organizations) would support broader community adoption for connectivity services, as described above.

To address the unique challenges of SME digitization, players from different sectors (telco, tech, infrastructure, finance and others) must collaborate to create holistic end-to-end offerings to facilitate digitization for SMEs with resource constraints – i.e. a "digital SME in a box" concept.

– **Connectivity**: Many smaller businesses are currently on residential-grade plans, without sufficient upload/download speeds or priority support for down times, rather than business-grade plans. They usually cannot afford leased lines (up to ten times regular broadband prices) yet require speeds faster than a household. Specific SME-focused connectivity plans need to be designed, alongside relevant added services below.

– **Devices**: Sufficient and affordable devices (e.g. laptops, smartphones, IoT-enabled smart devices) for SMEs based on their needs, along with the maintenance of a compatible device ecosystem and support infrastructure without a dedicated IT department or expertise.
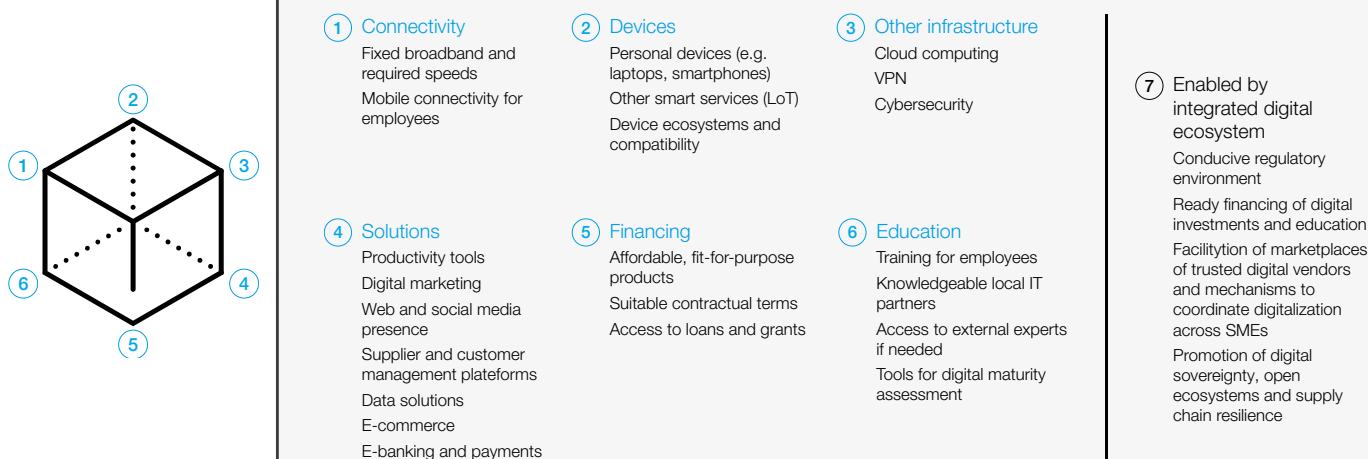
– **Other infrastructure (e.g. cloud, VPN and cybersecurity)**: Other types of critical infrastructure need to scale up and down according to small business requirements. Moreover, data breaches are on the rise, which is likely to persist due to more telework. Beyond technology infrastructure, even unused physical real estate from larger corporations could be packaged and repositioned as co-op space for selected SME services (e.g. customer service centres).

– **Solutions**: Various turnkey software solutions (e.g. productivity tools, digital marketing, web presence, data solutions, e-commerce) which are easy to set up and understand, even for SMEs without IT expertise.

– **Education**: Advisory programmes and online communities to increase the level of digital education within the SME workforce, such as training courses for employees, fostering a network of knowledgeable local IT vendor s who can assist with IT challenges, providing affordable access to external experts and consultants, and making digital maturity assessment tools to identify areas of strength and weakness for individual SMEs.

– **Financing**: Mechanisms to ensure affordability for SMEs, such as creating SME-targeted products at a reasonable price tag, ensuring SME-friendly contractual terms with appropriate payment schedules and no minimum lines/subscriptions, and programmes for SMEs to access cheap loans and grants for digital investments

In parallel, government should support in establishing the right digital ecosystem for SMEs:

– **Regulation**: Conducive regulatory environment (e.g. set up clear IP and data standards, amend taxes on e-commerce, release one-stop shop of guidelines to cybersecurity), potentially supported by the set-up of a dedicated department to focus and work with SMEs

– **Payment and contracting standards**: For SMEs to effectively work digitally, a prerequisite is that there is a nation-wide digital payment and contracting standard they can use. Governments have an essential role to play to facilitate the creation of standards and systems – both by the right regulation and also stimulating the service creation, i.e. by adopting it themselves.

– **Financing**: Loans and grants to support digitization efforts to complement financing mechanisms offered by private sector players; alignment of investments with broader national digital strategy

– **Education**: Investment in large-scale reskilling programmes, collaborating with private sector players

– **Facilitation**: Creation of hubs or marketplaces of trusted digital vendors to help simplify purchasing decisions; avenues to coordinate digitization across SMEs (e.g. "chamber of commerce" concepts to collaborate on IT solutions or reap benefits of scale)

– **Promotion of digital sovereignty**: Awareness among SMEs of issues of technological dependency and advantages of open ecosystems, increasing supply chain resilience in ICT products and services

Requirements for digital SME in a box

① Connectivity
Fixed broadband and required speeds
Mobile connectivity for employees

② Devices
Personal devices (e.g. laptops, smartphones)
Other smart services (LoT)
Device ecosystems and compatibility

③ Other infrastructure
Cloud computing
VPN
Cybersecurity

④ Solutions
Productivity tools
Digital marketing
Web and social media presence
Supplier and customer management plateforms
Data solutions
E-commerce
E-banking and payments

⑤ Financing
Affordable, fit-for-purpose products
Suitable contractual terms
Access to loans and grants

⑥ Education
Training for employees
Knowledgeable local IT partners
Access to external experts if needed
Tools for digital maturity assessment

⑦ Enabled by integrated digital ecosystem
Conducive regulatory environment
Ready financing of digital investments and education
Facilitytion of marketplaces of trusted digital vendors and mechanisms to coordinate digitalization across SMEs
Promotion of digital sovereignty, open ecosystems and supply chain resilience

4.2 | Financing

The expansion of internet connectivity drives significant positive effects for the wider economy. For example, the World Bank has estimated that a 10% increase in fixed broadband penetration would increase GDP growth by 1.21% in developed economies and 1.38% in developing ones. Over the next five years, operators will invest $1.1 trillion in their networks globally.[19]

Consequently, public and private funding for high-speed internet infrastructure development in unserved and underserved regions should be a priority. The post-COVID-19 new normal, in which digital access is increasingly essential to daily life, should drive even greater momentum for stakeholders to collaborate in such financing efforts.

Partnerships for utilization
Drive higher utilization of assets where relevant

Partnerships for ressources
Accelerate access to key ressources

Partnerships for capital
Facilitate long-term investment in digital development

New ways to prioritise affordable devices and digital services
Explore innovate ways to ensure full usage of services and devices

Promoting partnerships, fostering the right regulatory environment and distributing funds
While the concept of partnering to share assets and co-invest is not new, the new normal poses an acute challenge for industry players which had already experienced regulatory hurdles to collaboration and infrastructure roll-out. To overcome these barriers, stakeholders should continue to explore the following partnerships and rethink government regulations and policies to support a faster, cheaper and more efficient roll-out:

– Partnerships and enabling regulatory environment to drive higher utilization of infrastructure

– Partnerships and enabling regulatory environment to accelerate access to key resources

– Partnerships and enabling regulatory environment to facilitate long-term investment and access to unused and recovery funds

Exploring new ways to prioritize essential services
Governments and connectivity players can collectively explore new ways to prioritize essential services, such as agreements to award spectrum in exchange for better connectivity guarantees, or more targeted ways to achieve connectivity where it is currently lacking, including in selected sectors (e.g. education, healthcare).

To achieve the points above, stakeholders should consider the following actions:

	Key levers	Potential actions	Selected examples
Partnerships and regulations to drive higher utilization	Drive higher utilization of infrastructure, including power grids *New normal: Similar actions, yet higher urgency to partner to reach non-economic areas*	**Infrastructure sharing, where relevant, between industry players (telco, infra, utilities, others)** ⬆ Accelerate passive sharing partnerships such as site and mast sharing where multiple networks are not viable or where business case is insufficient, but promote infrastructure-based competition in competitive areas when it is most beneficial to end users ⬆ Promote active sharing of RAN and core network ● Partner between local complementary networks and middle-mile operators (backhaul in exchange of meeting licensing obligations) ● Revenue-sharing models in which the cell site and backhaul is provided and the MNO/other partners are invited to share the revenue ● Identify strategic partnerships with power supply providers in emerging markets for network expansion	Africa Mobile Networks revenue-sharing models for connecting remote areas
		Policies to facilitate sharing ● Allow active sharing where it is not currently allowed ● Promote establishment of IXPs to facilitate the exchange of traffic ● Allow mobile operators to pursue small cell-sharing agreements, including with utility providers	Develop strategic planning between power, connectivity, and associated network upgrades and expansions
Partnerships & regulations to accelerate access to key resources	Facilitate access to faster and cheaper key resources *New normal: Unprecedented urgency to roll out infrastructure rapidly*	**Actions, policies and regulations to reduce cost of resources** ● Facilitate synchronization of infrastructural development across players to optimize construction costs ⬆ Release new spectrum timely and affordably and on a technology neutral basis ⬆ Take advantage of unlicensed spectrum to set up community networks ⬆ Allow repurposing of unused or underused spectrum, including microwave spectrum for backhaul for telecom networks, serving multiple use cases ⬆ Allow spectrum sharing in a way that provides adequate access and protection to all users ⬆ Provide low-cost access to small cell deployment sites, e.g. on public property ● Reduce ICT services and equipment taxes to lower cost to consumers ● Offer incentives to pursue energy efficiency ● Review sector-specific taxes that affect affordability of resources, incl. on equipment import, deployment of satellite receivers ● Consider NRENs to help connectivity in schools using excess capacity and capabilities from universities	Reduction of fees for small cell equipment (Brazil) and satellite-receiving antennas (African countries) Tax regime for small cells set at 10% of tax for macro cells (France) Removal of 16% VAT on low-cost handsets, laptops (Colombia)
		Streamlined regulations/approvals to speed up ⬆ Simplify processes to get rights of way and small-cell deployment ⬆ Streamline regulatory and permit approval processes ● Lower cost of right of way access	Localities only recovering their costs incurred to small cell siting (United States) Reduction of time to give permits from 60 to 10 days (Colombia)

	Key levers	Potential actions	Selected examples
Partnerships and regulations to facilitate long-term investment	Facilitate access to capital *New normal: Unprecedented need for rapid financing and unprecedented interest by non-industry partners*	**Co-investment in infrastructure across sectors** 🔼 Pursue joint investments with financial institutions (e.g. banks, pension funds, private equity), multilaterals (e.g. development banks) or government agencies (e.g. sovereign wealth, USF) ● Leverage COVID-19 recovery budget to enable infrastructure roll-out in underserved areas	COVID-19 recovery funds allocated portions to digital infrastructure
		Multilateral and government policies to encourage private sector investment ● Implement "dig once" policies to allow funders to bundle investments across different types of infrastructure ● Provide anchor tenancies to improve business case for private investments	Localities establishing "dig once" policies to futureproof needs with dark fibre (e.g. community networks)
New ways to prioritise services	Explore new ways to prioritize digital devices and services	🔼 Explore market-based mechanisms (e.g. auctions for subsidies) to serve less economically viable areas with one player 🔼 Set up public-private partnerships to provide remote education devices to all students ● Provide guarantees (e.g. coverage in underserved areas) in exchange for access to resources from governments (e.g. spectrum)	Government project to provide broadband to public schools (Brazil, Mexico, Jamaica) Free spectrum in exchange for rural coverage obligations

BOX 2 | **Key recommendations**

Continue to accelerate relevant partnerships and regulatory actions
Many of the abovementioned actions related to infrastructure sharing where relevant, partnerships and other regulatory barriers have been well-documented and researched in recent years, including in a current effort from the GSMA, ITU and UN. Given the increased urgency to close the digital divide and the high momentum around such actions, stakeholders must continue to act on and accelerate these opportunities.

Facilitate sharing of infrastructure assets where relevant, including with cross-sector players
Where infrastructure sharing has become more common, most importantly in regions lacking sufficient near-term business cases, there is potential for more cross-sector collaboration to improve utilization of infrastructure and facilitate access to faster and cost-efficient resources. For example, electricity grids often include fibre optic cables for system supervision and grounding, but only 10% of this capacity is usually used.[20] There is an opportunity for partnerships between energy and connectivity players to use the spare capacity and/or infrastructure to reach new customers without having to lay new cable or ancillary infrastructure, as demonstrated by the Relined Fiber Network in the Netherlands and the Balkans Digital Highway Initiative. As another example, community Wi-Fi with satellite may, for example, need solar power. The Broadband Commission indicated that 77% of rural communities in sub-Saharan African lack reliable power, hence collaboration to provide power to such communities could be economically efficient. Such partnerships can significantly ease the business case for expanding into underserved areas, and moreover, network expansion in many emerging markets will need to go hand in hand with power supply.

Governments can help facilitate infrastructure sharing by coordinating across sectors and ensuring that players synchronize the laying of cable to prevent repeated digs. They should revisit regulatory barriers to sharing, such as those preventing electricity transmission providers from commercializing their assets by partnering with connectivity players.

Facilitate cross-sector financing of infrastructure, including global recovery budgets
Recent years have seen rising interest in connectivity investments from players outside the traditional telecoms industry, such as infrastructure investors and private equity firms. Governments and existing connectivity players have an opportunity to mobilize these investment dollars to finance infrastructure with the additional aim of closing the digital divide. Specific initiatives could include:

– Bundling projects into infrastructure funds to reduce individual risk exposure and attract capital for smaller, critical, projects

– Creating securitization mechanisms to provide various investment options

- Setting up official multistakeholder and co-investment funds to coordinate investment

- Encouraging the use of infrastructure marketplaces to link up investors and players

- Providing supporting schemes to potential investors such as technical assistance, risk underwriting and payment guarantees

- Issuing government grants and loans to reduce uncertainty for high-risk projects

- Identifying and promoting a pipeline of mature opportunities for interested funders

- Offering risk mitigation insurance and instruments in case of government or partner default

While many of these initiatives were first highlighted in the 2018 World Economic Forum report *Financing a Forward-Looking Internet for All*, the interest and availability of funds from such investors were still limited then. Recently, there has been far greater interest from such investors in connectivity investments, for example in the form of tower cos, fibre Cos, data centres, satellite constellations and community Wi-Fi. There is an opportunity to build on this momentum and availability of funds. Governments should promote such investments and explore ways to collaborate with investors.

Furthermore, there is an unprecedented opportunity to ensure that the recent stimulus programmes, which are being allocated by financial institutions, the EU and national governments, will enable more infrastructure roll-out in underserved areas. In parallel, a certain amount will need to be earmarked for connectivity and to digitize across all sectors (including healthcare, education, SMEs and others), supporting current digital needs and better preparing people and organizations for the future.

Explore new ways to prioritize and fund essential services across relevant

As digital becomes increasingly intertwined with daily life, it is important to ensure that all can take advantage of digital services for activities such as education, healthcare, financial services and e-citizenship. Governments and other players need to decide what these priority use cases are and consider creative ways to provide universal access where commercial ventures are insufficient. For example, governments and connectivity players can develop plans to connect all schools and students in a defined region within a set timeframe. Financing time-bound and use case-specific projects would need to be provided through redirection of selected government funds (including through the disbursement of the unspent universal funds) or partnerships between government and relevant industries, such as education. Beyond the above illustration, regulators can also design auctions to allow single players to serve specific areas where a multi-player market may not be economically feasible but a single-player one could thrive.

Actively resolve bureaucratic hurdles

Even when the right partnerships and regulations are in place, operators may face bureaucratic hurdles in the deployment process, such as opposition from landlords and municipalities, slowing down the required roll-out and excessive right of way fees. Governments and regulators should play an active role in addressing such hurdles and incentivizing stakeholders to close the divide through subsidies, brokered agreements and the right policies. The German government has recently announced plans to create a new infrastructure entity to accelerate the wireless infrastructure roll-out.[21] While it is not clear yet what role the new entity will play versus the mobile network operators, the plan to accelerate the roll-out is ambitious and, in cooperation with the federal states, will reduce the time taken to build a new site from two years to three months. Incentives to accelerate permitting and an information campaign to reduce public concerns are key elements of the plan.
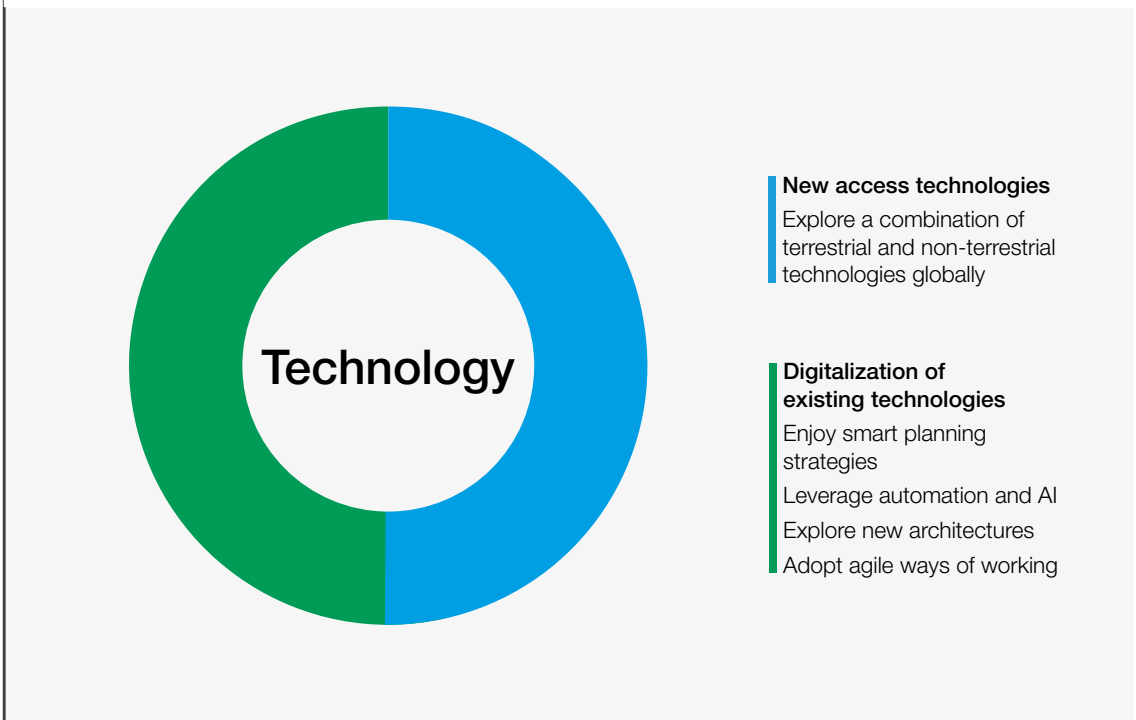
4.3 | Technology

A technology agnostic approach to bridging the digital divide can be most effective in the new normal. When doing so, it is important to note that unserved and underserved areas may have varying geographic, economic and social realities and therefore distinct needs. Stakeholders need to consider a range of innovative technological levers to cater to specific circumstances. These levers can be new access technologies as well as existing technologies that can be digitized to improve efficiency and, in so doing, improve the business case for connecting the unconnected.

What combination of existing and emerging technologies can efficiently and sustainably deliver affordable connectivity?

Technology

New access technologies
Explore a combination of terrestrial and non-terrestrial technologies globally

Digitalization of existing technologies
Enjoy smart planning strategies
Leverage automation and AI
Explore new architectures
Adopt agile ways of working

New access technologies
In the new normal, there is greater urgency than ever before to address the digital divide and to explore a combination of new and existing technologies that can reach and connect new areas faster. Public and private sector players should consider leveraging the capabilities and economics of terrestrial and non-terrestrial technologies in urban and remote regions; collaboration between terrestrial and non-terrestrial operators can present unforeseen opportunities for growth.

Digitalization of existing access technologies
Besides optimizing the right mix of access technologies, industry players must also leverage technology to close the divide by digitizing their existing operations. The new normal will drive greater needs for digitization across all sectors, and telecommunications are no exception. Improving the efficiency of existing operations through digitization can help reduce costs significantly and improve the economics of delivering connectivity in underserved non-economic areas today.
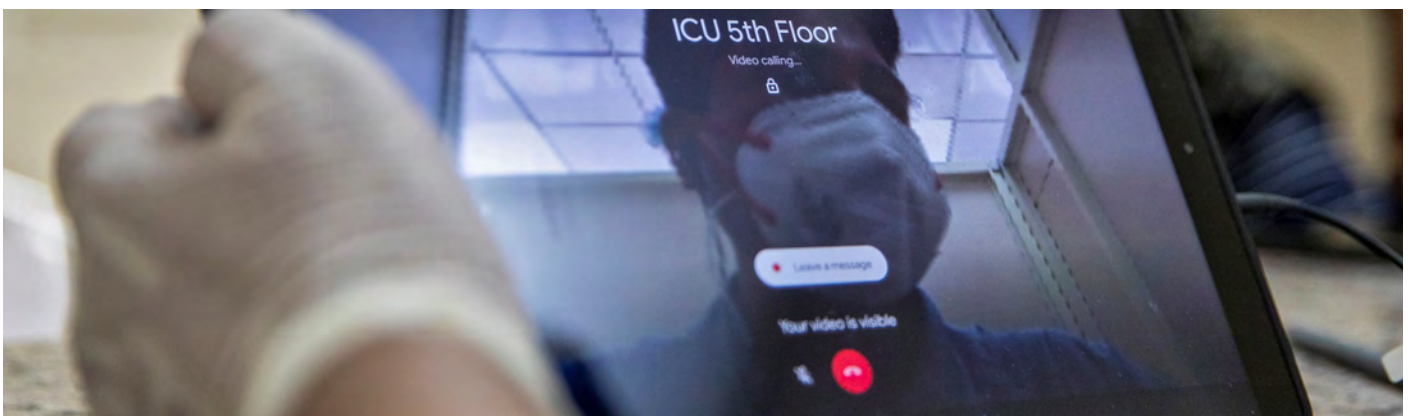
To achieve the above points, stakeholders should consider the following actions:

	Key levers	Potential actions	Selected examples
New access technologies	Leverage existing and emerging terrestrial technologies	**Fibre-wireless broadband access** • Integrate wireless access technologies with fibre infrastructure to provide faster, more efficient broadband in selected remote areas	AirPON solutions by Huawei
		Terrestrial networks – 4G/5G • Rapidly accelerate 4G roll-out and leverage 5G where relevant to provide sufficient coverage and speeds in areas without fixed broadband • Fixed Wireless Access over 5G can be a viable technology to cover the last mile connectivity in rural communities	$1.1 trillion investment planned in next 5 years by MNOs 5G FWB CPE solutions by Qualcomm
		Other technologies • Explore a combination/hybrid of all available technologies to efficiently connect underserve areas (e.g. data transmission relays and others)	Rural Star by Huawei SES enabling 25 million citizens in the DRC connect to 4G thanks to next-generation satellite backhaul
	Explore innovative non-terrestrial technologies to reach areas that terrestrial technologies cannot reach	**Non-terrestrial networks – satellites** • Provide broadband connectivity through satellite networks that transmit data to and from space	Viasat-3 Global Constellation Avanti Communications SES Inmarsat Intelsat And in the future: OneWeb Starlink by SpaceX Project Kuiper by Amazon Web Services
		Non-terrestrial networks – UAV and HAPS • Provide connectivity through network of high-altitude balloons that drift through stratosphere, connect to ground stations • Provide connectivity through solar-powered drones that use laser beams to transmit data • Develop conducive regulatory environment	Loon by Google Internet.org by Facebook
Digitization of existing operations	Employ smart planning	⬆ Smart roll-out planning (value-based rollout) • Use of digital twins (virtual/digital of physical infrastructure to run simulations and optimize roll-out before actual deployment)	Telefónica
	Integrate automation and AI in operations	⬆ Automated design and run activities ⬆ AI-driven optimization of network configuration • Predictive maintenance	Elisa Jio
	Explore and implement new architectures	• Move to open standards • Virtualization of the network	Vodafone-Idea Airtel
	Adopt agile ways of working	• DevOps in network operations • New roll-out approach	Verizon

BOX 3 | **Key recommendations**

Leverage the right mix of access technologies

The innovative non-terrestrial technologies described above, such as high-throughput satellites networks and high-altitude balloons, offer ways in which remote areas might be connected in the future. Billions of dollars are being invested by developers and operators of new advanced satellite technologies and constellations that have the potential of connecting hundreds of millions of the unconnected over the next five years.

Industry players and governments should continue to explore a combination of technologies where relevant and view these technologies as potential collaborators and partners in closing the digital divide, complementing rather than competing with existing offerings. Non-terrestrial technologies should become an integral part of hybrid solutions (enabling for example community Wi-Fi or cellular backhaul) for ensuring timely quality access to the internet.

While continuing to test new technologies, industry stakeholders should continue to leverage existing wireless and wireline technologies, including FWA and 4G/5G. In some circumstances, wireless connectivity can provide required speeds for households where fixed broadband is prohibitively expensive. For example, in May 2020, more than 60 countries worldwide had an average mobile speed of more than 30 Mbps, even reaching 100 Mbps.[22] Therefore, expanding 4G even further can already be a big step toward connectivity for the unreached. It should be noted that mobile operators are helping underserved and unserved areas to leapfrog directly from 2G to 4G, which would benefit from a combination of digital infrastructure approaches. 4G will still be the primary technology well into the future, especially for many areas in undeveloped and even developing countries.

Governments should also do their part by setting clear performance standards (e.g. in terms of speed, latency), which should be tech-agnostic. Indeed, acknowledging the diversity of circumstances and needs in underserved areas, all stakeholders should remain open to using a range of technologies as long as they meet those performance standards. Success metrics at government levels should also go beyond "coverage" metrics to include "penetration" metrics in order to reflect adoption challenges and support the right set of comprehensive measures.

Accelerate digitization of operations

Digitizing operations is a key way for connectivity players to reduce their cost base and improve the financial viability of investing in non-economic areas. Such industry actions will complement the initiatives and collaboration from other stakeholders, such as governments, multilaterals and cross-sector partners, to work together towards the closing of the digital divide.

Network virtualization and centralization: Virtualization of networks allows the development of new, more cost-efficient network architectures, thus reducing network spending and broadening the network infrastructure ecosystem. Virtualization is also a key enabler for network slicing. Rakuten, the Japanese retail giant, which launched its own telecommunications service in April 2020, built its network with more than 3,000 sites based on a cloud architecture with OpenRAN. The network deployment will be supported by a large diversity of vendors across the RAN, backhaul, core and operating systems.

Automation and self-organizing networks: Configuration, management and operation of mobile networks are complex tasks and there is substantial potential to optimize these processes. Near-term, programmable, rules-based automation of network processes can lead to significant savings. In the intermediate and long term, machine learning and artificial intelligence can help network components learn from data to achieve fuller optimization and realize the vision of self-organizing networks (SON). Elisa in Finland is an example of a leader in such network automation.

Conclusion

At this juncture, a heighten emphasis on public-private cooperation is critical to advancing the digital inclusion agenda in today's new normal. No one-size-fits all approach towards bridging the digital divide will work. Digital development and connectivity should be a top priority within nations and across international forums. The theme of this playbook presents the challenges of connecting the unconnected through the prism of the new normal and built upon the pillars of growth, financing and technology. The economic and behavioural trends brought about by the COVID-19 pandemic will challenge public and private sectors to rethink and prioritize digital in the future. To achieve 75% broadband internet penetration worldwide and have it cost no more than 2% of earning by 2025, government and industry players must accelerate action across all initiatives identified throughout this report. Only strong collaboration and partnerships will be meaningful enough to close the digital divide gap. Beyond the numerous current activities to accelerate, this playbook aims to highlight a few new priorities emerging from the new normal:

– Drive the rapid digitalization of all industry sectors by establishing holistic national digital strategies as well as concerted effort to facilitate SMEs digital inclusion via end-to-end offerings

– Finance connectivity infrastructure and digitalization in unserved and underserved areas by earmarking some of the COVID-19 stimulus budgets for digital infrastructure investment and digitalization of other sectors

– Strive to collaborate across technologies to optimize the right mix to accelerate and offer affordable and sustainable connectivity globally

It is critical that the dialogue between the public and private sectors, and across industries, on the priority actions highlighted be accelerated in order to join forces in tackling the digital divide holistically. Only with all stakeholders playing their part will the digital divide reduce in the medium term; collaboration is more essential than ever to achieve this ambitious goal. The above topics will continue to be the focus of the World Economic Forum's initiative on digital development and connectivity, which aims to leverage public-private dialogues to advance the digital inclusion agenda.

Acknowledgements

Endnotes

1. This report uses the terms "broadband" and "high-speed" internet interchangeably.

2. Forbes [Internet growth]; ZDNet [remote desktop]; Microsoft [collaboration tools].

3. GSMA [mobile coverage]; Ovum WBIS [broadband coverage].

4. Ovum [broadband coverage]; World Bank [income classifications]; ILO [labour force, share of jobs in remote-working-enabled industries]; EdTech Hub [school closures]; UIS/UNESCO [student enrolments]; BCG analysis.

5. E.g. in France there were 10,000 teleconsultations/day in early March and this grew to 1 million/day by the end of March – Digital Health Partnership.

6. GSMA [mobile]; Ovum WBIS [broadband]; New York Times and Pew Research [speeds in US]; BCG analysis

7. Economist Intelligence Unit [broadband subscription prices, PC penetration]; World Bank [GNI]; Ovum [smartphone penetration]; BCG analysis.

8. ITU & UN SDG [definition and data on digital skills]; BCG analysis.

9. World Bank SME Finance; OECD Digital for SMEs Initiative.

10. UNCTADStat.

11. Nikkei & The Straits Times.

12. OECD Digital for SMEs.

13. FCC, GoBrolly and World Economic Forum White Paper 2018, "Financing a Forward-Looking Internet for All" [Internet speeds]; BCG estimates.

14. Statista [average cost of devices]; World Bank [GNI]; BCG estimates

15. Unlevered free cash flow margin, Capital IQ.

16. GSMA, "The State of Mobile Internet Connectivity", 2019.

17. Tefficient.

18. World Bank, "Exploring the Relationship Between Broadband and Economic Growth", 2016.

19. GSMAIntelligence.

20. World Bank, "Infrastructure sharing in energy and digital development: takeaways from cross-sectoral cooperation", 2018.

21. Federal Ministry of Transport and Digital Infrastructure, "Mobile Communications Summit: Federal Government, federal states, local authorities and industry agree on mobile communications funding", 16 June 2020.

22. Ookla Speedtest Global Index, May 2020.