Partner2Connect Action Framework Report

"Partner2Connect aims to foster meaningful connectivity and digital transformation globally, in the hardest- to-connect communities, including those in Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs) and Small Island Developing States (SIDS)."

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#Partner2Connect

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- the United Nations Office of the Secretary-General's Envoy on Technology;
- the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS);
- the P2C Focus Area Leaders and Deputies, listed here;
- the P2C Working Group Participants;
- the Boston Consulting Group (BCG), P2C's Knowledge Partner; and
- the P2C Secretariat.

Foreword

In 2021, ITU launched the Partner2Connect Digital Coalition with a clear objective in mind: provide a global multistakeholder platform to mobilize and announce new resources, partnerships and commitments to achieve universal meaningful connectivity.

Having access to the Internet and information and communication technologies (ICTs) has never been more important. The COVID-19 pandemic taught us that connectivity is fundamental for individuals to work, learn, trade, and communicate. But while it is widely recognized that ICTs have tremendous potential to accelerate progress towards the Sustainable Development Goals (SDGs), the harsh reality is that **2.9 billion people** are still totally offline, while hundreds of millions more lack the affordable, accessible, and reliable connectivity that would meaningfully change their lives.

Partner2Connect (P2C) has been developed in close cooperation with the Office of the Secretary-General's Envoy on Technology and the UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), and in line with the WSIS Action Lines, the SDGs, and the UN Secretary-General's Roadmap for Digital Cooperation. It aims to foster meaningful connectivity and digital transformation globally, in the hardest-to-connect communities, including those in the least developed countries (LDCs), landlocked developing countries (LLDCs), and small-island developing states (SIDS).

The **P2C Focus Areas Action Framework** is the Coalition's guiding document. Developed by our Working Groups and Focus Area Leaders with the support of P2C's Knowledge Partner, Boston Consulting Group (BCG), it is the result of an extensive and inclusive process of consultations, and summarizes the key elements that need to be addressed to achieve universal, meaningful connectivity and digital transformation for all: the **what**, the **who**, the **why** and the **how**.

All of the focus areas have an equal weight in the framework. Simply having access to connectivity is insufficient if people are not equipped with the devices or skills to use it. And once people are

connected and using the Internet safely, we need to make sure that connectivity can be used for to drive value creation and the digital transformation of societies. Knowing the magnitude of the financial gap required to achieve all this is equally important, as are the financial models required to fund investments in meaningful connectivity.

I thank all our partners and supporters who, believing in the transformational power of this Coalition, have already stepped forward and submitted a pledge to bridge the digital divide. And I invite those who have not yet done so to make a solid and substantial commitment to universal digital inclusion through our P2C Pledging Platform. We need all your engagement, energy, expertise and resources so that, together, we can create a world where the life-changing power of connectivity is put within reach of everyone, everywhere.

Doreen Bogdan-Martin
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Abbreviations and acronyms

A4AI	Alliance for Affordable Internet
AI	Artificial intelligence
AT	Assistive technology
AWS	Amazon Web Services
B2B	Business to business
B2C	Business to consumer
BGAN	Broadband global area network
Capex	Capital expenditure
CERT	Computer emergency response team
CIRT	Computer incident response team
CI	Critical infrastructure
COP	Child online protection
CNT	*Corporación Nacional de Telecomunicación* [National Telecommunication Corporation]
CRPD	Convention on the Rights of Persons with Disabilities
CSAM	Child sexual abuse material
CSP	Communication service providers
CSR	Corporate social responsibility
DeFi	Decentralized finance
DFS	Digital financial services
DHIS2	District Health Information Software 2
DPG	Digital public goods
DPGA	Digital Public Goods Alliance
DPI	Digital public infrastructure
EGDI	E-government development index
EU	European Union
FA	Focus area

FDI	Foreign direct investment
Fintech	Financial technology
FITEL	*Fondo de Inversión en Telecomunicaciones* [Telecommunications Investment Fund]
FTTH	Fibre to the home
GAVI	Global Alliance for Vaccines and Immunisations
GB	Gigabytes
GHG	Greenhouse gas
GHz	Gigahertz
GIS	Geographic information system
GNI	Gross national income
GSO	Geostationary satellite orbit
HEIs	Higher education institutions
ICT	Information and communication technology
IMT	International mobile telecommunications
IoT	Internet of things
IPT	Internet *Para Todos* [for all]
ITU	International Telecommunication Union
ITU-D	International Telecommunication Union Telecommunication Development Sector
IXPs	Internet exchange points
KPIs	Key performance indicators
LATAM	Latin America
LDCs	Least developed countries
LEO	Low Earth orbit
LLDCs	Landlocked developing countries
LMICs	Lower- and middle-income countries
LTE	Long-term evolution
MB	Megabytes
MENA	Middle East and North Africa

ML	Machine learning
MOSIP	Modular Open Source Identity Platform
MSMEs	Micro, small and medium enterprises
Mt	Megatonnes
NCS	National cybersecurity strategy
NGSOs	Non-geostationary satellite orbit
ODA	Official development assistance
OECS	Organisation of Eastern Caribbean States
OOFs	Other official flows
OpEx	Operating expenditure
PASET	Partnership for Skills in Applied Sciences, Engineering and Technology
P2C	Partner2Connect Digital Coalition
PPP	Public-private partnership
R&D	Research and development
REG4COVID	Global Network Resiliency Platform
SDGs	Sustainable Development Goals
SIDS	Small-island developing states
SMAC	Social, mobility, analytics and cloud
SMEs	Small and medium enterprises
SOPs	Standard operating procedures
SSA	Sub-Saharan Africa
STEM	Science, technology, engineering and mathematics
Towerco	Tower company
TVET	Technical and vocational education and training
TVWS	Television White Spaces
UK	United Kingdom
UN	United Nations
USAF	Universal service and access fund

USD	United States dollar
USF	Universal service fund
USO	Universal service obligations
VC	Venture capital
WASH	Water for sanitation and hygiene
WEEE	Waste electrical and electronic equipment
WEF	World Economic Forum
WSIS	World Summit on the Information Society
WTDC	World Telecommunication Development Conference

1 Introduction

Digital connectivity is no longer a nice to have. Providing the remaining 2.9 billion people with meaningful and safe access to the Internet is an urgent imperative, as the opportunity cost of not doing so might hinder the socio-economic progress of nations. Even among the 4.9 billion counted as 'Internet users', many hundreds of millions may only get the chance to go online infrequently, via shared devices, or using connectivity speeds that limit the usefulness of their connection. ICTs form the backbone of today's digital economy and they have an enormous potential to fast forward progress on the SDGs and improve people's lives in fundamental ways.

Achieving Universal Connectivity is at the heart of the UN's work to achieve a more open, free and secure digital future for all and a key priority in the UN Secretary-General's Roadmap for Digital Cooperation. To achieve the Roadmap's goal of ensuring that every person has safe and affordable access to the Internet by 2030, including meaningful use of digitally enabled services, implementation of its recommendations on global connectivity has focused on ensuring a 'people-centred' approach in leaving no one behind. In this context, the Partner2Connect Coalition and the multistakeholder partnership model it represents is critical in implementing the Roadmap by catalyzing concrete joint efforts to accelerate connectivity.

This report introduces the Partner2Connect Focus Areas Action Framework, which is the guiding document of the P2C Digital Coalition. The framework attempts to tackle the challenge of universal meaningful connectivity by looking at it from the perspective of four focus areas. The first Focus Area is related to ACCESS: Connecting people everywhere, and it covers the provision of affordable, resilient and trustworthy connectivity for all. The objective of this focus area is to facilitate attainment of universal and affordable connectivity through resilient infrastructure deployments that ensure ubiquitous network coverage including "last mile" and hardest-to-connect uneconomical areas. The key issues to address here revolve around three pillars: Infrastructure, Affordability and Cybersecurity.

The second focus area is related to ADOPTION: Empowering communities, and it looks at getting all people meaningfully and safely connected. By taking a people-centred approach, the

key pillars under this focus area (Skills, Digital inclusion and Relevant / local content and services) seek to ensure that communities are digitally skilled and empowered to use digital technologies, content and e-government services safely, inclusive and equally.

The third focus area of the Action Framework relates to VALUE CREATION: Building digital ecosystems. This area covers the needs for adequate leadership to accelerate the digital transformation of societies through thriving local ecosystems, with an emphasis on relevant local content, services and digital businesses. The key pillars under this focus area (Digital innovation and entrepreneurship, Applications and services, and Digital economy) call for an inclusive whole-of-ecosystem approach that nurtures entrepreneurship, innovation, start-ups, SMEs, trade, and job creation, through collaborative policy and regulation practices supported by data.

Finally, through its fourth focus area, ACCELERATE: Incentivizing investments, the framework looks at innovative approaches to leverage existing and new forms of investment. The objective of this focus area is to structure innovative financing models and streams as well as adaptations to public policy and regulation to incentivize and facilitate public and private sector sustainable investment for financing meaningful access and affordable connectivity. The key issues to be addressed are grouped around three key pillars as well: Innovative financing, Project viability and Investor constellation.

As we strive to bring online the 2.9 billion people still offline and to improve the connectivity of those already online, setting goals and monitoring progress towards those are vital. P2C will rely on existing indicators and targets: the ICT-related targets in the UN Sustainable Development Goals (SDGs) framework; the targets of the ITU Connect 2030 Agenda; the affordability targets of the Broadband Commission for Sustainable Development; and the universal and meaningful

connectivity targets for 2030, to be announced by ITU and the Office of the UN Secretary-General's Envoy on Technology in Spring 2022. P2C efforts will contribute towards those targets.

The Focus Areas Action Framework presented here goes beyond the analysis of specific gaps. It also proposes some interventions and policies to fill those gaps. The Framework also outlines the overall structure under which pledges for the P2C Coalition can be made to mobilize resources and commitments. The examples of pledges provided in this Framework have been drafted based on existing language in ITU documents and resources and are intended to serve as an illustration of how pledges could be framed under the different Focus Areas and pillars.
The final section of the report provides an overview of the next steps for the Coalition including the Partner2Connect Digital Development Roundtable at WTDC, which will take place from June 7-9 in Kigali, Rwanda. It also highlights ITU's overall coordinating role in helping track and monitor the pledges submitted through the P2C's online Pledging Platform.

2 Focus Areas

2.1 Focus Area 1 – ACCESS: Connecting people everywhere

ITU estimates that in 2021, approximately 4.9 billion people were using the Internet.[1] That means roughly 63 per cent of the world's population is now online – an increase of 17 per cent since 2019 – with almost 800 million estimated to have come online since 2019. Internet penetration increased by more than 20 per cent on average in Africa, Asia-Pacific, and the UN-designated LDCs.

As the world collectively navigated through the COVID-19 pandemic, it became clear that connectivity is today an even greater priority. The pandemic exposed different types of inequalities within and across countries and regions, including those related to quality of access, affordability and use of the Internet. It also showed how under-prepared LDCs are for a digital world. Uneven connectivity within this group translates into many people and businesses not being able to avail themselves of high-speed networks for remote learning, access to e-government services and online trade.

2.1.1 A big gap to bridge

Although the numbers of people able to go online globally appear to have increased, when it comes to ICT access and usage of the Internet, digital poverty continues to be significant.

Coverage and usage

Approximately 37 per cent of the global population still remain offline[2] (i.e. not using ICT services such as data and voice, and/or not using the Internet). One of the key challenges to overcome is the wide gap in coverage (i.e. the geographical area covered by a service provider; within this area, the phone will be able to complete a call using the carrier's network or partner network[3]) and usage of ICTs to access online services. About 15 per cent of the population across

[1] ITU. (2021). Measuring digital development: Facts and figures 2021.

[2] ITU. (2021). Measuring digital development: facts and Figures 2021.

[3] GSMArena. (2022). Network coverage – definition.

developing countries still remains unconnected by a 4G network which is essential for a reasonable level of mobile broadband connectivity.[4]

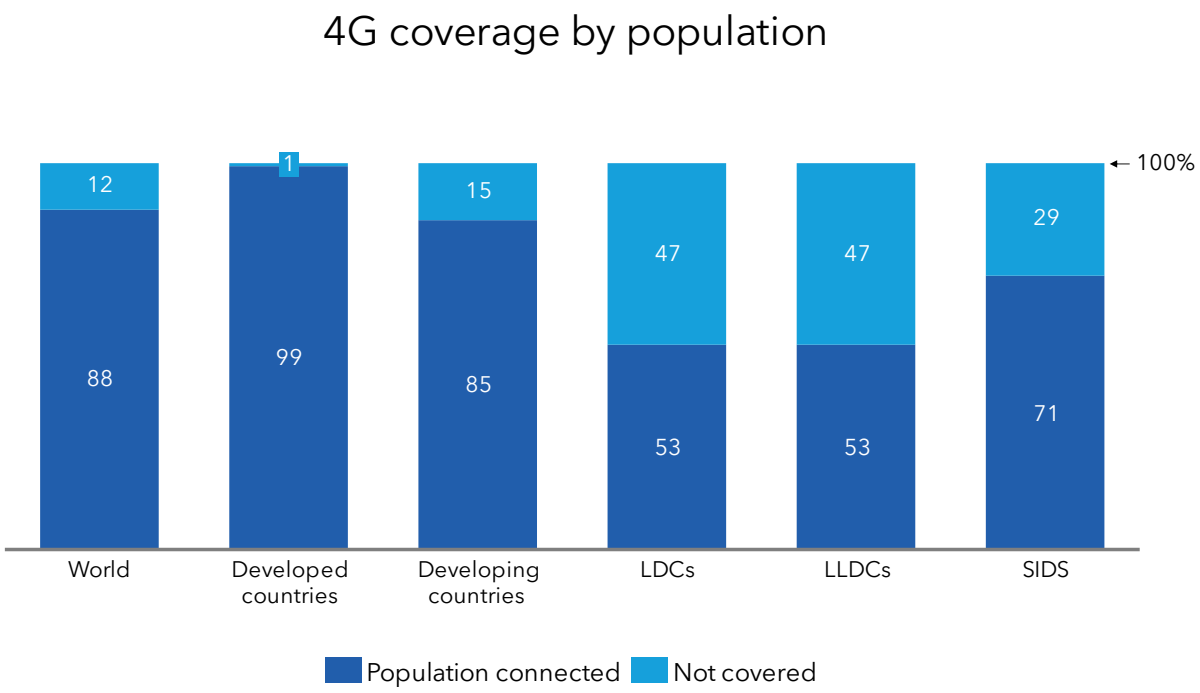


Figure 1: 4G coverage by population across regions[5]

As of 2020, in LDCs the coverage gap has been improving but 24 per cent of their population still remains uncovered. And for regions with coverage, the usage gap still remains close to 51 per cent. One of the biggest factors in this is affordability.

[4] ITU. (2021). Key ICT Indicators for Developed and Developing Countries, the World and Special Regions.

[5] ITU. (2021). Key ICT Indicators for Developed and Developing Countries, the World and Special Regions.

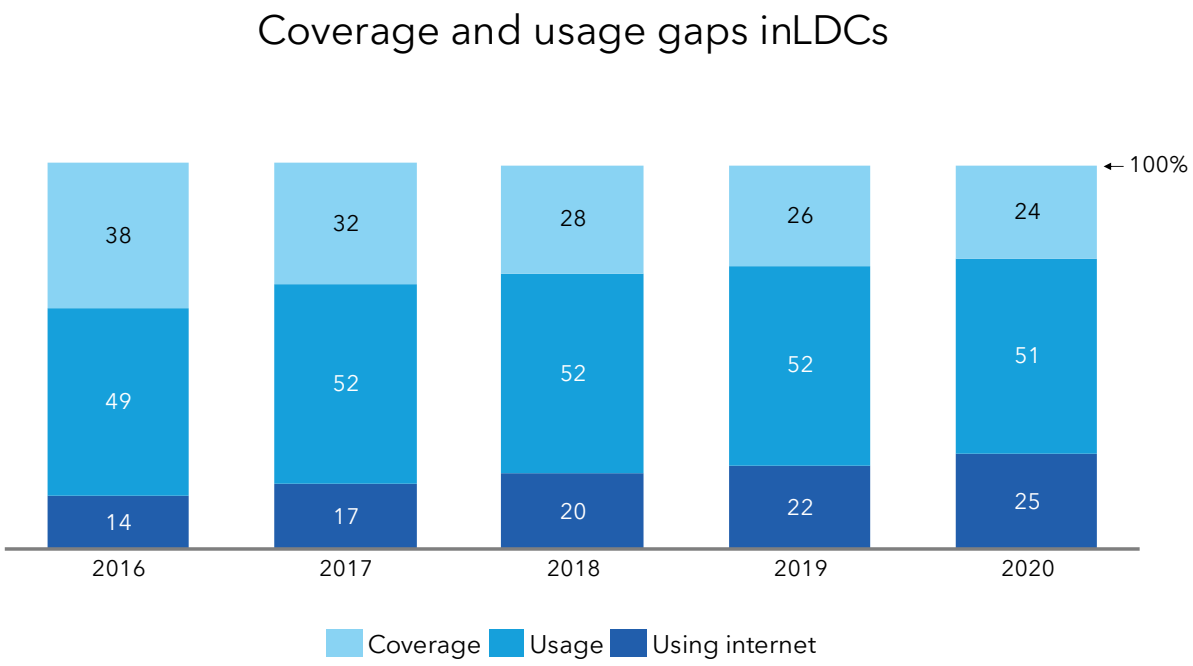


Figure 2: Internet coverage and usage gaps in LDCs[6]

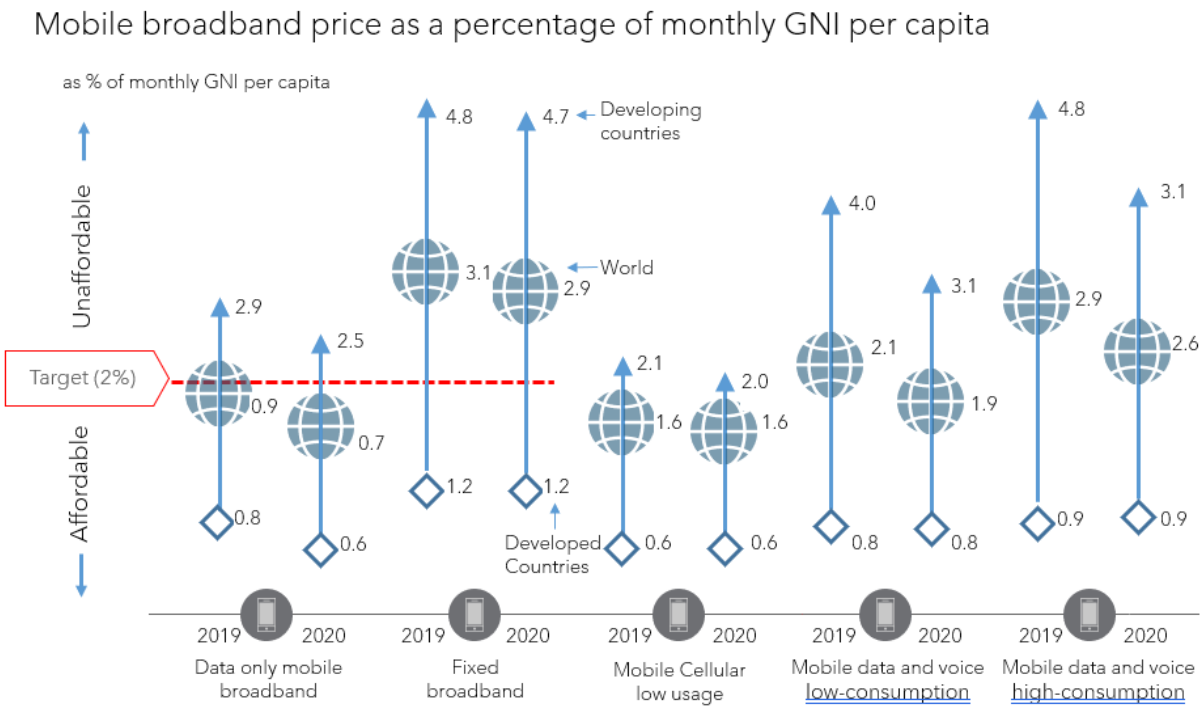
Affordability

In terms of measuring mobile broadband price as a percentage of monthly gross national income (GNI) per capita, the LDCs are lagging far behind (see Figure 3). ITU estimates that the actual pricing in LDCs is at 6.8 per cent of GNI (unweighted average), which is 4.8 points higher than the global affordability target of 2 per cent of GNI per capita.[7]

[6] ITU. (2021). Connectivity in the Least Developed Countries: Status report 2021.

Note: Percentages may not add up to 100 owing to rounding.

[7] Broadband Commission for Sustainable Development. (2018). Broadband Commission for Sustainable Development's 2025 Targets: "Connecting the Other Half".



Note: Median values for each basket are calculated based on the set of economies for which 2019 and 2020 data were available: 183 economies in the case of the data-only mobile broadband basket; 170 for the fixed broadband basket: 190 for the mobile cellular low-usage basket; and 179 and 182 respectively for the mobile data and voice low and high-usage basket.

Figure 3: Mobile broadband price as a percentage of the monthly GNI per capita[8]

Backbone infrastructure

Backbone fibre infrastructure is a key resource for increasing the penetration of broadband networks (mobile and fixed). A measure of the infrastructure deployment is the distance people live from the backbone. The farther away, the poorer the quality and connectivity. In LDCs, less than one-third of the population lives within 10 km of a national backbone, and this has been the case since 2016 (see Figure 4).

[8] ITU. (2020). Measuring digital development: ICT price trends.

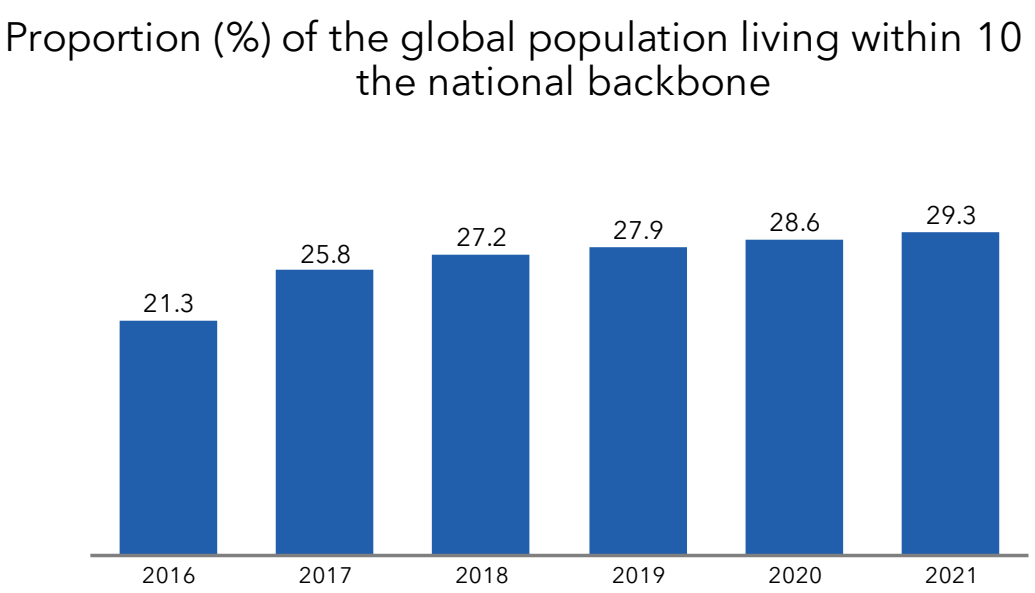


Figure 4: Proportion of the global population living within 10 km of the national backbone[9]

2.1.2 Three key pillars to address

The Focus Areas Action Framework is the result of a consultation process carried out with the Working Group participants and Focus Area Leaders of the P2C Digital Coalition. Out of this process, key pillars across each of the four focus areas were identified. The pillars will help categorize some of the key challenges that need to be addressed to bring 2.9 billion people meaningfully online.

[9] ITU. (2022) ITU Broadband Capacity Indicators.

Figure 5: Key pillars for ACCESS: Connecting people everywhere

Connectivity and digital infrastructure: Infrastructure – To be able to connect the target population of 2.9 billion people, one of the most critical aspects is to deploy the network infrastructure so that each part of the population is covered and able to start using the Internet and associated services. To achieve this, it is necessary to secure the following:

- Economic stimulus/support for ICT network (terrestrial and space-based) deployment
- Energy availability and security
- The use of multiple technologies (terrestrial and space-based) to overcome distance/geographical constraints (e.g. in SIDS)
- Spectrum allocation and management
- The involvement of a multitude of government agencies in the approval process
- Adequate infrastructure to provide meaningful connectivity (available, accessible, relevant and affordable, safe, trusted, user-empowering and leading to positive impacts)

Connectivity and digital infrastructure: Affordability – In most of the developing nations (including LDCs, LLDCs and SIDS), one of the biggest barriers in the proliferation of Internet use is the factor of affordability. Some of the key issues affecting the uptake of Internet and digital services are:

- The affordability of mobile/broadband data plans
- Prohibitive device costs (smartphones/computers)
- Device financing
- Reliability of services – communication and uninterrupted power supply

Cybersecurity – As people continue to be enabled with online access and services, the aspect of cybersecurity becomes increasingly important. There are multiple fundamental issues related to the cybersecurity set-up that need to be addressed:

- CIRT/CERT deployment
- Cybersecurity capacity – tools and metrics, training and skills gaps
- Cooperation at public/private levels, and bilateral or multilateral agreements
- Protection and resilience of critical infrastructure

The next three sub-sections explore these key pillars in further detail. Issues that are closely related or similar in nature are explored jointly. Sets of potential interventions to tackle these issues are also introduced, but are not exhaustive and only represent only a sample of ideas on how to address the ACCESS challenge. All stakeholders are encouraged to consider additional actions to help bring the remaining 2.9 billion people online.

2.1.2.1 Connectivity and digital infrastructure (Infrastructure)

ICT infrastructure remains one of the key things to focus on in order to bring everyone online by 2030. ICTs can help countries leapfrog chronic development impediments in areas from education and health to government services and trade. ICT services make businesses more efficient and productive, as they open the door to innovative services and applications that can fuel growth and trigger new opportunities.

ICT infrastructure is an essential component for a digital economy, as it comprises the facilities for transporting, exchanging, and storing data. There are significant gaps in national transmission networks, Internet exchange points (IXPs), and data centres. The coverage and density of national transmission networks are lagging in the developing nations. It is also important to have a streamlined network licensing process, and these are often lacking.

Key issue: Economic stimulus for deployment of ICT network (terrestrial and space-based)

From Figure 6 it is evident that African LDCs require more digital infrastructure, for both mobile connectivity and power.

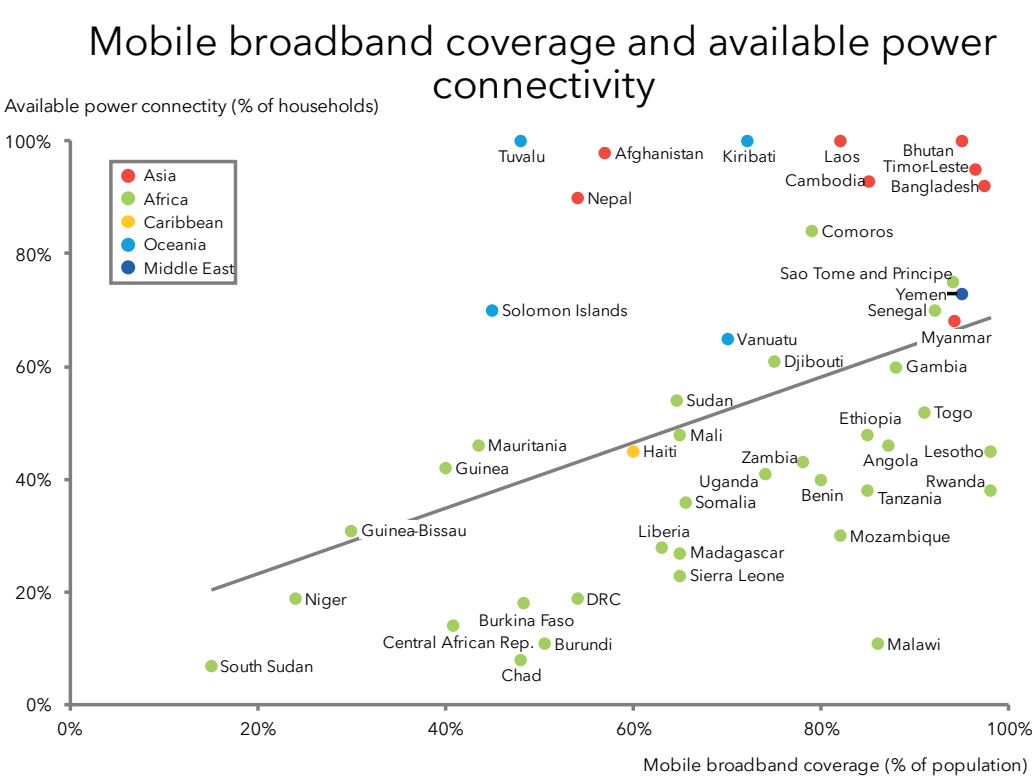


Figure 6: Mobile broadband coverage and available power connectivity in LDCs[10]

[10] ITU. (2021). Connectivity in the Least Developed Countries: Status report 2021.

The deployment of ICT networks in the LDCs and developing nations remains a challenge due to a multitude of factors including:

- High costs to deploy the network
- Small population/market size, making it difficult to exploit economies of scale
- Insufficient government policies and regulations, as well as weak overall stability

Potential interventions:

a. Active and passive infrastructure-sharing

Sharing network resources (wireline and wireless), backhaul, spectrum and fibre across sites brings in synergies and reduces network build costs. This can make the infrastructure deployment more economically viable. In many countries, regulatory bodies have given the go-ahead to communication service providers (CSPs) to engage in active and passive infrastructure-sharing. Similar regulatory measures would be especially beneficial in rural and remote areas. Furthermore, joint action by CSPs to implement the modalities stipulated in sharing agreements will further streamline the deployment of ICT networks.

Incentivizing passive infrastructure-sharing at the government level can be a key enabler and the CSPs can voluntarily engage in promoting this concept. National governments can provide technical assistance to municipalities and encourage the development and updating of local regulations that promote infrastructure-sharing, including simplified permitting processes for small cells and macro sites, and a radius of non-proliferation.

Spotlight[11]

Telefónica has struck deals in Brazil, Mexico and Peru, while CNT and Claro have signed an agreement in Ecuador. Infrastructure sharing helps to reduce unnecessary duplication of network infrastructure, saving costs and speeding up network roll-out.

[11] GSMA. (2021). Global Mobile trends 2021: Navigating Covid-19 and beyond.

Spotlight[12]

The **Inter-American Development Bank** published a document analysing the benefits derived from sharing as well as its regulatory and legal implications. The document presents potential models for implementing this strategy in Latin America and the Caribbean. According to the Bank, infrastructure-sharing has the greatest potential "to reduce the cost of deployments and thus make private sector investment in infrastructure-sharing viable, both among telecommunications operators and with operators of other infrastructure (electricity, roads, and gas, among others)".

b. Business case

A shift towards longer-term horizons on infrastructure investments by private players would enable greater financial returns. This would also allow CSPs to cover the offline, hard-to-reach geographies and last-mile gaps. Policies, subsidies, standard operating procedures (SOPs), universal service obligations (USOs), and best practices can help improve business cases. Other key aspects to consider are the social return and the contribution to sustainable development, which is becoming increasingly important.

Spotlight[13]

Indonesia's Ministry of Communication and Information Technology, via its USO agency (*Badan Aksesibilitas Telekomunikasi dan Informasi*), has a five-year agreement with Teleglobal and SES Networks to supply 150,000 sites in remote areas of the country with broadband Internet access and mobile backhaul services.

c. Faster and more economical deployment

Enabling the ecosystem to build faster and at a competitive price is fundamental to achieving universal connectivity. Another key enabler is the **availability of data** and the mapping of existing network infrastructure to identify white spaces and prioritize coverage; also important is the

[12] Inter-American Development Bank. (2020). Digital Transformation: Infrastructure Sharing in Latin America and the Caribbean.

[13] Telecom Asia. (2019). Indonesia's Teleglobal acquires capacity on SES-12.

sharing of information between the public and private entities to bring synergies in the effort to deploy ICT networks. Private parties or government agencies can ensure the availability of disaggregated data for creating national strategies and effective network deployment roll-out plans.

Spotlight

Why is broadband mapping key to universal connectivity? Watch the video and click on the ITU Interactive Maps to track connectivity around the world. The maps document over 20 million km of terrestrial networks. They support initiatives like Giga, a joint project by ITU and UNICEF to connect all the world's schools. Policy-makers, investors and network providers use broadband maps to make faster and more accurate decisions.

Spotlight[14]

As part of the WARCIP-Mauritania Project funded by the World Bank, the Mauritanian government has succeeded in building a national backbone of 1,700 km of optical fibre linking several regions of the country. This project was carried out through a public-private partnership.

Streamlining processes to facilitate wireless and wireline communication networks and making sufficient spectrum available for a wide array of ICT technologies (terrestrial and space-based) and services are all key actions to speed up deployment cost-effectively. It is imperative to note that global coverage, with an adequate quality of service, should be prioritized over speed to avoid broadening the digital divide. However, the network needs to align with what the government defines as the basic minimum broadband speed for each user.

d. Neutral passive infrastructure

Opening the passive infrastructure roll-out to neutral parties can be beneficial as it allows faster progress and enables competitive pricing of the infrastructure. This allows the deployment costs

[14] WARCIP Mauritanie. (2022). Project de Connectivité Nationale.

to then be optimized. The introduction of regulations to remove the barriers facing passive infrastructure providers, particularly in countries where state-owned operators are the only providers, is a way to unlock this leverage.

Spotlight[15]

Liquid Intelligent Technologies has deployed more than 100,000 km of backbone fibre in Africa. This group first installed fibre in 2009, and now owns the largest independent fibre network on the African continent. By expanding into the Democratic Republic of the Congo (DRC), Liquid introduced fibre to a population that only had access to expensive mobile broadband.

Spotlight[16]

UFINET is a neutral fibre-optic operator in the wholesale telecommunications market. They provide capacity services and connectivity through a fibre-optic network linking together Latin America, Mexico and the USA.

e. Community collaboration and deployments: Having the necessary licence and security aspects in place to allow public and private players to operate community Wi-Fi services may go a long way toward expanding the reach of Internet accessibility. This requires support from regulators to create a conducive environment, as well as private players who are willing to deploy the networks. In a community collaboration model, a community rolls out the last-mile network and takes responsibility for its maintenance. The network is usually composed of simplified small cells, and satellite-enabled cellular or Wi-Fi sites, which are relatively easy to activate and maintain. Community involvement in the deployment and maintenance of the network results in lower costs for the operator, thus increasing their willingness to set up networks in rural areas. In an alternative version of this model, governments can allow an operator to count community networks towards its coverage obligations, and in exchange, the operator can provide backhaul at a reduced cost.

[15] Connecting Africa. (2021). Liquid Intelligent Technologies surpasses 100,000km of fiber.

[16] Crunchbase. (2022). Ufinet.

Spotlight[17]

The BharatNet Scheme 2022, launched by the **Indian Government,** is the world's largest rural broadband connectivity project. It aims to equip 250,000 *Gram Panchayats* (village councils) and 600,000 villages with high-speed digital connectivity at affordable prices. The councils run Wi-Fi networks to provide Internet to the local community.

Spotlight[18]

Zenzeleni Networks is a Wi-Fi-based ISP in South Africa that provides affordable voice and data services. (*Zenzeleni* means 'do it yourself' in Xhosa.) Its networks are managed by people in the local community, and customers can use Wi-Fi-enabled devices to access its services. It has provided Internet access over a 30 km radius in the Mankosi community and is on track to connect 300,000 people in up to 30 villages in the region.

[17] Bharat Broadband Network Limited. (2022). BharatNet.

[18] Association for Progressive Communications. (2020). Zenzeleni Networks NPC.

Key issue: Energy availability

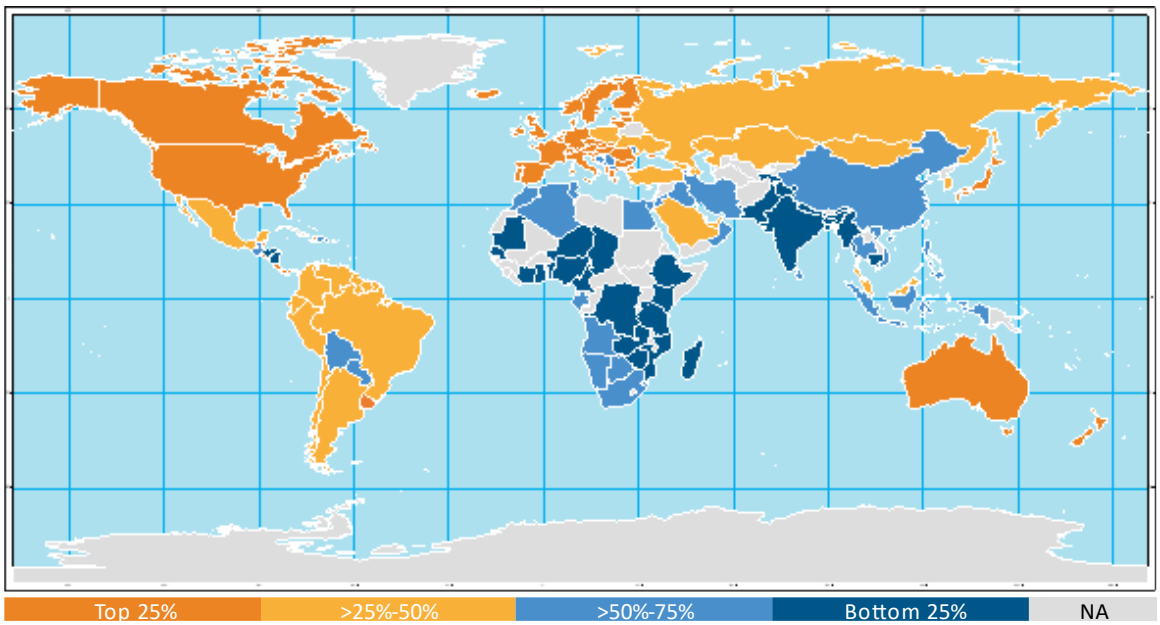


Figure 7: Global map ranking countries based on energy availability[19]

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As shown in Figure 7, most developing nations find it difficult to meet current and future energy demands and provide universal access to reliable and affordable energy for domestic and commercial use.

According to the World Energy Trilemma Index 2021 Report, most African nations lag considerably behind the rest of the world in terms of energy equity (the ability to provide reliable, affordable and abundant energy) and energy security (the ability to meet current and future demands for energy). Africa has a score of 46 out of 100 for security and 26 out of 100 for equity. Asia fares better, with an energy security score of 58 out of 100 and an equity score of 68 out of 100. This poses a massive challenge when it comes to the large-scale deployment of ICT infrastructure and people's ability to use relevant digital devices.

[19] World Energy Council. (2021). World Energy Trilemma Index 2021 Report.

Potential interventions:

a. Reliable and sustainable energy

Reliable and sustainable energy interventions are imperative in meeting the need for expanding ICT infrastructure. Governments are investing in increasing the energy index, which measures on one hand the energy equity to ensure universal, reliable, affordable and abundant access; and on the other hand, the energy security to meet current and future demands. Simultaneously, they can leverage the ICT infrastructure to meet some of the demand. Tower companies can be encouraged with attractive policies and subsidies to use renewable energy sources (e.g. solar) and offer power to communities, increasing their energy access and security.

Spotlight[20]

Internet *Para Todos* (IPT), a broadband-focused rural towerco in Latin America, aims to establish 3,600 solar-powered small cell sites to achieve last-mile mobile connectivity across Peru. The solar hybrid systems are deployed using four models: capex, opex, energy savings as a service, and energy efficiency service.

Spotlight[21]

Airtel, India's premier communication intervention provider, recently commissioned a captive 21MW solar power plant in partnership with Avaada. The plant will supply clean energy to Nxtra (Airtel's service arm for its edge data centre).

[20] GSMA. (2020). Renewable Energy for Mobile Towers: Opportunities for low- and middle-income countries.

[21] PV Magazine. (2022). Avaada commissions 21 MW captive solar panel plant for Airtel.

b. Micro-energy grids

Micro-grids as self-sufficient energy systems may potentially provide a solution to low electrification rates across the developing nations including the LDCs, LLDCs and SIDS. A micro-grid is "a local energy grid with control capability" that can work autonomously to both produce power and supply it to remote communities.[22] Small and often isolated, micro-grids have the ability to easily harness renewable energy sources and could constitute at least part of the answer to the electrification problems. The autonomy of micro-grids means that they avoid some of the negative aspects of larger power grids, such as rolling blackouts. In many developing nations, governments are eagerly implementing micro-grid technology in areas without pre-existing infrastructure.

Spotlight[23]

Energicity builds, owns and operates solar-powered micro-grids for off-grid communities with more than 100 households. These micro-grids provide 24-hour electricity to communities using solar and battery storage. The company distributes AC electricity to its end customers metered at each individual household. Energicity's electricity is affordable, reliable and scalable. Those micro-grids serving rural communities operate through subsidiaries in Ghana Sierra Leone and Nigeria, and currently serve 36 communities and 23,000 people.

Key issue: Use of multiple technologies

One of the key issues in expanding the coverage of high-speed connectivity across different geographies has been the dependence on expensive traditional technologies. The deployment of these technologies is capex-intense and highly time-consuming. New promising technologies can become key enablers, especially for geographies where expanding connectivity to hard-to-reach areas, like extremely rural areas or islands (SIDS), remains logistically and financially unviable.

[22] The Borgen Project. (2020). Microgrid Technology in African Countries.

[23] Tech Crunch. (2020). Could developing renewable energy micro-grids make Energicity Africa's utility of the future?

Potential intervention: Choosing the most effective technological intervention

While last-mile mobile and fibre networks will continue to be the mainstay of ICT network deployment, space-based technologies are now part of the mainstream. Satellite broadband communication is becoming a major enabler of providing connectivity and Internet services. Many private players are launching satellites in geostationary satellite orbit (GSO) and non-geostationary satellite orbit (NGSO) segments. Going forward, it will be important to integrate mixed-technology landscapes in national strategies/plans, streamline the licensing procedure for satellite broadband spectrum availability, and make policy changes to foster growth.

Satellite connectivity is cost-competitive for remote and dispersed populations where fibre deployments are challenging. The new generation of LEO and high-throughput GEO satellites are likely to lower the cost structure even further. Satellite users are expected to multiply 2.5 times by 2029, and 90 per cent of these new users will be in emerging regions.[24]

> "Satellite communications are everywhere but all too often remain invisible to the general public."
>
> *- Mario Maneiewicz (Director, ITU Radiocommunications Bureau)*

Combining satellite broadband communication with other technologies has the potential to solve some of these issues; however, but it is not yet being deployed on a large scale. Satellite connectivity along with terrestrial networks can enable the development of an extensive gateway infrastructure which can then act as a hub for providing multiple services like community Wi-Fi and MSME connectivity.

[24] Buchs, D. (2021). Market Overview – Satcom for Universal Broadband Access.

Spotlight[25]

Schools in Kenya are being connected with 100% coverage by **iMlango** through **Avanti's** satellites. iMlango is also providing the schools with a learning platform and interventions. To date, 180,000 children have benefited from this.

Spotlight[26]

With customers relying on their mobile network for their very livelihood, Tigo Tchad required a partner who could quickly refurbish 40 of their cell sites and establish an in-country teleport with limited downtime. **SES** completed the upgrades and teleport construction in less than four months, despite the physical challenges involved. This intervention utilizes SES's GEO capacity for ease of deployment and broad coverage of all locations.

Spotlight[27]

Orange Mali selected **Intelsat** to bring 3G and 4G connectivity to hard-to-reach areas in Mali, the eighth-largest country in Africa. Mali has a population of just over 20 million people.

[25] Avanti. (2018). Project IMlango.

[26] SES. (2019). Tigo Tchad.

[27] Via Satellite. (2022). Orange Mali Taps Intelsat for 3G and 4G Connectivity.

Key issue: Spectrum availability and management

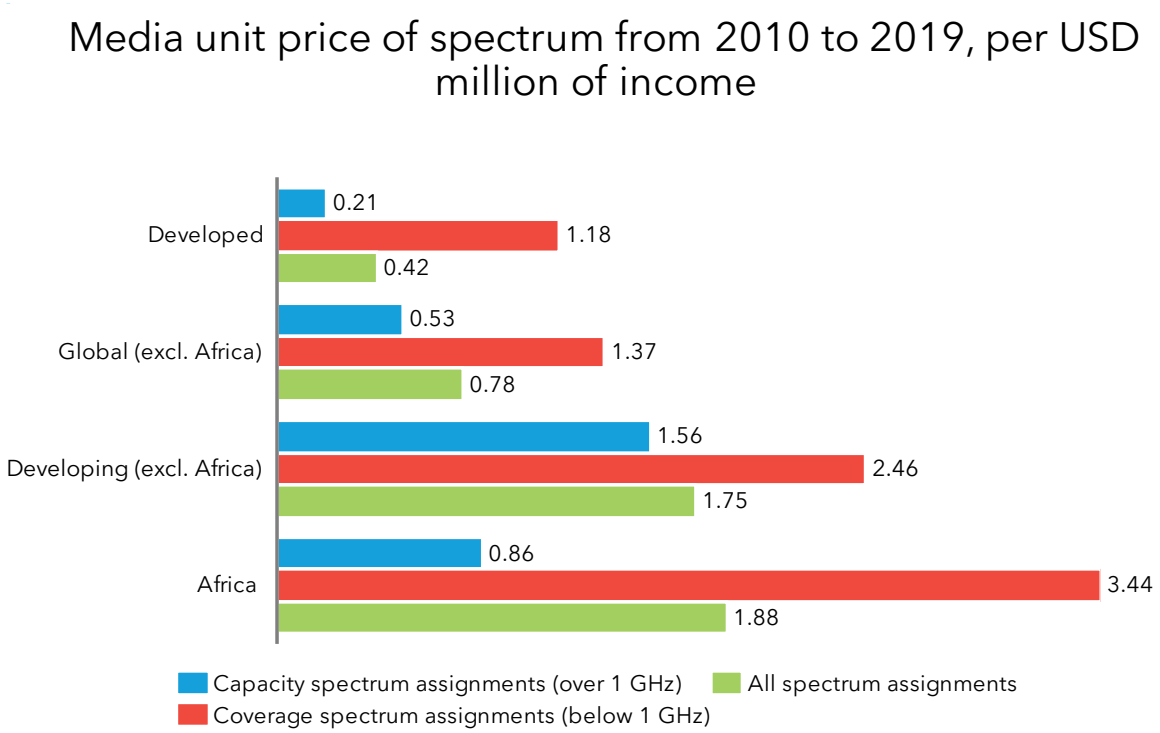

Figure 8: Median price of spectrum from 2010 to 2019, per USD million of income: World vs Africa[28]

The availability of spectrum undergoes a cumbersome process of identification, clearance, technology definition and restrictions, valuation, and awarding. Each country has its own set of challenges and issues across each of these categories. Some of the key challenges with spectrum management include:

- reserve prices that may be well above market valuation;
- a scarcity of, or unclear policy on, spectrum availability; and
- the awarding mechanism being too lengthy, complicated or inappropriate.

[28] GSMA. (2021). Spectrum pricing and licensing in Africa – driving mobile broadband.

Potential intervention: Spectrum allocation

Spectrum is a key but scarce resource needed for the deployment of ICT services. It is essential that proactive steps are taken to enable the objectivity of universal connectivity, particularly with regard to spectrum. Effective spectrum management has a direct bearing on the quality and affordability of mobile services. Management activities that can be undertaken include:

- allocating a sufficient amount of internationally harmonized spectrum for IMT;
- ensuring that there is a balance in allocations between licensed, license-exempt, and satellite IMT; and
- working through the ITU Radiocommunication Sector to ensure that there are appropriate rules to mitigate interference while minimizing constraints on the deployment of services.

Spotlight[29]

The African Telecommunications Union (ATU, a specialised agency of the African Union) and key industry players developed a set of policy recommendations to improve access to information infrastructure and services. These recommendations included spectrum licensing, spectrum evolution, spectrum management, and emerging radiocommunication technologies.

Spotlight[30]

Spectrum allocation is one of the outcomes of the PRIDA project which is being implemented by **ITU-BDT in Africa**. This project, funded by the EU and ITU, is about understanding international spectrum pricing, defining roadmaps for current and future spectrum needs, outlining realistic coverage and quality guidelines, and unlocking unlicensed spectrum to enable future technologies. These are all key actions for better utilizing spectrum.

[29] African Telecommunications Union. (2021). ATU-R Recommendation: Relating to Spectrum Licensing for Mobile/Broadband Systems.

[30] ITU. (2022). Policy and Regulation Initiative for Digital Africa (PRIDA).

Key issue: Availability of adequate infrastructure to provide meaningful connectivity

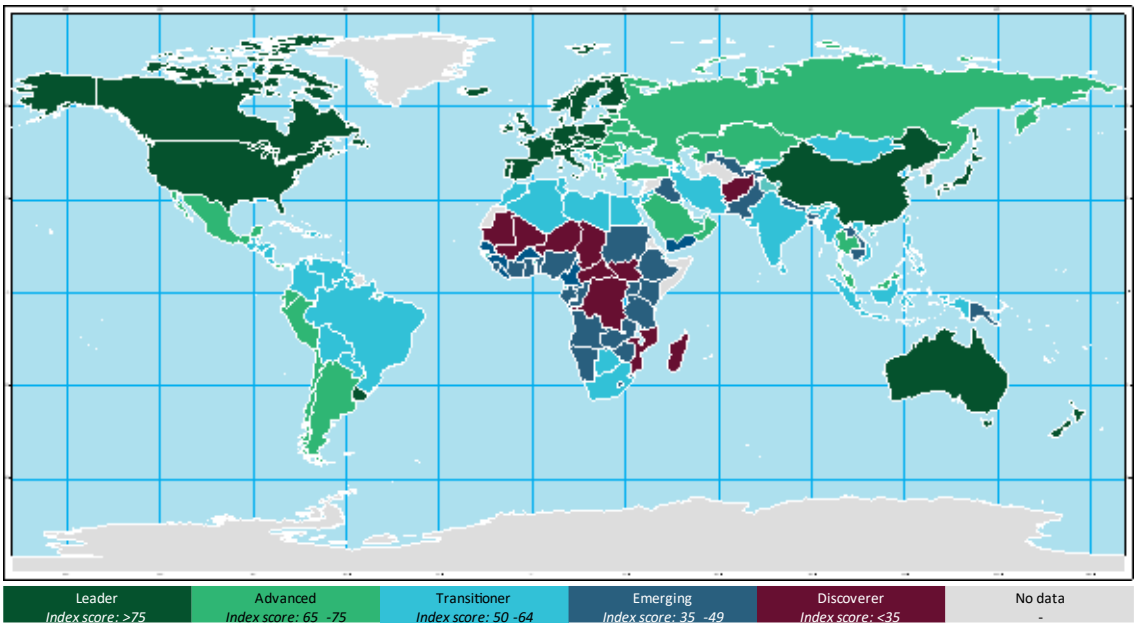

Figure 9: Mobile connectivity categorization[31]

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On one end, the challenge is that a large portion of the population still remain unserved by the ICT infrastructure; however, for people who are covered, a key dimension to having connectivity is for it to be "available for everyday use, accessible and fast, relevant with enough data, affordable, safe, trusted, user-empowering and leading to positive impact".[32] In Figure 9, countries are grouped based on the advancement of key enablers for mobile Internet adoption, which includes infrastructure, affordability, consumer readiness, and content and services. The meaningfulness of connectivity is considered in section 2.2 with a special focus on LDCs.

[31] GSMA. (2019). Mobile Connectivity Index.

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[32] A4AI, GSMA and ITU definition

Potential intervention: Policy, legal and regulatory measures

Policies and regulations stipulating key criteria (e.g. minimum speeds to qualify as broadband, basic standards for safe and trusted connections and user empowerment, and pricing control for devices) are required to outline an avenue for "meaningful connectivity". These need to be aligned with national digital strategies and roadmaps defined by governments. To successfully implement both policies and strategies as well as ease approval processes and decision-making, strong inter-departmental coordination by governments and in the public-private partnership (PPP) environment is imperative. In addition, adapting public financial instruments to new business models of ICT (e.g. cloudification) will be an important enabler. It is also critical to consider that while general principles may be similar, there is no fit-for-all intervention. The approaches and interventions must be tailored to the specific country's needs and reality on the ground.

Spotlight[33]

To support countries with ensuring that their populations have meaningful connectivity, the **Alliance for Affordable Internet** (A4AI) launched the Meaningful Connectivity targets and detailed policies informed by their research, analysis and multistakeholder consultations.

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[33] A4AI. (2022). Meaningful Connectivity – unlocking the full power of internet access.

2.1.2.2 Connectivity and digital infrastructure (Affordability)

One of the key components of affordability for mobile Internet is related to data bundles. The UN Broadband Commission has set a target to make entry-level data services less than 2 per cent of monthly GNI per capita by 2025.

Another major component is the affordability of Internet-enabled devices. In this context, it is important to consider the affordability of the cheapest such device (whether a smartphone or feature phone), measured as the cost relative to monthly income per capita. Despite improvements in affordability, the cost of a device will remain a barrier for many of the people who are offline, particularly those on the lowest incomes. For many potential users, even a phone priced at USD 20 represents a significant one-off cost. In sub-Saharan Africa, for example, the median cost of an entry-level Internet-enabled handset amounted to more than 120 per cent of monthly income for the poorest 20 per cent of the population in 2019.[34]

Key issue: Broadband plans

The affordability indicator is the monthly price of broadband plans as percentage of GNI per capita. The target set by the Broadband Commission for Sustainable Development is for this to be less than 2 per cent of GNI per capita by 2025. At the time of writing, mobile broadband plans are priced at a level that is well above the aspirational target, especially in the LDCs.

[34] GSMA. (2020). The State of Mobile Internet Connectivity 2020.

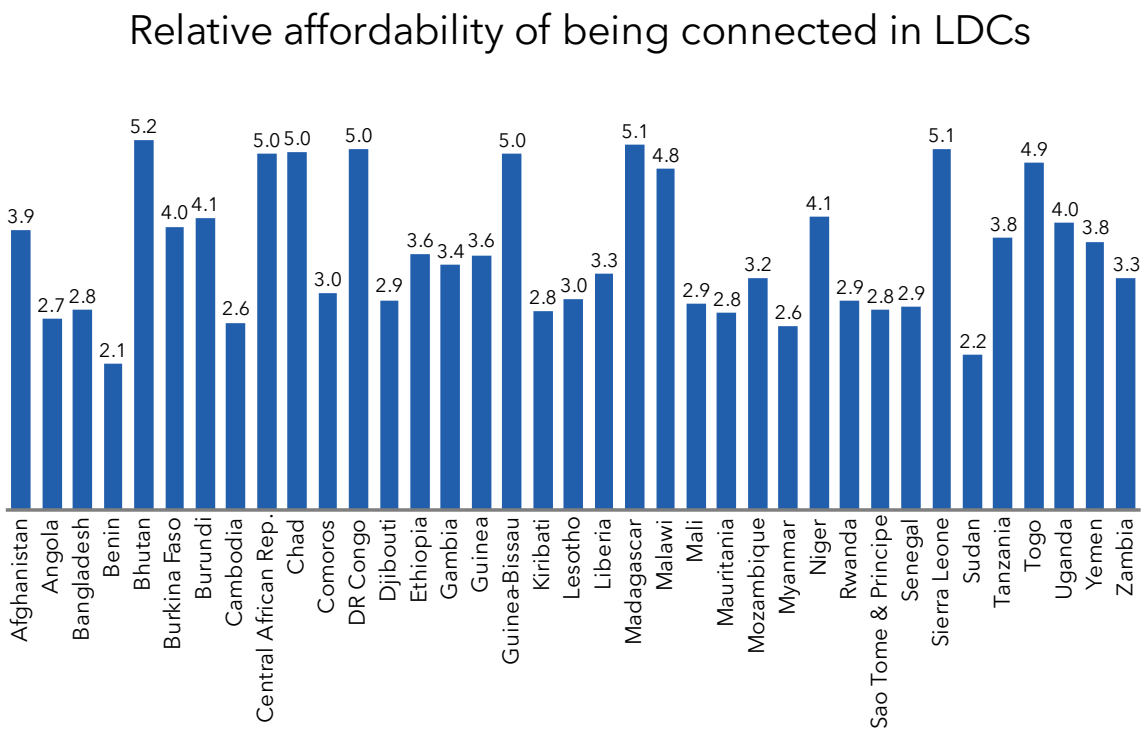

Figure 10: Relative affordability of being connected in LDCs, based on the cost of 1.5GB of data and the average affordability of a smartphone[35]

Potential intervention: Broadband (mobile/fixed) plans

As the objective is to bring people online, it will be very important to ensure that the data plans being offered are aligned with the economic conditions of the target population. Affordable mobile broadband translates into increased Internet usage. Introducing affordable and innovative data packages and leveraging mechanisms to keep prices in affordable ranges are a few ways to attract people who are offline. It is also helpful to focus on services that are relevant for the local population.

[35] The Economist Intelligence Unit. (2021). The Inclusive Internet Index.

Spotlight[36]

Vodacom offers a "data-sharing wallet" in the DRC that enables a group of customers to buy mobile data in bulk at an affordable price of about R2,200 for 100GB.

Key issue: Device costs

One of the key tenets of meaningful connectivity is providing people with access to the right device at an affordable price. However, this remains one of the key barriers for people who are otherwise willing to connect to the Internet and/or in a position to use digital services.

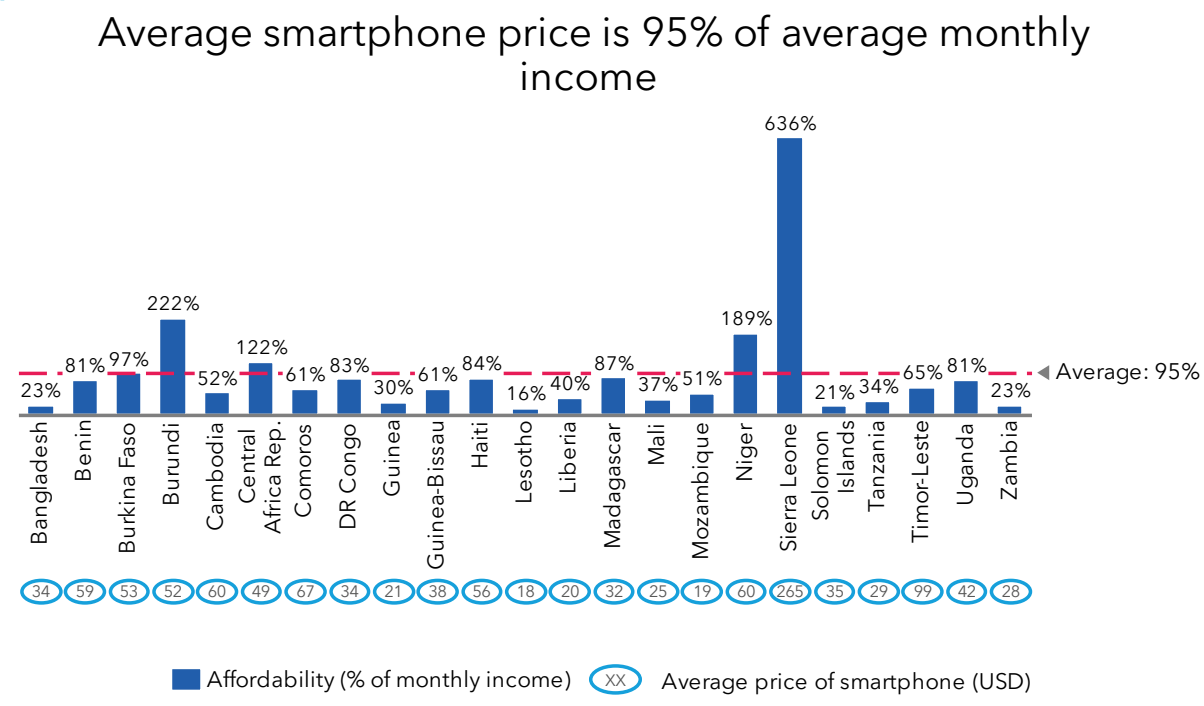

Figure 11: Affordability (as a percentage of monthly income) and average price (USD) of smartphones in LDCs[37]

[36] Vodacom. (2020). Vodacom SDG Report 2020.

[37] ITU. (2021). Connectivity in the Least Developed Countries: Status Report 2021.

Smartphone prices remain high in LDCs, hampering Internet take-up. According to research on smartphone prices conducted in over 180 countries, the LDCs have the least affordable devices at 53 per cent of the average monthly income.[38] Similarly, in sub-Saharan Africa, devices are 45 per cent of monthly income, and in South Asia, 40 per cent. Contrastingly, in Europe, Central Asia, East Asia, the Pacific, the Middle East and North Africa, they are merely 23-24 per cent. Latin American and the Caribbean spend approximately 10 per cent of their monthly income on devices. Most impressive is North America where devices are a mere 2 per cent of monthly income.

Satellite user terminals remain expensive but as adoption is increasing, the price factor is also seeing a major shift. In the current state, satellite user terminals remain expensive but as the adoption is on the increasing trend, the deployment model and the price factor are also seeing major shift. The most relevant model of satellite broadband connectivity is by connecting a hub either of a private player or a CSP for example and then these players use the satellite broadband backhaul to provide data connectivity. This model helps standardize the terminal cost and the end user is not burdened with high-cost devices.

Potential intervention:

a. Device ownership / financing

During the past few years, many consumers in LMICs who could not afford to purchase a mobile phone or Internet-enabled device with a single upfront payment have benefited from asset financing models (such as payment instalment plans, subsidies, loans, leases or rentals). Operators are also innovating with alternative credit-scoring models. Several operators and third-party providers (such as pay-as-you-go utility companies) have launched such initiatives.

b. Taxation / duties

It may be worthwhile to reduce customs duties for the ICT sector, especially for handsets/devices (hardware and software), and review tax policies in the sector to encourage investment and promote the adoption of the ICT services.

[38] A4AI. (2021). Device Pricing 2021.

Spotlight[39]

NuovoPay (an Indian company) offers a technology platform that targets consumers who do not have access to traditional financial assistance. It gives them access to smartphones while reducing the risk of telecommunications companies losing the customer from their core business. Operators lease their devices and through NuovoPay, they are able to lock the device remotely when the consumer defaults on payments.

Spotlight[40]

In 2019, **KaiOS Technologies** also started partnering with mobile operators to introduce smart-feature phones in several sub-Saharan African markets. This included Vodacom's Smart Kitochi 4G phone in Tanzania, the Orange 4G Sanza in Botswana, the MTN Kamunye in Uganda and Telma Wi-Kif + 4G in Madagascar (all priced at or close to USD 20). The emergence of KaiOS and its partnerships with operators across Africa are helping to remove the affordability barrier for low-income users.

Key issue: Service reliability

In many countries the reliability of ICT services is a major challenge. Ensuring continuous and stable connectivity remains a fundamental requirement; however, there are multiple factors that can cause difficulties with this, including:

- the extreme remoteness of some areas;
- limited access on some islands;
- poor network construction (making it problematic to manage cost); and
- the quality of power connectivity, especially in remote areas.

[39] NuovoPay. (2022). Smartphone leasing for Telecos with NuovoPay.

[40] KaiOS. (2021). Internet for everyone.

Potential intervention: Network diversity

The prime impetus will come from allowing telecom operators (private or public) to be able to build sufficient resiliency into the network design to overcome challenges. The policy and regulatory support to invest large amounts of capex is a key aspect of this. The government can be one of the enablers by investing in the infrastructure, laying a fibre network across the country, and allowing third parties to lease resources from the network or making policy changes to allow neutral infrastructure providers to be able to create and lease the required network resiliency.

Spotlight[41]

The **Palapa Ring project** in Indonesia was initiated by the government to build a national infrastructure connecting seven of the archipelago's island groupings. The effect of this project has been a significant improvement in mobile services. It has also enabled the operators to build resiliency into their own networks for better service continuity.

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2.1.2.3 Cybersecurity

As people come online, will they be secure? Cybersecurity is a fundamental element of universal access to meaningful connectivity, allowing people to safely come online to carry out critical day-to-day functions. Because cybersecurity has a broad field of application, cutting across many industries and various sectors, ITU's global cybersecurity index displays each country's level of development or engagement in this issue, assessed along five pillars – (i) legal measures, (ii) technical measures, (iii) organizational measures, (iv) capacity development, and (v) cooperation

[41] Opensignal. (2020). Palapa Ring has successfully improved mobile connectivity in remote Indonesian islands.

– and then aggregated into an overall score. As Figure 12 illustrates, although some LDCs are making progress in responding to cybersecurity challenges, the majority rank poorly in this area.

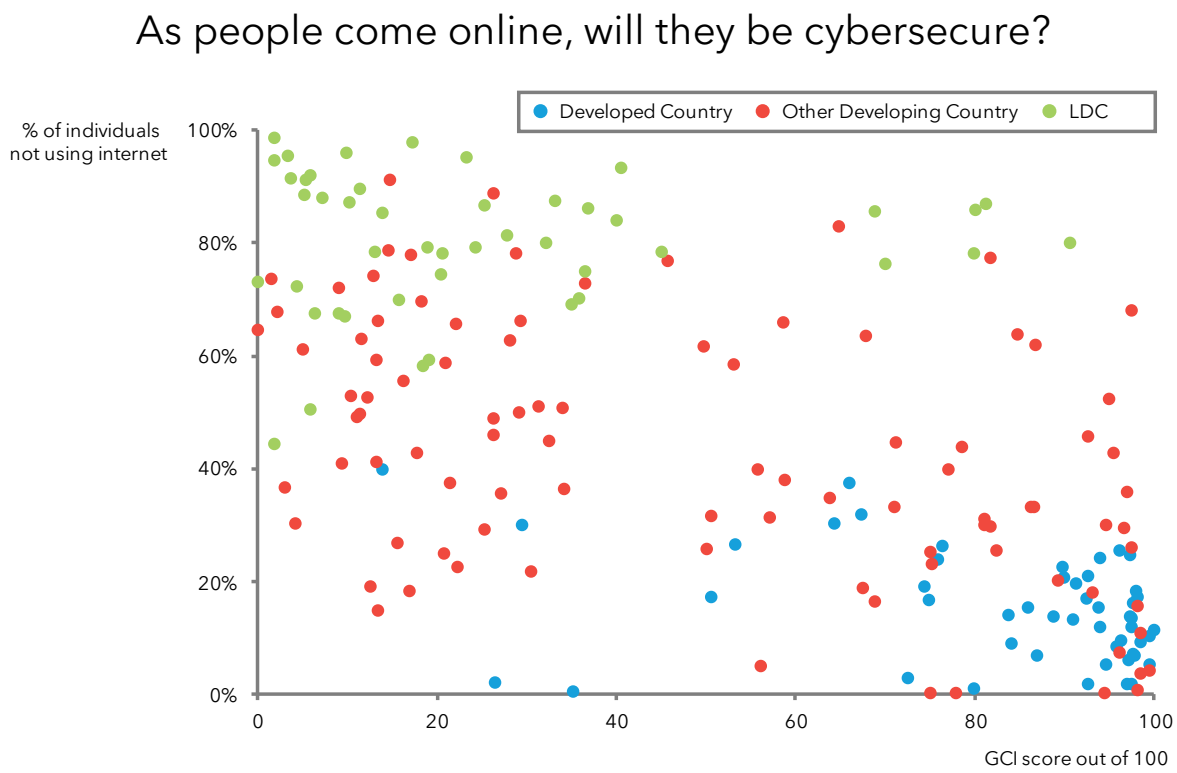

Figure 12: Global cybersecurity index 2020/21[42]

Many challenges today erode online trust and prevent the digital society from operating at its full potential. Global losses due to cybercrime are estimated to range from USD 1 trillion[43] to as high as 6 trillion[44].

Activating legal and regulatory frameworks to address this problem includes establishing legislation that identifies what constitutes illicit activities in cyberspace; defining the necessary procedural tools to enforce such legislation through investigations and prosecutions;

[42] ITU. (2021). Global Cybersecurity Index 2020/2021 Report Release.

[43] Smith, Z. M., Lostri, E., & Lewis, J. A. (2020). The Hidden Costs of Cybercrime.

[44] Cybercrime Magazine. (2020). Cybercrime To Cost The World $10.5 Trillion Annually By 2025.

determining cybersecurity baselines and compliance mechanisms for a set of national stakeholders; and devising procedures to ensure consistency with international obligations.

Why is cybersecurity in Focus Area 1?

The requirement to look at the implications of cyberthreats remains valid for all four of the focus areas. However, the reason for keeping cybersecurity as a pillar in Focus Area 1, 'ACCESS: Connecting people everywhere', is to highlight some of the key areas from a deployment perspective and look at the safety and resiliency of the critical infrastructure from a national perspective. To cover further aspects of cyberthreats and associated cybersecurity elements, each of the other focus areas includes applicable key points and prospective approaches for handling the requirements.

Key issue: CIRT/CERT deployments

Effective mechanisms and institutional structures at the national level are necessary to deal with cyber risks and incidents reliably. Computer incident response teams (CIRTs) or computer emergency response teams (CERTs) enable countries to respond to incidents using a centralized contact point and promote quick and systematic action, empowering governments to learn from experience and build their cybersecurity resilience.

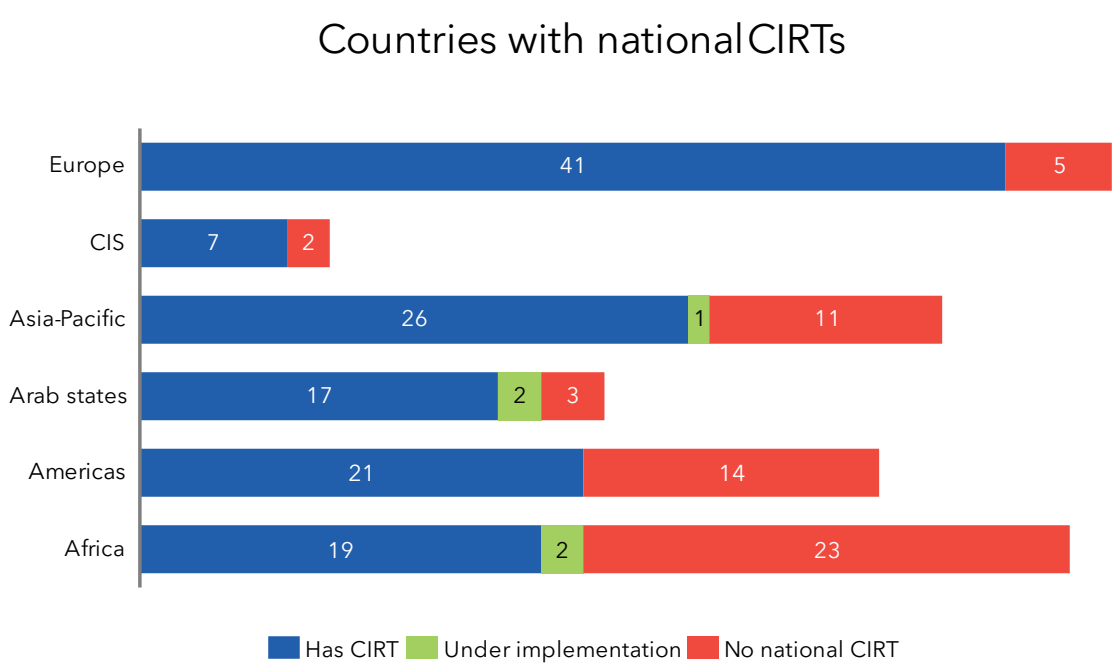

Figure 13: Number of countries with national CIRTs across regions in 2020[45]

Potential interventions: CIRTs/CERTs

CIRTs or CERTs enable responses to incidents at the national level. These teams should be developed and implemented by the government, although private parties can be engaged in the process of setting them up. In addition, sector-specific CIRTs should be established, e.g. for health service providers or law enforcement.

Key issue: Cybersecurity capacity – tools and metrics, training and skills gap

It is increasingly important to provide training programmes in cybersecurity to address the needs of various sectors. Cybersecurity analysts predicted that there were between 3.5 million and 4 million[46] cybersecurity jobs left unfilled globally in 2021. Despite this projected gap, a significant number of countries are yet to develop sector-specific training, and over 50 per cent of countries lack programmes tailored towards specific sectors or professions such as legal actors, MSMEs, private companies, and government officials. The lack of affordable software licences for security and productivity software, tools, and technologies must also be addressed.

Potential interventions:

[45] ITU. (2021). Global Cybersecurity Index 2020.

[46] New York Times. (2018). The mad dash to find a cybersecurity force.

a. Cybersecurity capacity and expertise

Securing the cyber domain by building cybersecurity capacity and expertise is another key activity. Cybersecurity professionals can advance this knowledge through sector-specific educational programmes and training. Primary and secondary school curricula should include cybersecurity courses to equip children and youth with the fundamentals to navigate digital technologies safely. Improving public awareness of cybersecurity essentials in different industries and across all groups of society is vital. Countries can promote cybersecurity in the private sector by including standards for it in contracts or through incentive mechanisms such as tax holidays or discounts based on cybersecurity parameters. These will encourage private sector actors to prioritize cybersecurity within their operational structures and processes, which in turn will improve a country's cybersecurity posture in the short, medium, and long term.

b. Cooperative approach

Cybersecurity remains a transnational issue due to the increasing interconnection and correlated infrastructures. The security of the global cyber-ecosystem cannot be guaranteed or managed by any single stakeholder. National, regional, and international cooperation are required to extend the reach and impact of cybersecurity. There is a need to have bilateral or multilateral cooperation and PPPs, and most of the LDCs lack these fundamentals. According to ITU's global cybersecurity index (GCI), in Africa, only 20 countries have either signed or are in the process of entering into multilateral cybersecurity agreements.[47]

c. Multisector and multilateral harmonization

Cybersecurity risks are borderless and independent of sector or industry due to ever-increasing interconnections and correlated infrastructure. Collaboration helps the harmonization of security measures across the board. Both bilateral and multilateral agreements are crucial in codifying norms and behaviours as well as enhancing international cooperation on cybersecurity. PPPs can facilitate the exchange and implementation of actionable intelligence and good practice. To continue building on the global standards and keep up to date with new developments, stakeholders should host and engage in international activities like cybersecurity conferences, workshops, partnerships and conventions.

[47] ITU. (2021). Global Cybersecurity Index 2020.

Key issue: Protection and resilience of critical infrastructure

Critical infrastructure such as ICT networks, electrical grids, water purification plants, and transportation systems continue to face cybersecurity risks, and ensuring the continuity of operations at the national level is an ongoing challenge for countries. The consequences of an incident impacting critical infrastructure are potentially devastating, and national cybersecurity postures should result in greater attention to risk management efforts intended to reduce the likelihood and escalation of a high-consequence event. As an example, in Africa, only 10 countries have a strategy that addresses both critical infrastructure and resiliency.[48] More governments are in the process of defining such strategies, but many others do not address these elements.

Potential intervention:

a. Cybersecurity strategy:

The national cybersecurity position and current practices need to be studied to capture the status of the measures and policies that are in place. This will include an analysis and assessment of the existing cybersecurity risk landscape and the strengths and weakness in the critical national infrastructure. Thereafter, an incident protocol should be set up to monitor and coordinate the responses to any national cyberattacks or threats. In addition, response models aligned to sector-specific requirements (e.g. cyberterrorism against airports or threats to the ICT sector from penetration or denial of service) should be developed and continuously improved.

b. ICT network resilience and recovery following disasters

Disaster-resilient ICT infrastructure can save lives and reduce loss and damage. Extreme weather events, earthquakes, tsunamis, and pandemics, as well as oil spills and other human-made hazards, pose continued challenges to countries and communities. ICTs are crucial for monitoring the environment, analysing information, delivering early warnings, and facilitating the timely flow of vital information in the aftermath of disasters.

[48] ITU. (2021). Global Cybersecurity Index 2020.

Spotlight[49]

The availability of data on network presence and operational status has helped first responders to quickly coordinate actions on the ground. The ITU Disaster Connectivity Map delivers near-real-time information on connectivity gaps and supports decision-making by first responders about where telecommunication network services need to be restored.

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2.2 Focus Area 2 – ADOPTION: Empowering communities

Digital technologies, if leveraged correctly and positively, can be one of the core enablers of a new social contract; however, they have mostly accelerated inequalities. Universal access to the Internet and ICT/digital accessibility can help the world rapidly recover much of the ground that has been lost due to the COVID-19 pandemic, setting up a path towards a brighter, more resilient and inclusive future.

ICTs and the Internet have the potential to improve people's lives quickly and radically but also to harm and control people. They underpin access to information and knowledge, simplify the delivery of essential services, and enable social and economic participation. On the other hand, digital technology can drive Internet addiction, cause alienation, disseminate discriminatory beliefs and false information, exacerbate marginalization, enslave people, and facilitate crimes. Unless the potential dangers are mitigated, the advantages of ICT and the Internet cannot be guaranteed for all.

[49] ITU. (2020). Disaster Connectivity Maps.

Digital divides reflect and amplify existing social, cultural and economic inequalities. For example, in two out of every three countries, more men use the Internet than women.[50] Similar challenges affect youth, older people, children, persons with disabilities, and rural and indigenous populations. COVID-19 has pushed these communities even farther away from the transformative power that digital technologies have to offer.

Furthermore, substantial digital divides persist between countries. Indeed, nearly 87 per cent of people were using the Internet in developed countries in 2019, compared with 47 per cent in developing countries. Digital divides are also evident within countries. Men, urban residents and young people are more likely to be online than women, rural dwellers and older persons. Smartphone usage is still primarily concentrated in urban, wealthier and more highly educated populations, and lower access and usage rates of digital services are observed for women, persons with disabilities, people living in poverty, and other marginalized groups. Place-based policies could help bridge digital divides and reduce systemic exclusion.

The 2030 Agenda for Sustainable Development clearly states the importance of addressing the needs of these groups. SDG 5 seeks to *"achieve gender equality and empower all women and girls"* and SDG 10 aims to "*reduce inequality within and among countries"*. Furthermore, the UN Roadmap for Digital Cooperation[51] underscores the importance of building inclusive digital infrastructure for the post-COVID-19 world, in order to accelerate progress for all.

Inclusion is in itself a goal, but it is also a powerful enabler since there is no doubt of the positive impact brought about by more inclusive and open national digital economies. Yet digital poverty explicitly widens inequalities, as people who can afford and have access to new technologies are able to progress ahead of those who do not. Leaving no one behind in the digital world means ensuring that technology is people-centred and contributes to the upliftment of communities. This encompasses aiming for the ideal of nobody being offline due to a lack of connectivity or insufficient accessibility of digital information, products, or services.

[50] ITU. (2021). Measuring digital development: Facts and Figures 2021.

[51] United Nations. (2020). Roadmap for Digital Cooperation.

The Action Framework for Focus Area 2, 'ADOPTION: Empowering communities', aims to address inequalities so that everyone is equipped with the skills and digital tools needed to use the Internet safely, everyone is aware of the benefits of being connected, and everyone feels empowered and incentivized to leverage digital technology. However, for the groups of people with lower usage due to specific barriers that they face, it is essential to focus on developing the appropriate policies, strategies and actions that address their specific needs so that they can enjoy digital inclusion. Transformation will be driven by finding ways to empower marginalized communities to make their own choices and actively participate in driving the development of digital technology that is relevant to them.

Taking a people-centred approach is key when designing accessible and affordable digital interventions. According to the Broadband Commission,[52] this is an approach that "recognizes the heterogeneity of individuals and communities (across gender, age, race and abilities and other marginalized groups such as the forcibly displaced) and underlines affordability, useful service levels and quality content. The approach emphasizes digital skills and the digital literacy required to participate fully in the digital economy, while acknowledging the importance of trust and civility in online engagement. The approach carefully directs technologies and financing aligned with user needs and requirements".

Therefore, this focus area builds upon three key pillars: Skills, Digital inclusion and Relevant/local content and services. It conveys distinct commitments to enable change, such as clear and enforceable legal frameworks to guarantee inclusivity. It also recommends supporting specific local communities (through multistakeholder partnerships, collaborations and initiatives) to implement scalable roadmaps, actions, activities, and projects, to reduce the digital divide and move towards more equal access and use of ICTs for all.

[52] Broadband Commission for Sustainable Development. (2021). The State of Broadband 2021: People-Centred Approaches for Universal Broadband.

2.2.1 Existing inequalities in the adoption of digital technologies

As digital technology continues to make large strides in innovation, inclusivity remains a challenge that is yet to be adequately addressed. Too many people from too many diverse and vulnerable groups have limited access, interest, incentive, comfort or safety to connect.

Lack of digital skills

Being meaningfully connected relies on having fundamental literacy skills, digital literacy and basic digital skills. On average, only 65 per cent of adults (people aged 15 and older) in LDCs are literate[53], which already excludes 35 per cent of adult population from engaging with digital technology. Of those who are literate, less have the digital literacy and basic digital skills needed to interact with, configure and enhance tools and the online environment beneficially and safely (as an example, in most of the LDCs, digital skill levels remain below 5 per cent[54]).

Gender inequities

Women are more disadvantaged and face more barriers than men across many dimensions such as empowerment, rights, access to labour market, pay and reproductive health. Inequities are not unique to women and people from other marginalised groups – such as persons with disabilities, older persons, LGBT+ community, minority ethnic groups – also face additional obstacles compare to people from more privileged groups. These obstacles can be more severe and result in great inequality in LDCs, where the Gender Inequality Index (GII), is already at 0.62 (benchmark is at 1.00). These barriers accumulate and can even compound, which can have potentially unintended consequences. Women are less likely to: have the basic digital skills and digital literacy to use technology, afford digital products and services, be aware of the benefits of being connected and be encouraged to seize those benefits. All of which reduce online accessibility and prevent their inclusion. More importantly, women with disabilities and women from minority ethnic and social groups are significantly more marginalised than those who are from privileged socio-economic groups.

[53] WEF. (2018). The Global Competitiveness Report 2017-2018.

[54] World Bank. (2019). GCI 4.0: Digital skills among population.

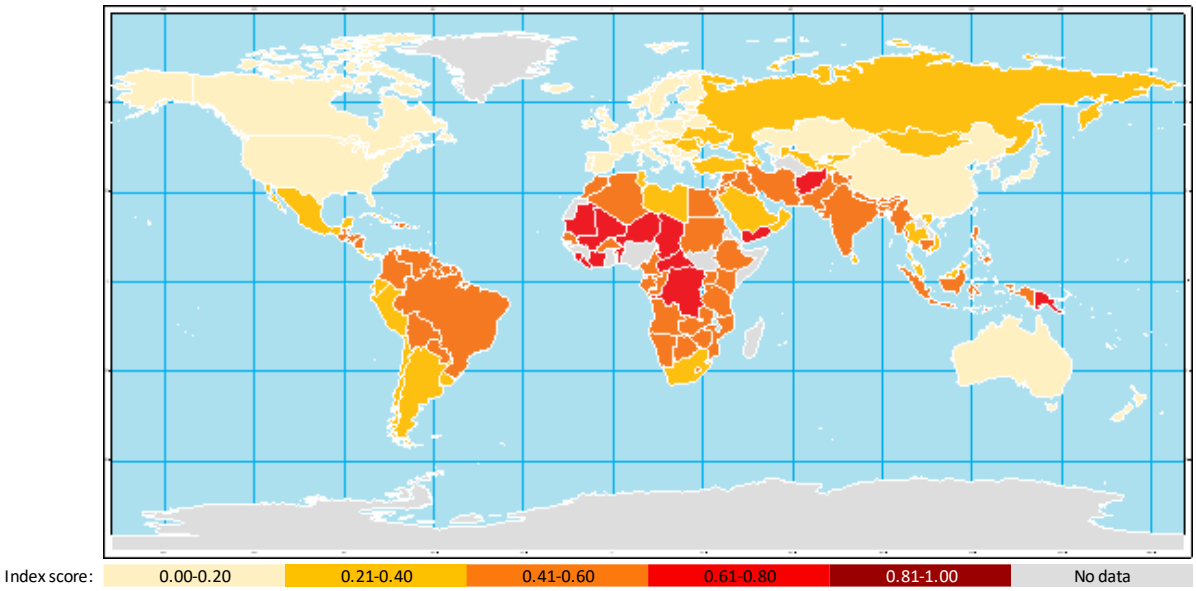

Figure 14: Global view of the Gender Inequality Index (GII)[55]

Disclaimer: The designations employed and the presentation of material on this [map/graphic] do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Persons with disabilities inequities

It is estimated that almost 15 per cent of the global population, approximately 1 billion people, lives with some form of a disability[56]. Among older persons, is it estimated that more than 46 per cent live with disabilities[57]. Yet, about 90 per cent of persons with disabilities living in developing countries do not have access to ICT that is accessible[58]. By 2030, it is estimated that 1.4 billion older persons may face age-related disabilities and that this will increase to 2.1 billion by 2050[59]. If inaccessibility is not address, the number of persons with disabilities who are offline is likely to grow.

[55] UNDP. (2020). Gender Inequality Index.

[56] WHO. (2021). Disability and Health.

[57] UNDESA. (2022). Ageing and disability.

[58] ITU. (2020). Advancing ICT Accessibility at the World Summit on the Information Society Forum By ITU News.

[59] UNDESA. (2017). World Population Ageing – 2017.

Opportunity Lost

What would the global economic and social benefit of bringing 2,9 billion people online? The rhetoric of the discussion has always been centred around the importance of digital inclusion as equalizer of societies. But what about the huge opportunity loss of having half of the planet still offline? According to the Alliance for Affordable Internet (A4AI), low and lower-middle income countries lost about USD 24 billion in tax due to gender gap[60]. It is time to "flip the coin" and start looking at the issue of universal connectivity from a different perspective.

2.2.2 Three key pillars to address

Based on the research and interviews conducted for this report, there are three key pillars to address: Skills, Digital inclusion and Relevant / local content and services.

Figure 15: Key pillars for ADOPTION: Empowering communities

Under each pillar there is a list of issues to resolve in order to move towards empowering communities:

[60] A4AI. (2021). The Costs of Exclusion: Economic Consequences of the Digital Gender Gap.

Skills – A fundamental requirement for the remaining 2.9 billion people to be able to connect is having the capabilities to understand, use and configure digital technology for meaningful engagement. Developing these skills across populations is hindered by:

- Low literacy levels
- Insufficient digital skills in the teaching community and school curricula, e.g. around cybersecurity
- Lack of training infrastructure and opportunities
- Few tailored training or educational programmes for vulnerable communities or target groups such as women, older people, persons with disabilities, LGBT+ people, youth, and children

Digital inclusion – There are many ways in which discrimination and barriers to access more acutely affect particular groups of people, owing to e.g. structural inequalities and marginalization. Historically, these have been insufficiently addressed and have manifested into larger obstacles including:

- Gender inequalities and the exclusion of vulnerable groups
- Inadequate policies and strategies to support ICT/digital accessibility for persons with disabilities and specific needs (e.g. older people)
- ICT use discrimination
- Not enough universal inclusion and assistive technology (AT) for persons with disabilities and specific needs
- An absence of data on e.g. the numbers of girls completing education, people from ethnic minorities enrolled in colleges and universities, and use of ICT by people with disabilities
- Few ICT programmes or initiatives factoring in local culture and tradition
- Inadequate or outdated laws/regulations around safeguarding online access for different segments of society, including women, persons with disabilities, and older people
- Insufficient child online protection (COP) measures and implementation
- Online antisocial behaviour

Relevant / local content and services – Although there exists a myriad of digital products and services, not all of these are equally accessible, applicable or empowering to everyone. They may especially lack relevance for people living in LDCs, LLDCs and SIDS. This is because of:

- A failure to adjust content to the local reality and characteristics
- The use of monolithic tools and systems that prevent, negatively impact on, the development of local content and services

The next three sub-sections explore these key issues in further detail. Issues that are closely related or similar in nature are explored jointly. A set of potential interventions to tackle these issues are also introduced, but these are not exhaustive and only represent a sample of ideas on how to address the ADOPTION challenge. All stakeholders are encouraged to consider additional actions to help bring the remaining 2.9 billion people online.

2.2.2.1 Skills

Key issue: Low levels of literacy and digital skills

One of the primary skills that digital technology users need to access and effectively use digital technologies is basic literacy. Meaningful engagement with technological platforms is dependent on digital literacy and basic digital skills, which unlock people's capacities to operate in and benefit from the broadband environment (e.g. to improve their financial literacy or engage in ICT-enabled career training). Only 46 per cent of individuals in developing countries have basic digital skills; however, developed countries fare only somewhat better at 65 per cent.[61] Across the world, digital skills will grow in importance, particularly in sub-Saharan Africa where more than 230 million jobs are projected to involve digital components by 2030, and 64 per cent of workers will require at least basic digital skills.[62]

Potential intervention: Offering digital skills school curricula, training and programmes

The development of digital skills should be tailored to suit the needs of each segment of the community and aligned with current and future engagements with digital platforms. Governments should develop and integrate curricula for children in primary and secondary school that teach digital literacy (the fundamentals required to interact with, configure and use digital tools); and basic digital skills, including how to use technological assets (computers,

[61] ITU. (2021). Digital Skills Insights.

[62] IFC. (2019). Digital Skills in Sub-Saharan Africa: Spotlight on Ghana.

smartphones, software), online operations (search engines, social networks, privacy), communication media (cellular and Internet protocol networks). Similarly, curricula for technical and vocational education and training (TVET) are important tools for equipping adults with basic digital skills. Training programmes building the same foundational skills – facilitated by the public, private or social sectors – can be offered to people across other age groups. Furthermore, cybersecurity and how to remain safe online are essential topics to include in curricula and teaching programmes. Children and adults should be empowered by knowing about their rights, applicable cybersecurity legislation, potential cyberthreats, and cyber hygiene, and how to report cybercrimes, discern disinformation and fake news, and leverage data and privacy settings on devices and platforms to protect themselves. The content and material may need to be adjusted to be relevant to certain age groups as well as adapted to address the needs and challenges faced by vulnerable people. Similarly, programmes should be kept up to date as technologies and cyberthreats evolve.

Spotlight[63]

With the aim of strengthening healthcare service provision in the Kanchanpur district of Nepal, **Medic** introduced a programme that leverages mobile phones to improve care coordination, administer remote healthcare services, report to health facilities, and update health records. Female community health volunteers (FCHVs) who have limited experience with mobile phones are taught key skills including writing, formatting, and sending text messages; dealing with e-mail inboxes and communicating with patients to ensure the programme's success. More than 2,700 FCHVs had been trained as of 2021.

Spotlight[64]

To help address the lack of basic digital skills, **Orange** deployed its Digital Schools programme. Today it spans 16 countries, 1,357 schools and 500,000 pupils. The programme provides pupils with kits that include a mini server of educational content connected to tablets that can be used for instant access to hundreds of materials, available offline and online.

[63] Medic. (2021). SMS tools empowering FCHVs in Nepal: Adapting to a new normal during COVID-19 lockdown.

[64] Orange Foundation. (2022). Digital Schools, call for projects 2022.

Key issue: Limited access to training infrastructure and opportunities

Building digital skills is dependent on having access to the necessary technological assets and broadband connectivity; however, many people cannot afford either. Schools across LDCs still lack the infrastructure necessary for delivering education that equips children with the skills to navigate the digital world. The COVID-19 pandemic highlighted how imperative it is for schoolchildren to have the access and ability to use digital technologies, especially in a world that is increasingly hybrid and remote. Beyond having access, people require opportunities that are conducive to learning and practising digital skills. This means that work and other regular daily activities should provide them with chances to exercise and improve their digital skills. Yet 34 per cent of adults without post-secondary school education or training, and 17 per cent of college graduates, report not learning any new digital skills.[65]

Potential intervention: Providing digital centres with learning environments

More action should be taken to make available and maintain devices and connectivity in learning centres as well as to create the opportunities to learn. Governments, in partnership with the private sector, funders and donors, could invest in devices, software and connectivity for schools, community centres, neighbourhood clubs and other institutions with social participation. Well-equipped institutions can be utilized as digital skills centres where basic digital literacy is taught at affordable prices or free of charge. For adults, these courses can be held in the evenings and on weekends. The private and social sectors can donate or resell devices at affordable prices to the digital skills centres. A key enabler, beyond providing devices, is creating relevance to the concerns of the learners. Educators and trainers should have the knowledge and experience to make their teaching serve the students' particular interests and needs. Employees can benefit from on-the-job training and programmes hosted by their organizations to build their digital skills and potentially advance their careers.

[65] ITU. (2020.) Digital Skills Insights 2020.

Spotlight[66]

In partnership with Shule Direct, Camara Education Tanzania, and Apps and Girls, **Lyra in Africa** has endeavoured to make digital offline learning a reality in 7 rural secondary schools across Tanzania. The partnership has introduced digital learning mentors to advance the digital literacy and skills of students and their teachers, as well as providing 4 computer labs and 130 tables.

Spotlight[67]

Giga, an initiative by **UNICEF** and **ITU**, aims to provide connectivity to every school around the globe. There are 4 pillars to achieve its ambition: map, finance, connect and empower. Giga is active in 3 regions thus far: the Eastern Caribbean, Central Asia, and sub-Saharan Africa. As of early 2022, Giga has mapped over 1 million schools across 41 countries and connected over 3,200 prototype schools.

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2.2.2.2 Digital inclusion

Key issue: Gender inequalities

In LDCs, LLDCs and SIDS, one of the greatest obstacles to comprehensive connectivity and Internet usage is the gap in gender demographics. Figure 16 illustrates how LDCs and LLDCs fare well below other nations, with only 19 and 27 per cent of women being connected, respectively. While 83 per cent of women own mobile phones, they are 15 per cent less likely to own a smartphone than men in low- and middle-income countries.[68] In the same geographies only 58 per cent of women use mobile Internet; however, 234 million fewer women than men

[66] Lyra in Africa. (2020). Digital Learning.

[67] Giga. (2022). Connect with Giga.

[68] GSMA. (2021). The Mobile Gender Gap Report 2021.

are accessing it.[69] Women who own mobiles also use them less; on average, they have cause to use them 3.3. to 7.1 times per week, but men average 3.8 to 7.7 times.[70] These inequalities are driven by lower digital literacy rates and skills, less affordability, a wider pay gap, weaker safety and security measures, and restrictions on women's activities stemming from traditional gender norms and stereotypes.

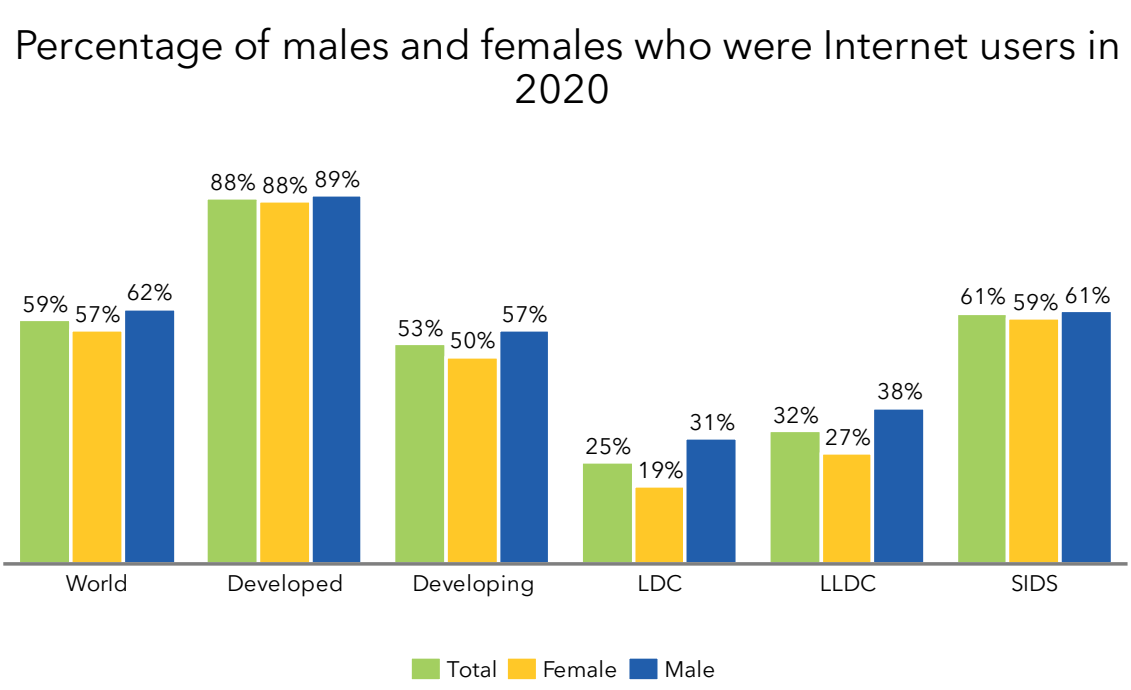

Figure 16: Proportion of males and females who were Internet users in 2020[71]

Potential intervention: Implementing policies to enable equitable access

Policies are required to tackle the two closely linked key drivers of gender inequity: existing socio-economic structures, and limited access to digital technologies. Governments should persist with addressing poverty, low education rates, restricted access to labour markets, and gender stereotypes that have created inequalities. To help lift LDCs, LLDCs and SIDS out of poverty, several systemic issues need to be addressed. Specifically, secondary school and tertiary education for women and girls is an imperative for sustainable change and requires the removal

[69] GSMA. (2021). The Mobile Gender Gap Report 2021.

[70] GSMA. (2021). The Mobile Gender Gap Report 2021.

[71] ITU. (2021). Regional and global key ICT indicators.

of structural barriers – including a lack of safe transportation, clean water for sanitation and hygiene (WASH), and safe toilets for individuals who menstruate starting at puberty. Moreover, societies' attitudes and behaviours that drive inequalities, especially those of men and patriarchal societies, need to be changed. Tackling these problems will put women and girls in a better position to harness the opportunities made available by digital technologies. They can benefit from targeted training to develop their digital capabilities and opportunities to leverage technology outside of training that help build their confidence. Multi-sector partnerships can strengthen the execution of policies and strategies. Throughout the design, implementation and monitoring of all initiatives, it is crucial that women are at the centre of leadership as well as being actively involved and engaged.

Spotlight[72]

To ensure an increased uptake of digital technology, **Prospera Digital** in Mexico provides pregnant women and new mothers with health-related information using a conditional cash transfer model. The women receive this information via SMS messages, creating an opportunity for them to develop their mobile phone and SMS skills.

Spotlight[73]

The **Action Coalition on Technology and Innovation**, which is one of the six action coalitions under the Generation Equality Forum, is committed to developing "innovative, multistakeholder partnerships" to help achieve gender equality. The coalition consists of 15 leaders from civil society, governments, and the private and social sectors implementing a 5-year plan focused on reducing "gender digital gap", making "technology feminist", building "transformative ecosystems", and "leaving no space for online violence".

[72] Gobierno de México. (2015). ¿Qué es Prospera Digital?.

[73] Action Coalition Technology and Innovation for Gender Equality. (2022). 25 years since the World Conference on Women in Beijing, the world has witnessed two things: a global digital revolution and not a single country having achieved gender equality.

Key issue: Inaccessible digital technology for persons with disabilities and older people

Not all digital technologies are designed to meet the needs and abilities of all people. Older people are more likely to be offline than those who are younger.[74] Persons with disabilities are between 11 and 55 per cent less likely to have a mobile phone than those without a disability.[75] Furthermore, they are less likely to own a smartphone or access the benefits of its AT, and their mobile Internet usage ranges from just 4 to 43 per cent.[76] Devices, software and platforms are not always available in accessible formats, which creates a barrier. As a result, people with hearing and visual impairments experience communication challenges, social exclusion, high dependency and a lack of information about services. People with physical impairments may struggle to use devices or navigate content effectively and face similar outcomes. Even as digital technology becomes more accessible, there are still difficulties with accommodating the varied abilities of older people and individuals with disabilities.

Potential intervention: Universal inclusive design, AT and policies

To ensure the digital inclusion of people with disabilities, older persons and other marginalized groups, ICT should be centred on universal design. This approach aims to create new technology that is accessible to everyone irrespective of disability, age, gender, ethnicity or any other characteristic. Universal design is underpinned by seven principles:[77] equitable use; flexibility in use; simple and intuitive use; perceptible information; tolerance for error; low physical effort; and size and space for approach and use.

AT is another pathway to achieving inclusion. Even with largely inclusive technology, some people are still likely to be excluded. For them, it is imperative that AT is developed to address the obstacles they face. The design can be low-tech or high-tech, and may harness special hardware or software, and tailored learning materials or devices. AT should be available at no cost to the user in order to ensure equitable access. Another enabler of accessible AT is open assistive tech and content, which is explored in more detail under section 2.2.2.3. It is also worth

[74] GSMA. (2021). The State of Mobile Internet Connectivity 2021.

[75] GSMA. (2021). The Mobile Disability Gap Report 2021.

[76] GSMA. (2021). The Mobile Disability Gap Report 2021.

[77] National Disability Authority. (2020). The 7 Principles.

noting that persons with disabilities, older people, and their families and caregivers may need training to increase their awareness of AT and learn to use it effectively.

Inclusion can also be fostered through policies and strategies that governments introduce to help remove the barriers restricting these individuals from accessing and using digital technology. These policies should be developed from the outset either by or in consultation with older persons and people with disabilities, together with other key stakeholders. Alignment with the UNCRPD, where applicable, is advised. Policy should be implemented at all levels of government, from a national perspective to the local administrations. It is important that government portals incorporate, recommend, and demand these principles across every level. National governments can develop guides of accessibility and usability as well as provide technical assistance in the matter.

Spotlight[78]

By offering online products and consulting to customers, a Mexican company called HearColors aims to ensure that websites, online platforms and applications are accessible to all users in Latin America. The company offers training on this for designers, developers and content creators; diagnostics to assess the accessibility of content; and a Web Access badge to validate websites that meet content accessibility guidelines.

Key issue: Insufficient and ineffective child online protection

An increasing number of children and young people are connecting for the first time as access to the Internet and digital technology becomes easier and more widespread. Although ICT has allowed children and young people to communicate, socialize, share, learn, find information and express themselves on numerous social issues, it also presents the global challenge of protecting them while online. Being online makes them vulnerable to numerous threats such as identity and data theft, violation of privacy, harmful online content, cyberbullying, harassment, exploitation, grooming and sexual abuse. In 2020, more than 33 per cent of young people in 30 countries

[78] HearColors. (2019). Productos y servicios de accesibilidad.

were reported to have experienced cyberbullying.[79] Additionally, the registered number of reports of suspected child sexual abuse material (CSAM) increased fourfold from 1 million in 2019 to 4 million in 2020.[80] There are still too few national COP strategies globally. As shown in Figure 17, over 100 countries have yet to start building, creating, or adopting such a strategy.

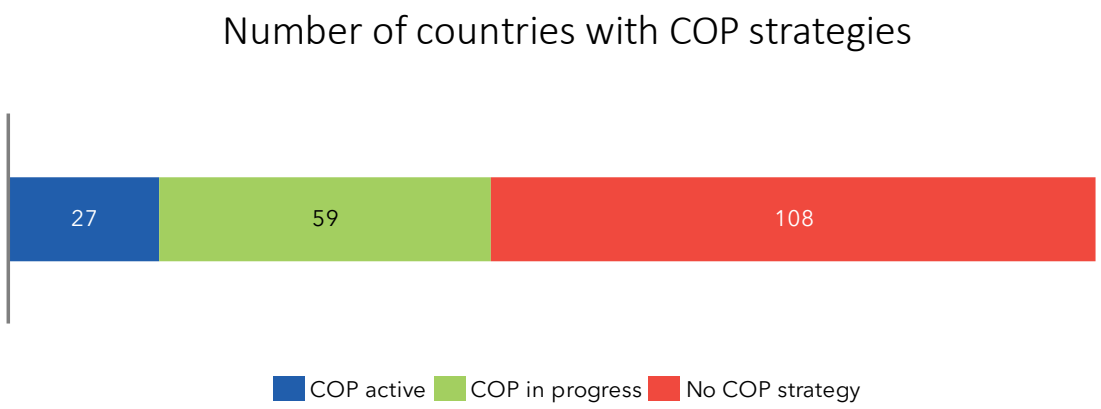

Figure 17: Number of countries with COP strategies in 2020[81]

Potential intervention: Education and strategies

As technology continues to advance quickly, the approach to strengthening COP needs to be adaptive and agile. Protecting children and young people from harm online requires minimizing four types of risk:

- Content risks: exposure to inaccurate or incomplete information, inappropriate or even criminal content, racist or discriminatory ideas, and content related to self-abuse, self-harm, destructive and violent behaviour, or radicalization
- Contact risks from adults or peers: harassment, sexual abuse, exploitation exclusion, discrimination, defamation and damage to reputation
- Contract risks: exposure to inappropriate contractual relationships, embedded marketing, online gambling, and the violation and misuse of personal data, and other issues around children's consent online
- Conduct risks: the sharing of self-generated sexual content or risks characterized through hostile or violent peer activity

[79] UNICEF. (2022). Protecting children online.

[80] NCMEC. (2020). CyberTipline 2020: Rise in Online Enticement and Other Trends from Exploitation Stats.

[81] ITU. (2021). Global Cybersecurity Index 2020.

Mitigating these risks requires educating children and young people as well as their families and caregivers about COP. Similarly, legal and medical professionals need more education, awareness and readiness on COP to provide better support. Resources and tools must be made available to facilitate the development of the necessary digital skills and digital literacy to help tackle online safety. Governments can contribute to COP through inclusive multistakeholder strategies. These national strategies should be aligned and integrated with existing policy frameworks for children's rights and cover all risks and potential harm to guarantee a digital environment that is safe, inclusive and empowering. Moreover, people should be made aware of what constitutes legal and socially acceptable behaviour online, and what actions must be taken to identify perpetrators and remediate the situation.

Spotlight[82]

To make the Internet a safer online environment for children, **MTN** blocks sites with CSAM identified by the Internet Watch Foundation (IWF) by using a neutral third-party software. Customers and civil society organizations are encouraged to flag online CSAM through the IWF's confidential reporting portal.

Key issue: Online antisocial behaviour and less online safety of vulnerable groups

An ongoing challenge for countries to address is online antisocial behaviour. This includes online harassment, racism, xenophobia, exploitation, sexual abuse and cyberbullying. In Latin America, safety and security has consistently been among the top barriers to mobile Internet adoption.[83] Certain groups of people, typically vulnerable groups, tend to have greater exposure to these behaviours and risks due to e.g. a lack of education, traditional or cultural prejudices, or extremism. For example, one of the top three barriers preventing women who are aware of the mobile Internet from using it is safety and security.[84] Other vulnerable groups such as the LGBT+ community, abuse survivors, and people living in poverty or with illness, mental health difficulties

[82] MTN. (2019). MTN partners with Internet Watch Foundation to make the Internet a safer place for children.

[83] GSMA. (2020). The Mobile Gender Gap Report 2020.

[84] GSMA. (2021). The Mobile Gender Gap Report 2021.

or addictions, may also be exposed to negative and harmful experiences online. These experiences can lead them to reduce or stop their engagement with digital technology. Antisocial behaviour has the potential to influence other users' comfort with connecting as well. As technology continues to expand, so too will the risks that vulnerable groups face online.

Potential intervention: Regulations, reporting and education to safeguard online environments

Creating an online environment where vulnerable groups can obtain access safely will require contributions and collaboration from multiple stakeholders, including governments, private sector actors, and civil society organizations. Governments can develop and implement regulatory frameworks that seek to protect the rights of all online users, including vulnerable groups. These should be supported by putting processes and systems in place to respond to any violations (e.g. national CIRTs/CERTs). Some countries, as shown in Figure 18, have even adopted legislation that criminalizes online harassment and abuse. In alignment with regulatory frameworks, private sector organizations can integrate safety features in their products and services that mitigate the potential threats and risks faced by users. When people experience online antisocial behaviour while using these products or services, there should be a clear, simple and effective reporting procedure available to address the incident. For children, helplines and hotlines can be opened so that they are able to report incidents and obtain support. All connected people should be educated about their rights, empowered with information about how to keep safe online, and taught to leverage technical settings and other mechanisms to report antisocial behaviour. They also need to be made aware of illegal activities to avoid and given guidance on how to engage online respectfully and create an inclusive environment for all.

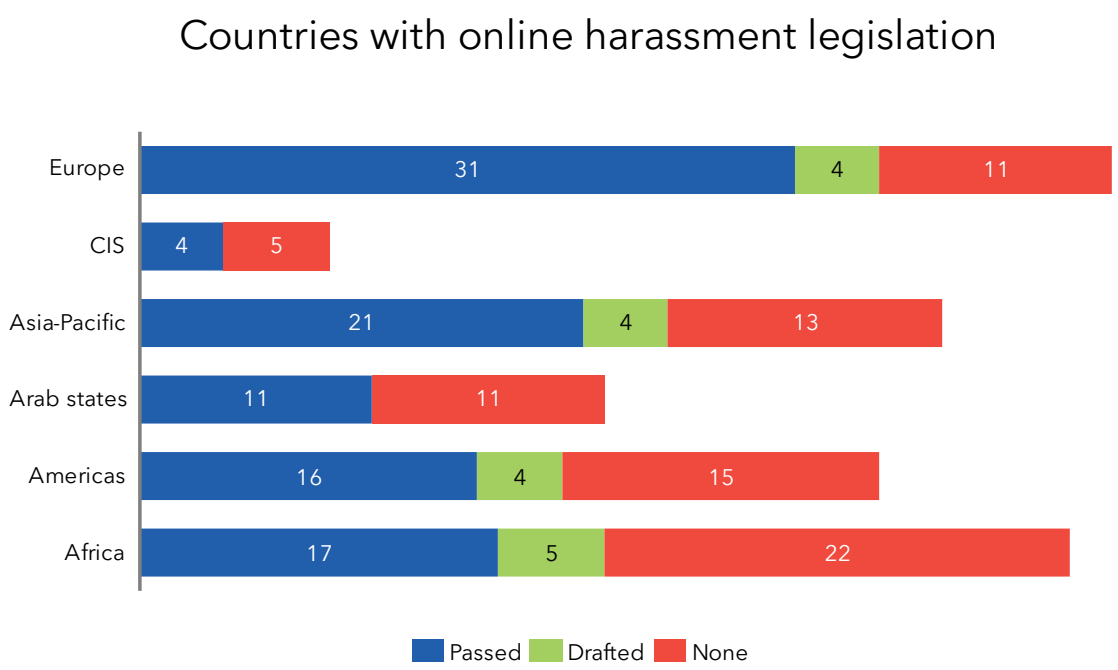

Figure 18: Number of countries across regions with online harassment legislation[85]

Key issue: Lack of data

There is little data about the estimated 2.9 billion people who are still offline, particularly in LDCs, LLDCs and SIDSs. Disaggregated and granular data tends to be even more scarce. Some barriers to obtaining data are the associated complexity, cost and time-frame. Another obstacle is the methodological development and alignment of the data collection procedure and the selection of indicators to track inclusion. When data is available, there is limited statistical capacity to interpret it. Without robust information, it is difficult to develop a comprehensive overview of the status of ICT and connectivity in these countries. The public, private and social sectors are unable to quantify the gaps in meaningful connectivity, making it impossible to realistically set targets, monitor and track progress, measure the impact of interventions, and identify actions that do and do not work. Furthermore, data often serves the interests of people who are in power instead of those who are marginalized. Existing power structures are maintained and even strengthened by the failure to enable people to generate and utilize their own data.

[85] ITU. (2021). Global Cybersecurity Index 2020.

Potential interventions: Dedicated expertise, time and funds

Organizations across all sectors can contribute to collecting, verifying, harmonizing, analysing and sharing data individually or through partnerships. Increased investments in the funding and time required to collect and analyse data are key, as is improving the technical expertise and capacity of the regulators and operators. As their capabilities expand, there are greater opportunities to advance data collection (e.g. harnessing big data and AI) and introduce new statistics that are more accurate, granular, faster and cheaper to compute. In addition, organizations can contribute by thoroughly monitoring and reporting the impact of their initiatives addressing digital inclusion. Through an open government approach, administrations play a fundamental role regarding data sharing and promoting cooperation at the local levels. Most importantly, all people should be empowered to create, own and leverage their own data through digital technology. This can be activated through making analytical tools available and affordable for individual users, while generating person-centred data policies and regulations including transparency requirements for data collection and usage across sectors.

Spotlight[86]

The **Government of Nigeria**, the **Department of Foreign Affairs, Trade and Development Canada** and the **International Development Research Centre** partnered to establish the **Nigeria Evidence-Based Health Systems Initiative** (NEHSI). This initiative was committed to supporting the primary healthcare sector in two Nigerian states by improving their health information systems and developing evidence-based health planning by building sufficient capacity to capture data accurately and timely.

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[86] IDRC CRDI. (2014). Nigeria Evidense-based Health System Initiative (NEHSI).

2.2.2.3 Relevant / local content and services

Key issue: Limited relevant content and services

Attracting people to connect to and benefit from digital technologies is reliant on empowering communities to inform the development of relevant content. This is content that appeals to their needs and wants, in a relatable and understandable manner. In LDCs, online content that is relatable and reflects the culture can be scarce. In some regions the available digital products or services are detached from daily life. The other challenge is having online content that is in local languages and, for those with weaker literacy skills, written simply and clearly. There are as few as three mobile applications in the national languages of some LDCs, as shown in Figure 19. As a result, people are less interested in connecting and have reduced opportunities to experience any benefits from being online.

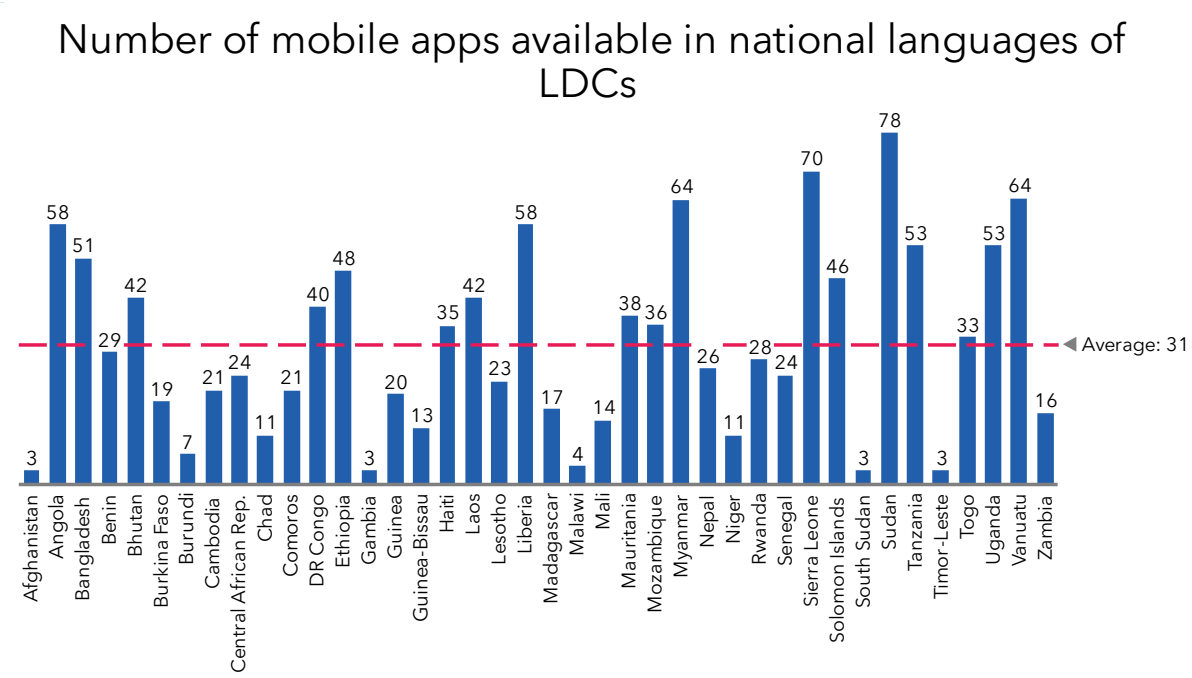


Figure 19: Number of mobile apps in the national languages of LDCs[87]

[87] GSMA. (2019). GSMA Mobile Connectivity Index.

Potential interventions:

a. Co-creating digital content for essential services

The creation of relevant content for users, particularly in LDCs, may be driven across a variety of sectors. Digital technology can be associated with products and services that are essential to local communities and people. For example, the public sector can leverage e-government services to introduce people to the Internet. Creating content in collaboration with the target users might help achieve the relatability, pertinence to local needs and resonance with the culture to make digital technology attractive. Private and social sectors can form partnerships with local organizations and people to co-create the content. Through these partnerships, locals are well-positioned to advocate for connectivity. People's interest in the available content needs to be raised via awareness campaigns, especially those endorsed by trusted locals, and can also increase the knowledge and cultural acceptance of digital technologies. The advantages of being online (e.g. access to information, convenience, efficiency, and the global community) should also be communicated in the context of what is most appealing to a community or group of people.

Spotlight[88]

By collaborating with and training rural farmers, **Digital Green** has empowered them to produce and distribute over 6,000 videos in more than 50 languages that share locally relevant knowledge and practices to help increase resilience, improve crop yields and tackle malnutrition. These community videos have been created for Afghanistan, Ethiopia, Ghana, India, Niger and Tanzania.

b. Open-source tools, systems and content

Making more software for various digital tools and systems open-source is a key way to produce more relevant and local content. This may require strategies to encourage the development of open-source software such as incentives and benefits that are more attractive than those of closed-source software. Open-source software is reusable, easy to access, scalable and

[88] Digital Green. (2022). Community Videos: By the community, for the community.

inexpensive or free. As a result, developers across the world can leverage what already exists to create products and services that are attuned to locals and their contexts quickly and at a low cost. An important enabler for this is equipping local people with the skills and incentives to become developers, content creators and designers who can build digital tools and systems. (This is explored in more depth under Focus Area 3 – VALUE CREATION: Building digital ecosystems.)

Spotlight[89]

NavCog is an 'indoor GPS' that uses Bluetooth to collect data and map the topology of the area around the user. With the intention of obtaining a global contribution to the project, **IBM Research** and **Carnegie Mellon University** made the platform open-source.

Commit to a pledge on our P2C Pledging Platform here. See guidelines on how to make your pledge in *Pledging for universal meaningful connectivity* and example pledges here"

2.3 Focus Area 3 – VALUE CREATION: Building digital ecosystems

Thriving digital systems that drive relevant local content, services and businesses, as well as the rapid adoption of innovation from elsewhere, are key to including and benefiting the 2.9 billion people who remain offline. The performance enhancements offered by each new generation of technology drastically impacts and often improves societies. They can also provide new economic opportunities and have the potential to overcome the historic barriers (e.g. access, geographic location) that have prevented people, mostly in developing countries, from participating and contributing to their economies.

[89] Carnegie Mellon University. (2015). IBM Research, Carnegie Mellon Create Open Platform To Help the Blind Navigate Surroundings.

New services spur growth as technologies reach into practically all aspects of everyday life. As aspects of daily life turn more digital, so too should the appropriate information, products and services. Now is the time to accelerate the digital transformation of societies through an inclusive whole-of-ecosystem approach[90] that nurtures entrepreneurship, innovation, start-ups, SMEs, trade, and job creation, through collaborative policy and regulation practices supported by data. This is an approach that also values and pivots around ICT and networks at its core. Yet, technology alone cannot realize the transition to a fully digital economy and society.

A digital economy and society include all activities that are reliant on, or significantly enhanced by, the use of digital inputs including:

- Technologies: smartphones, robotics and automation – the tools and products that support day-to-day work
- Infrastructure: connectivity to be online
- Services: the processes and business models that enable end-to-end service such as digital platforms, applications and software
- Data: the basic element that can be processed including facts, statistics, instructions, and concepts
- Regulatory frameworks: the standards that underpin the operation of digital technologies and infrastructure and oversee the efficient, safe and reliable functioning of the digital economy
- Capabilities and skills: the application of skills and knowledge that ensures people are able to use digital technologies and participate in society

All businesses, consumers and governments that use and are responsible for these inputs are part of a digital economy and society.

Today's world is characterized by rapidly changing technological developments and digital transformations that are resulting in driving great evolution. Across an increasing number of services, there is a proliferation of new concepts, such as 'digital identity', and innovations being made to principles like consumer rights, confidentiality and data protection. All stakeholders in

[90] OECD. (2021). Development Co-operation Report 2021.

the ecosystem, especially regulators and policy-makers, now deal with profound changes that have far-reaching consequences.

People's access to, adoption of, and engagement with digital technologies throughout the economy are the key determinants of success in the digital age. The availability of fast and affordable Internet access combined with the digital skills of the population drive both labour-market participation and consumer activity. In turn, as the participation of workers and consumers increases, so too does the demand for fast and affordable connectivity and the skills necessary to share in this growth.

The digital ecosystem can be thought of as being based on three key areas:

- Fundamentals to support the ecosystem – consumers; businesses; digital products, applications and services; digital banking and finance; and laws, regulations and policies
- Capability to adopt emerging technologies
- Digital growth priorities:
    - Boosting the digital capabilities of small to medium enterprises (SMEs)
    - Building a dynamic technology sector
    - Delivering simple and secure digital government services

Developing countries – especially LDCs, LLDCs and SIDS – can still advance their digital ecosystems further. To foster the growth of these ecosystems, countries need to have key enablers in place. The map in Figure 20 shows countries' digital readiness based on seven components: basic needs, business and government investment, ease of doing business, human capital, the start-up environment, technology adoption, and technology infrastructure.

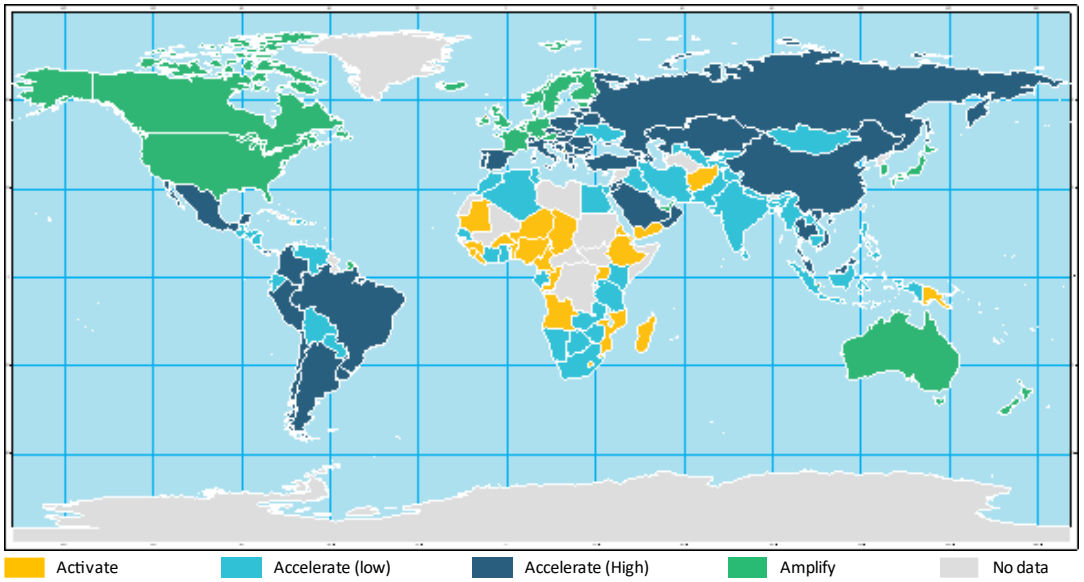


Figure 20: Global digital readiness index[91]

Disclaimer: The designations employed and the presentation of material on this [map/graphic] do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Through the digital ecosystem, all sectors and aspects of people's lives are impacted by digital technology. E-commerce allows everyone to buy things online. E-health, e-agriculture and e-education are among the other sectors where innovation has opened up opportunities for value creation.

2.3.1 Key challenges when building digital ecosystems

The emergence and advancement of digital technologies has brought with it the digital ecosystem. Examples include e-health, where health care and data are enhanced by ICT; and e-agriculture, which uses digital technologies to promote rural farming, sustainable agriculture and

[91] CISCO. (2020). Digital Readiness Index.

related socio-economic development. Digitalization is a social and economic game-changer, and we cannot afford to leave anyone offline. Although the digital ecosystem has flourished across industries, it has not yet matured in all countries and there are opportunities for further growth. This is most apparent in LDCs, LLDCs and SIDS, where there is untapped human potential and unrealized capacity to establish, expand and diversify the ecosystem.

Limited innovation capacity (advanced digital skills)

Having enhanced knowledge of digital technology – such as programming, machine learning (ML), the Internet of things (IoT), networking, engineering, hardware design, big data analysis, and design thinking – is a part of the foundation for designing and programming new digital tools and features. In approximately 50 per cent of the 83 countries where data is available, up to 5 per cent of people have advanced digital skills.[92] In only 4 of those countries are there advanced skills among 15 to 50 per cent of the population,[93] but it is estimated that this level of ability will be required for tens of millions of future jobs. There is still a long way to go to develop these capabilities across the globe.

Inequitable digital governance

Governments can lead the creation of an accessible digital ecosystem by advancing e-governance and subsequently implementing enablers, for example the introduction of e-services and equitable regulatory frameworks promoting intensive initiatives, strategic directions and multisector cooperation. It is important that policy-makers develop frameworks around key digital topics and issues (e.g. data privacy) that safeguard all who engage with the technology. Most LDCs, LLDCs and SIDS have an e-government development index (EGDI, to measure the readiness and capacity of national institutions to use ICTs to deliver public services) that ranges from 0.25 to 0.50, indicating the potential for improved e-governance and subsequently an environment more conducive to growing the digital economy equitably.[94] Figure 21 illustrates governments' ability and willingness to offer services and communicate with their citizens online.

[92] ITU. (2020). Measuring digital development: Facts and figures.

[93] ITU. (2020). Measuring digital development: Facts and figures.

[94] UN. (2020). E-Government Development Index.

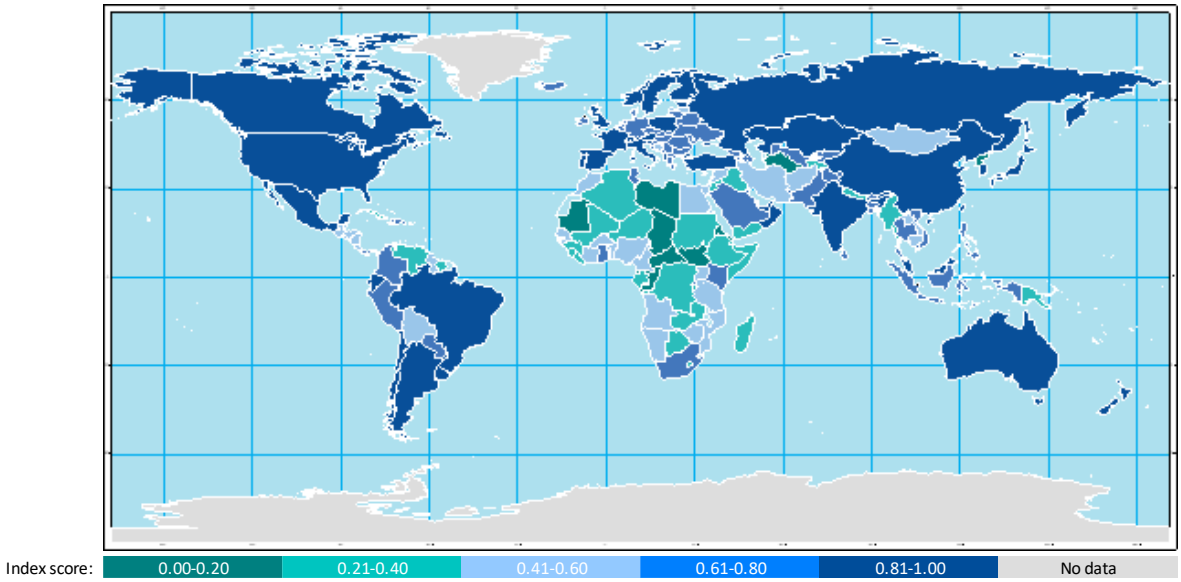


Figure 21: Global online service index[95]

Disclaimer: The designations employed and the presentation of material on this [map/graphic] do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

Geographically concentrated digital platforms and data collection

A crucial aspect of building a strong digital ecosystem is developing digital platforms that can support it. These platforms have the advantage of being well-positioned to collect data from the users accessing their products or services. This creates a considerable advantage that, without the necessary adequate global data governance, can be converted into disproportionate financial gain. With 41 per cent of the top 100 global digital platforms (by market capitalization) located in the US and 45 per cent in the Asia-Pacific region, there is a clear discrepancy in the ecosystem development happening across the world.[96]

[95] UN. (2020). E-Government Development Index.

[96] UNCTAD. (2021). Digital Economy Report 2021.

Concentrated research and development

The geographic areas with the greatest amounts of R&D investment have shifted over time. The economic changes caused by the pandemic do not seem to have altered these "swings". If anything, COVID-19 accelerated the rate of these changes. North America, South America and Europe have traditionally been the main locations of R&D leadership. Similarly, Asia – China in particular – is increasing their share of worldwide R&D and related spending. Japan, India and South Korea are also leading this shift. Even though nearly USD 1.7 trillion was spent on R&D globally, 80 per cent of this expenditure was from approximately 10 countries located in Asia, Europe and the Americas.[97]

Countries in Africa, South America and the Middle East continue to languish in the hierarchy of R&D spenders. The combined total investments of these three regions is just 5 per cent of the total global R&D spending, despite creating more than 13 per cent of the total global GDP. These ratios have not changed significantly over the past ten years, and there is no evidence to support expectations of any meaningful improvements over the next five years. Therefore, the benefits of R&D (e.g. generating expertise, patents, data, and innovations) are not yet fully realized or experienced in these regions.

The factors outlined above indicate that the creation of a thriving digital ecosystem is a challenge in many countries, especially in Africa, South America and the Middle East. However, local digital ecosystems are essential for developing digital services and exploiting the economic and societal benefits of the Internet.

[97] UNESCO Institute for Statistics. (2022). How much does your country invest in R&D?

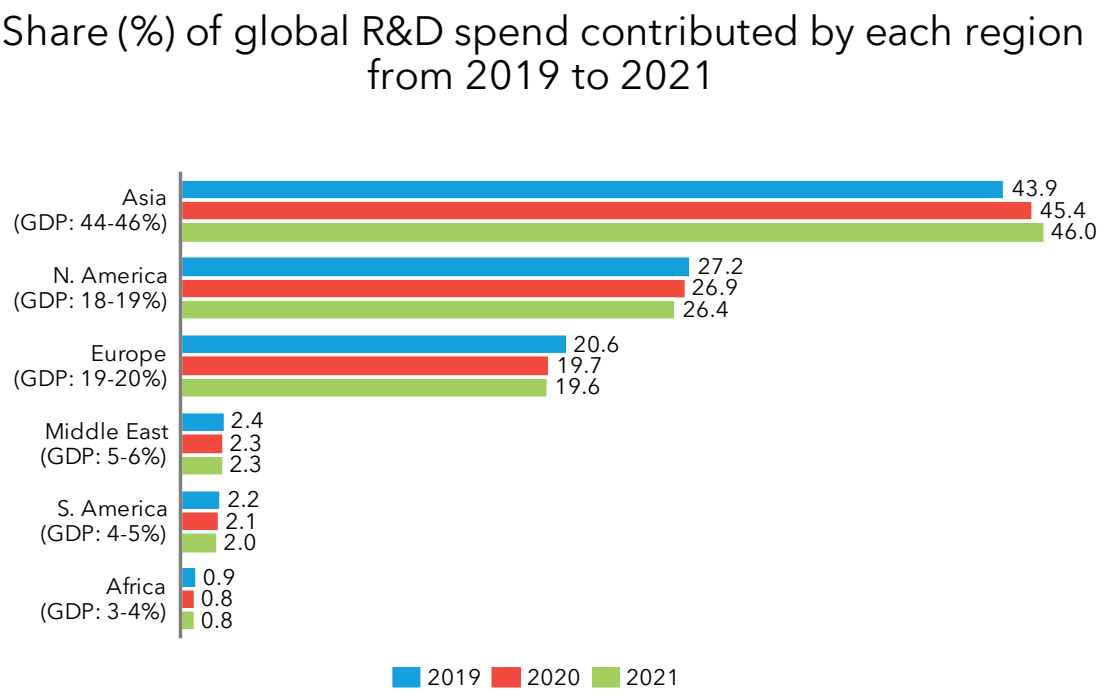


Figure 22: Share of global GDP (%) vs share of global R&D spend (%) per region from 2019 to 2021[98]

2.3.2 Three key pillars to address

To accelerate the digital transformation of societies through an inclusive whole-of-ecosystem approach to building digital ecosystems, action is required across three key pillars. These pillars, derived from the research and interviews conducted for this study and presented in Figure 23, are **Digital innovation and entrepreneurship**, **Application and service**, and **Digital economy**.

[98] R&D World. (2021). 2021 Global R&D Funding Forecast released.

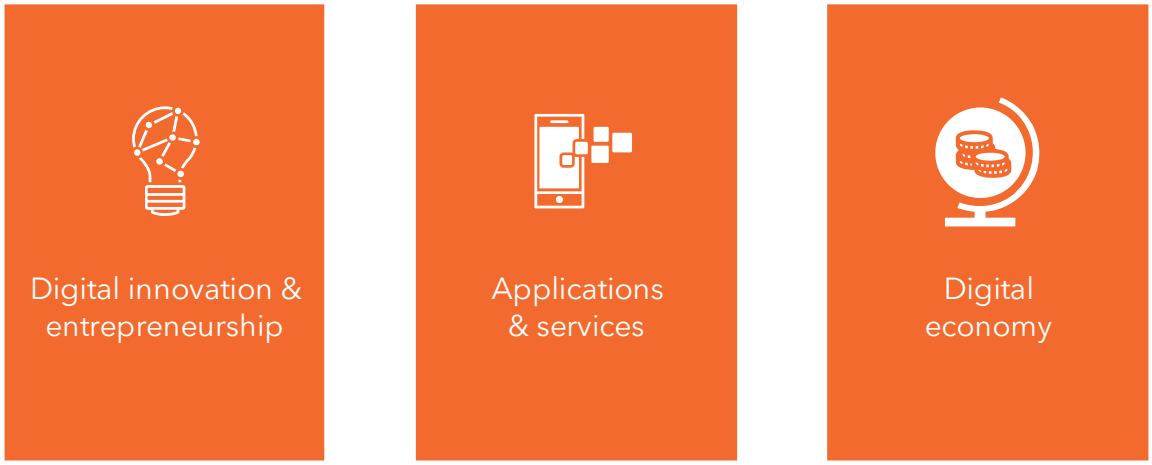


Figure 23: Key pillars for VALUE CREATION: Building digital ecosystems

Under each pillar is a detailed list of issues to resolve to move towards meaningful connectivity for all. Below is an overview of these issues:

Digital innovation and entrepreneurship – A key driver and added value of the digital ecosystem is the creation of new digital tools, services and business models; however, the generation and development of these ideas are limited by:

- Insufficient innovation capability and capacity – advanced digital skills (e.g. AI/ML, coding, blockchain, design thinking, data literacy)
- Insufficient clarity on digital strengths/areas of focus at country level
- Limited numbers of initiatives that stimulate individuals to realize their potential to the fullest extent (e.g. mentorships, lab programmes, research projects, stakeholder networks, and innovation funds)
- No local start-up and innovation ecosystem (e.g. unclear national start-up act or holistic strategies fostering digital innovations across sectors)
- Lack of universities and TVET institutes as innovation hubs and entrepreneurial bodies

Application and services – In many LDCs, LLDCs and SIDS, the local communities are not enabled to introduce or contribute to activities that involve their needs and desires, and thus they cannot fully benefit from digital connectivity. To address this, there are various challenges that should be tackled:

- Incomplete and/or insecure digital public infrastructure (e.g. for payments, identity verification, and consent), putting the inclusion, privacy and protection of citizens at risk
- No digital services available beyond e-government
- Limited open-source content
- Few smart hubs (i.e. cities and villages) enabling digital and commercial connectivity
- Little co-creation with local communities and key stakeholders
- No data governance framework or usage principles for safeguarding and empowering citizens

Digital economy – Another positive aspect of digital ecosystems are the digital economies that people who are connected and empowered can gain from. Yet today, there are multiple barriers that are preventing people from partaking, namely:

- Lack of digital financial inclusion – low maturity and limited trust of online access and suite of government-led or private entities offering services
- Slower digitalization of B2B trade
- Low uptake of e-commerce
- Slower digitalization of supply chains, and cybersecurity risks
- Not enough national cybersecurity strategy definition and implementation globally
- Limited ability of MSMEs to tackle cybersecurity incidents
- Unsustainable practices and lack of a circular economy to deal with e-waste and prevent harm to the environment and human health
- Identity theft, financial fraud, illegal access
- Insufficient multistakeholder, multisector collaboration mechanisms aligned to national ambitions (e.g. ecosystem acceleration mechanism, tech parks, virtual park)

The following sub-sections consider these key issues in further detail. Issues that are closely related or similar in nature are explored jointly. A set of potential interventions to tackle these issues are also introduced. These interventions are not exhaustive and represent only a sample of ideas on how to address the VALUE CREATION challenge. All stakeholders are encouraged to consider additional actions to help bring the remaining 2.9 billion people online.

2.3.2.1 Digital innovation and entrepreneurship

Key issue: Lack of innovation capacity – advanced digital skills

To drive digital innovation and entrepreneurship, an economy relies on innovation capacity to invent and execute new ideas. This innovation capacity consists of both advanced digital skills (AI/ML, coding, blockchain, data literacy, etc.) as well as soft skills (leadership, entrepreneurship, etc.). Globally, these skills are scarce: an ITU study of 83 countries around the world found that 95 per cent of the countries have a population where 15 per cent or less of the population has advanced skills.[99] Looking closely at selected LDCs, LLDCs and SIDS, on average only 4 per cent of their populations have intermediate to advanced skills, as detailed in Figure 24. Beyond resulting in limited innovation, the lack of advanced digital skills could hinder the acceleration of new digital tools in society as there would be insufficient capacity to support growth. It is predicted that advanced digital skills will be a necessity for 75 per cent of jobs by 2030.[100] This emphasizes the urgency not only to upskill adults for innovation today but also to support and expand it in the future.

[99] ITU. (2020). Measuring digital development: Facts and figures.

[100] Oxford Economics. (2021). Gen Z's Role in Shaping the Digital Economy.

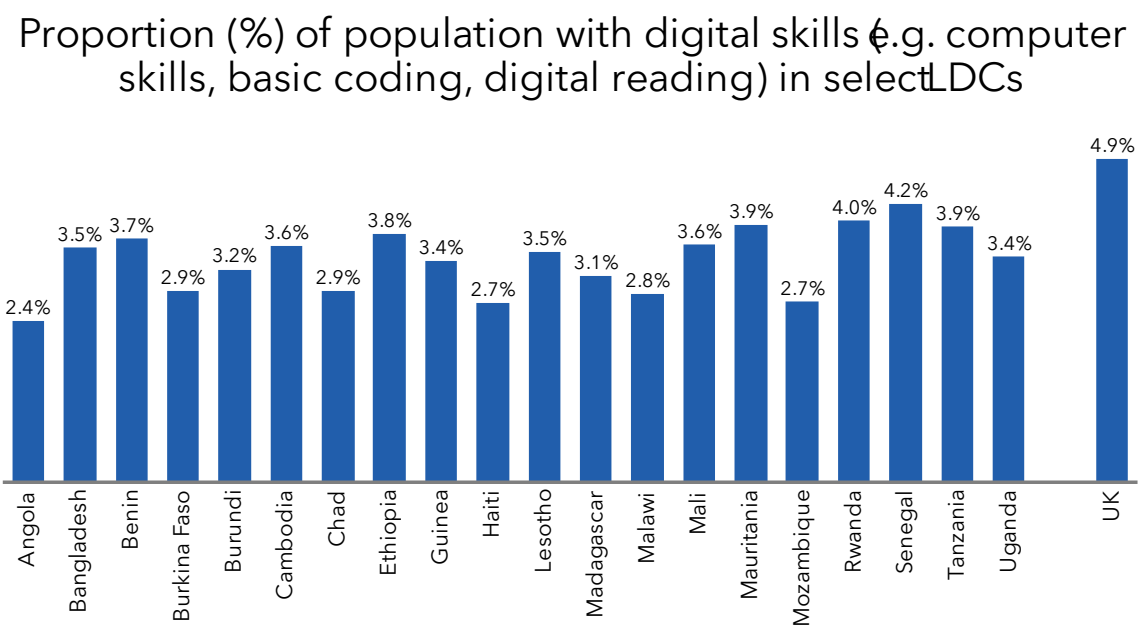


Figure 24: Proportion of the population with intermediate to advanced digital skills in selected LDCs[101]

Potential intervention: Higher education curriculum and workforce upskilling

Advanced digital skills are mainly taught as a part of the curricula of higher education institutions (HEIs), including universities and TVET institutions, and require a robust foundation of basic digital skills to develop. Often, studies related to science, technology, engineering and mathematics (STEM) as well as social, mobile, analytics and cloud (SMAC) equip students with intermediate to advanced digital skills and critical thinking. HEIs and TVET institutions may need to reform their curricula to be reflective of the ever-changing landscape of digital technology and continue to update the courses as technology evolves. In addition, more youth should be supported, encouraged and incentivized to enrol in STEM and SMAC programmes, especially those from groups that tend to have greater barriers to connecting and lower digital inclusion (e.g. women and girls, persons with disabilities). The private sector can play a major role and support with rapidly skilling its workforce and people with advance digital skills relevant to the respective industry and business. Partnerships across the public, private and social sectors could strengthen efforts by ensuring alignment in the skills being developed and the longer-term incentives for people to acquire these advanced digital skills. Private funding to setting up local

[101] World Bank. (2019). GCI 4.0: Digital skills among population.

R&D centres in conjunction with the capability build in advanced technology skills will be a key enabler.

Spotlight[102]

A regional initiative driven by African governments and facilitated by the World Bank, called **Partnership for Skills in Applied Sciences, Engineering and Technology** (PASET), is committed to developing excellence in advanced digital skills to propel transformation in Africa. Governments, donors and the local private sector collaborate to reform HEIs and TVET institutions to incubate and launch regional initiatives, provide technical assistance and facilitate knowledge sharing.

Spotlight[103]

Tech Mahindra Foundation, the CSR arm of leading IT firm Tech Mahindra, is offering free training across India to help underemployed or unemployed individuals to start a career in cloud computing. It is working with Amazon Internet Services Private Limited to deliver the programme, which is called Amazon Web Services (AWS) re/Start.

Spotlight[104]

In 15 countries across Africa, Europe and the Middle East where Orange is present, **Orange Digital Centers** provide free educational services that are open to everyone. These services range from digital training for young people to start-up acceleration. Over the last 10 years, the initiative has reached more than 42,200 communities, hosted 710 events and training sessions, accelerated 50 start-ups, and made a difference for 110,000 beneficiaries.

[102] World Bank. (2022). Partnership for Skills in Applied Sciences, Engineering and Technology (PASET).

[103] Business Today. (2022). Tech Mahindra offers free AWS program for cloud computing technology training.

[104] Orange Digital Centers. (2022). Orange Digital Center, delivering digital training to all.

Key issue: Insufficient clarity on digital strengths at country level

Data-driven digitalization creates global opportunities as well as challenges that require global interventions to harness the positive developments and mitigate the negative impacts. Similarly, with regard to digitalization, countries have different strengths that can be leveraged (e.g. high capacity to support ICT, a thriving start-up ecosystem, willing investors in local digital technology, or data and insights on ICT and digital industries), and different weaknesses (e.g. insufficient ICT infrastructure, inequitable digital governance, or insufficient e-government). Understanding all of these is important for countries, especially when defining the areas of focus in national digital ecosystem strategies and plans. Owing to the lack of research and data on digital technology – particularly LDCS, LLDCs and SIDS – countries may not have accurate or sufficiently detailed insights on their strengths. This makes it challenging for countries to identify where they are best positioned to spark innovation and support entrepreneurship, and understand the strength of the relevant enablers (e.g. regulatory framework, ease of doing business). Without these perspectives, countries may struggle to define a roadmap and implement initiatives to grow their digital ecosystems and achieve tangible impacts.

As the data-driven digital economy has evolved, a data-related divide has compounded the digital divide. In this new configuration, developing countries may find themselves in subordinate positions, with the capture and control of data and their associated value being concentrated in a few global digital corporations and multinational enterprises. Hence, developing countries and their citizens risk becoming mere providers of raw data to global digital platforms, while having to pay for the digital intelligence obtained from their data.

Potential interventions:

a. Increased data and multilateralism

To improve the awareness of their strengths, countries should rely on data and analytics related to their performance in the digital ecosystem. More data can be generated from increased research, improved collection procedures, regular monitoring and consistent reporting. Assessment, benchmarks and international standards are methods to help governments calibrate their strengths in comparison to other countries regionally and/or globally. Countries could also work together in multilateral partnerships, economic communities, and forums to produce and align agreements on which strengths countries should develop or pursue. This

would ensure that countries can prepare strategies for their digital economy with a clear ambition in mind while fostering an international environment that is conducive to further progress.

b. Sharing country-specific data

In terms of economic advancement, it is important to ensure that developing countries are able to properly capture the value of the data extracted from their citizens and organizations. A fundamental factor in this is the local and global governance of data. This governance is also a prerequisite for using data to support the attainment of the economic, social and environmental objectives of the 2030 Agenda for Sustainable Development, with people at the centre.

Spotlight[105]

The Personal Data Protection Bill 2019 and the Draft National E-Commerce Policy (entitled "India's Data for India's Development"), both clearly outline the ambition of **India** to build its digital sector by capitalizing on the data of Indian people through data localization measures.

Key issue: Unaffordable access and adoption for MSMEs

About 90 per cent of businesses worldwide are SMEs.[106] They account for more than 50 per cent of global employment.[107] Consequently, it is essential that MSMEs have affordable access to ICT and the Internet. Furthermore, MSMEs should be included in the innovation, expansion and enhancement of digital tools to maximize their growth and access to them. More specifically MSMEs and MSME entrepreneurs can lead the incubation, translation and dissemination of innovative technologies into replicable development interventions and employment generation. Yet MSMEs face barriers to accessing and adopting new digital technology such as limited access to sufficient financing, lack of personal finance and other feasible credit markets to allow for capital ownership and investments, inhibited access to global markets, challenges with public procurement, incoherent regulatory frameworks, and a lack of harmonized business ecosystems.

[105] UNCTAD. (2021). Digital Economy Report 2021.

[106] World Bank. (2022). Small and medium Enterprises (SMEs) Finance.

[107] World Bank. (2022). Small and medium Enterprises (SMEs) Finance.

A lack of e-business capacities (e.g. tech savvy, entrepreneurial and communication skills, and digital business knowledge) hampers the adoption and effective use of digital technologies by companies and entrepreneurs. MSMEs in less developed and developing countries score much lower in the capacity to connect (specifically, on ICT access and ICT use) in comparison to developed economies, with Southeast Asia and sub-Saharan Africa recording the largest gap.

Potential interventions: Policy and effective partnerships

MSMEs would benefit from coherent policy (e.g. legislation, regulatory frameworks, national strategies and plans) that is conducive to digital innovation and entrepreneurship in addition to the prosperity of their businesses. Firstly, policies can enable access to ICT, which is critical to improving competitiveness in the digital economy, especially in LDCs, LLDCs and SIDS where connectivity can be an obstacle. Then demand-driven policies can stimulate innovation, entrepreneurship and growth by addressing challenges that are specifically faced by MSMEs. For example, these policies could:

- Facilitate increased market access
- Increase access to financing or support public procurement
- Overcome the un-connectedness of MSMEs (e.g. by over 50 per cent across all sectors)

The barriers faced by MSMEs can vary so it is important that the measures put in place address the diverse needs and contexts of these entities. Partnerships with the public sectors – including with international organisations who can help incubate, translate and disseminate innovation – can play an important role in connecting and supporting MSMEs in the digital ecosystem.

Spotlight[108]

The **International Trade Centre** (ITC), together with players in the private and public sectors, offers training courses and advisory services to help MSMEs in developing countries tackle the obstacles associated with e-commerce and empower them to sell their products and services online economically. The ITC provided support to numerous initiatives in Africa, including organizing international logistics for Made in Morocco, introducing credit card payments to the Ivory Mall in Côte d'Ivoire, and establishing a shared online platform (eMall) for the IT services sector in Kenya and Uganda.

Spotlight [109]

Bharti Airtel, which provides communication solutions in India, is stepping up initiatives to accelerate the digital transformation of local MSMEs by partnering with the National Small Industries Corporation (NSIC), a Government-of-India enterprise whose mission is "to promote and support the MSME sector by providing integrated support services encompassing marketing, technology, finance and other services".

Key issue: Concentrated innovation and start-up ecosystems

Innovation is often stimulated in ecosystems of various stakeholders (e.g. entrepreneurs, start-ups, universities, accelerators, venture capitalists, governments, corporations) that produce new ideas and transform them into viable products and services. The presence of innovation and start-up ecosystems in a country is beneficial in driving the growth of its digital economy. However, both the top performing and top emerging ecosystems are concentrated in developed countries. Of the top 30 ecosystems, 50 per cent are located in North America, 27 per cent in Asia and 17 per cent in Europe while none are located in Africa or Latin America. [110] Approximately 67 per cent of emerging ecosystems are in North America and Europe, as illustrated in Figure 25. There is a clear dearth of performing ecosystems in the rest of the world, particularly in LDCs, LLDCs and SIDS.

[108] International Trade Centre. (2015). E-interventions: Enabling access to digital tools and market places.

[109] Airtel. (2020). NSIC and Airtel join forces to accelerate Digital Transformation of Indian MSMEs.

[110] Startup Genome. (2021). The Global Startup Ecosystem Report 2021.

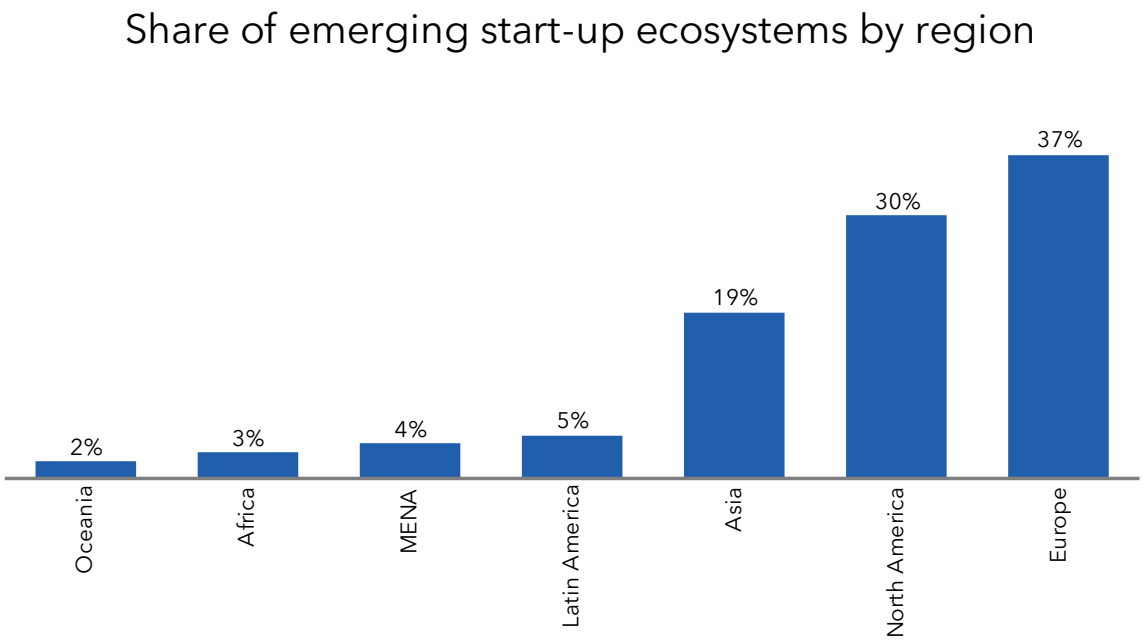


Figure 25: Share of emerging start-up ecosystems by region[111]

Potential intervention: Committed multistakeholder collaboration/partnerships

Building innovation and start-up ecosystems requires focus commitment over the long term, potentially decades, from multiple stakeholders across sectors. Central to the ecosystem are people generating ideas and becoming entrepreneurs to realize those ideas. HEIs, including universities and TVET institutions, tend to be fertile innovation hubs where people can invent new digital technologies. Other start-ups can also provide innovation from existing entrepreneurial thinking and experience. Ideas by themselves are not enough and require robust support, for example through the following:

- Policies, regulatory frameworks and national strategies, including coherent national-level digital transformation strategies
- Incentives from governments to create an environment conducive to innovation
- Capital and funding from investors, e.g. venture capitalists, corporates, and angel investors

[111] Startup Genome. (2021). The Global Startup Ecosystem Report 2021.

- Expertise and mentorship from e.g. other entrepreneurs, the private sector, experts, and academics
- Greater awareness of new digital technology from increased media attention
- National digital entrepreneurship strategies and engagement with start-ups and MSMEs

All these stakeholders need to partner and collaborate to build and grow the ecosystem. As the success of an ecosystem is linked to how long it has to mature, stakeholders need to consider and integrate sustainability in their initiatives.

Spotlight[112]

The SheLeadsTech programme in India was created by **Facebook** to help respond to this challenge. The initiative supports start-ups founded by women by providing access to tools, mentorship and resources to overcome barriers and succeed in building a business in technology. This includes FbStart, a programme that offers year-round technical support through an exclusive community of global start-ups, free credits to tools, training on developers' tools used at Facebook, and services from dozens of partners. Another initiative is SheTrades, which gives female entrepreneurs around the world free access to online courses, face-to-face workshops, and live webinars on a range of topics to help them better understand their markets.

Commit to a pledge on our P2C Pledging Platform here. See guidelines on how to make your pledge in *Pledging for universal meaningful connectivity* and example pledges here"

2.3.2.2 Application and services

Key issue: Digital public infrastructure designed for profitable use

[112] YourStory. (2019). Facebook is celebrating two years of encouraging women entrepreneurs with the SheLeadsTech community.

A large proportion of the existing digital infrastructure could be described as "incidentally public".[113] Although these interventions are available to the public, they exploit user data and are not designed so that the user can participate in their governance.[114] Contrastingly, digital public infrastructure (DPI) should be designed to enable digital inclusion by providing systems to support identification, payments and data exchange for basic functions that are intended for public and societal-scale use (e.g. governance, collaboration, and commerce). In LDCs, LLDCs and SIDS there may be insufficient DPI or the existing infrastructure may not be robust, secure and/or safe. This leaves citizens unprotected and vulnerable to breaches of privacy.

People have faced concerns about the potential ill-intentioned use of databases held by organizations that no longer have the ability to safeguard the information. No one should have to feel this way, highlighting why it is crucial to get things right from the start and anticipate how things could go wrong. Bad DPI can have dramatic consequences, which is why building "good" DPI should not be merely an afterthought when developing infrastructure.

Potential intervention: Expansive, robust and secure digital public infrastructure

More digital systems that have been designed for societal use are necessary to help expand DPI. These systems should be built with their respective societies in mind, taking into account their citizens' needs, Internet access, and digital tools, not only today but in the future. Particular attention should be paid to guaranteeing that the infrastructure is safe and secure for all people to use. DPI is often described as technologies that tend to be "horizontals", solving problems impacting the state (taxation, government aid), the market (start-ups, enterprises), and consumers, and are the rails that other interventions "run on top of". Their implementation typically enables many other interventions and business models to flourish. DPI interventions can improve the lives of citizens around the world by enabling digital inclusion, and some governments have been able to harness these digital tools to address urgent challenges facing society.

The economics and governance of the DPI should be informed by its users, the public. Responsible PPPs or collaborations can facilitate the development of DPI, where governments

[113] Initiative for Digital Public Infrastructure. (2022) What is Digital Public Infrastructure?

[114] Initiative for Digital Public Infrastructure. (2022) What is Digital Public Infrastructure?

enact suitable policies and provide incentives and viable use cases for it, and the private sector supports its expansion and service offerings. Greater investments – potentially from investors, funders, donors, and national budgets – can accelerate the implementation of the infrastructure. Building meaningful PPPs is instrumental in developing good DPI, and businesses, large and small, will benefit from this.

Spotlight[115]

During the COVID-19 pandemic, **Togo** used digital payments and data to facilitate emergency cash transfers to people who were most vulnerable. The programme was operationalized in 10 days and has distributed over USD 10 million in relief funds, paying more women than men and supporting informal workers.

Spotlight[116]

In India, the digital payments ecosystem grew after **Aadhaar** and **UPI** were established and attracted many new companies – domestic and international – who were able to build and deliver new services and gain sizable market shares. By bringing over 330 million people into the formal financial sector, India's digital infrastructure has driven innovation in both the public and private sectors.

Key issue: Barriers to building and deploying digital services and applications

There are several barriers to building and scaling digital technology. Developing digital services and applications is expensive. It requires people with the technical expertise to build it, and even then, the development can still be challenging. Existing proprietary technology can be leveraged through leasing or buying licensing, but customization can be limited and/or incur additional costs. Furthermore, the process to create new technology can be time-intensive. In LDCs, LLDCs and SIDS, all these challenges are more pronounced. In addition, the uptake of digital services and applications can be low in these countries as the intended purposes and content are rarely made relevant to local culture and experiences. Although these issues can be perceived as

[115] WEF. (2021). How to bring digital inclusion to the people who need it most.

[116] WEF. (2021). How to bring digital inclusion to the people who need it most.

merely inconvenient, addressing them can generate powerful ways of unlocking improvements in people's lives and better emergency responses.

Potential interventions:

a. Digital public goods

Digital public goods (DPGs) are defined by the UN Secretary-General's Roadmap for Digital Cooperation as "open-source software, open data, open artificial intelligence models, open standards and open content that adhere to privacy and other applicable international and domestic laws, standards and best practices and do no harm". From providing remotely accessible learning resources and paying out social benefits, to distributing vaccines and providing vaccination certificates, we have seen first-hand how DPGs can enable governments to swiftly respond to immediate health and social protection needs.

Ensuring meaningful connectivity for all, requires a perspective that recognizes the need for digital technology to be a DPG – a collective global resource. When digital resources are made freely available, they promote innovation and scale as anyone around the world can leverage and contribute to them. As DPGs continue to be shared and recycled, they only become more valuable to society; however, they need to be customized to the specific needs of a country, especially in LDCs, LLDCs and SIDS. Collaboration and coordination of the public, private and social sectors are fundamental to the discovery, development, and use of, and investment in, DPGs. By incorporating them in national development strategies and plans, governments can further strengthen their impact. Alignment to the standards of the Digital Public Goods Alliance (DPGA), which include the following, is important for sustainability and scalability:

1. Adaptability: Governments can freely adapt DPGs. For instance, Aadhar can only be adopted after permission from the Indian Government, whereas Modular Open Source Identity Platform (MOSIP) is open-source and can be reused. DPGs can be adapted to fit local needs, and this can also help build long-term ownership and agency for the implementing countries.
2. Scalability: Adopting DPGs that have been successfully implemented at scale elsewhere can save a country's resources and enable faster piloting and roll-out.
3. Country ownership, trust, and capacity to iterate for future needs: DPGs can trigger the deep involvement of local expertise in country-specific implementations. Agency, in

combination with the transparency of DPGs, can also help build country ownership and trust in technology.

4. Harmonization of approaches: DPGs can facilitate community building, knowledge sharing, and joint training approaches across jurisdictional boundaries.
5. Transparency and accountability: The open-source licensing of DPGs means that their code base can be independently scrutinized and audited. This also facilitates accountability and public discourse around issues such as incorporating best practices and designing DPGs with the aim of doing no harm.

Spotlight[117]

Created to tackle the gaps in the collection, access and use of local health data that were experienced in post-apartheid South Africa, the **District Health Information Software 2** (DHIS2) is now the largest health-management information platform globally. It is used by 73 low- and middle-income countries, covering 30% of the global population. During the COVID-19 pandemic, Sri Lanka developed new modules on DHIS2 to support real-time disease surveillance and the vaccine roll-out. These modules were refined and shared with over 41 countries.

Spotlight[118]

The Digital Impact Alliance, Estonia's Ministry of Foreign Affairs, GIZ and ITU established GovStack, a partnership committed to empowering governments to take ownership of their digital futures by building more effective and cost-efficient digital government services. To initiate their digital transformation, GovStack collaborates with countries are enabled to adopt, deploy, and scale e-government. The partnership supports research and development to determine the design specifications, including which building blocks (enterprise-ready, reusable software components). GovStack also helps create a model digital government services platform and leverages the model to demonstrate use cases across services and sectors. The resulting platform is then made available as digital public goods for the global community, particularly for procurement and implementation low-resource contexts.

[117] WEF. (2021). How to bring digital inclusion to the people who need it most.

[118] GovStack. (2022). Accelerating the digital transformation of government services.

b. Smart sustainable hubs (smart villages and cities)

Another approach to expanding the reach of the digital ecosystem is to embed it in cities, integrate it into daily life and empower people to leverage the technology at their disposal. Cities, villages, islands and rural communities can be transformed into "smart" hubs that are innovative and technologically modern by harnessing ICT to improve competitiveness, residents' quality of life, and the efficiency of urban operations and services. For example, digital tools can be utilized to improve housing, healthcare, energy efficiency and waste management. The integration of digital innovations – like the IoT, AI, digital twins, smart grids and robotics – is pivotal for smart hubs and can drive the need for additional applications and services. It is important that these hubs operate sustainably too, and a catalyst for this is renewable energy providing stable electricity. Other aspects of sustainability to consider include energy efficiency and e-waste.

Global collaboration and advocacy across sectors can help introduce the necessary policies, standards and buy-in to transition to smart sustainable hubs. Transitioning successfully will rely on strategies, targets, KPIs, data collection, monitoring and reporting across five major dimensions: ICT usage, infrastructure, social inclusion and equitable access, quality of life and environmental sustainability.[119] Even though no city is a smart hub yet, continued advancements in ICT increase their possibility. It is estimated that smart hubs will represent 4 per cent of total revenue opportunities by 2025.[120]

Spotlight[121]

The **International Development Association** (IDA, part of the World Bank) has committed USD 100 million to developing smart villages for rural growth and digital inclusion in Niger. Its first priorities are increasing access to mobile phones and broadband services as well as introducing digital financial services to people in underserved areas.

[119] ITU. (2018). ITU's approach to smart sustainable cities.

[120] GSMA. (2019). The GSMA Guide to the Internet of Things.

[121] World Bank. (2021). Niger: Smart Villages for rural growth and digital inclusion.

c. Co-creation with local communities

It is fundamental that local communities and key stakeholders in LDCs, LLDCs and SIDS contribute to and are engaged in the development of new applications and services. This helps ensure that innovation meets an existing need and will be relevant to the local context. More people should be equipped with the capabilities to co-create in these regions. Co-creating with locals and key stakeholders can also inform and inspire more ideas. This theme is explored in depth under section 2.2.2.3.

Key issue: Inconsistent data governance

Although data has proven to be invaluable in the digital ecosystem, its fragmented landscape presents a number of risks. As data can be a powerful asset, sovereignty (authority, power and control) is a main concern. The different ways in which countries view data – such as a geopolitical asset or individual property – influences sovereignty over data at a national level. As a result, sovereignty can become unclear when data flows across borders. Within countries, data collected by the private sector but within public spaces can also raise issues on sovereignty. Powerful digital platforms can have large enough data in their ecosystems that their sovereignty can be similar to that of countries. Furthermore, individuals have data rights that must be respected. There are different types of data that may need to be safeguarded differently. This complex sovereignty landscape can create misalignment, confusion and gaps in governance. There are also conflicting interests between various stakeholders in the digital ecosystems including countries, individuals, the private sector, and civil society. Thus, when there are concerns about more than one aspect of data governance (e.g. innovation vs data protection, national security vs individual privacy) it can be difficult to apply existing policies and make trade-offs. All of this increases the potential impacts of cybersecurity threats such as privacy breaches, cyberattacks and fraud.

Potential intervention: Data governance framework

A more global, holistic and balanced approach to data governance is imperative for empowering citizens, achieving equitable access to the benefits of digital technology, and minimizing the associated concerns and risks. It may be fairer and more impactful for a multilateral, multistakeholder and multidisciplinary coalition to develop a global data governance framework. Enabling the development and execution of this framework would depend on openness, aligned

definitions, adequate measurement, terms of access to data and its treatment as a DPG, and the adoption of universal rights and principles as well as international standards. People from underrepresented groups should be included throughout the process. The global framework needs to complement and be integrated with national policies while providing countries with enough regulatory leeway to allow them to benefit from the data-driven digital economy irrespective of their readiness and maturity. In LDCs, LLDCs and SIDS, additional support can be leveraged to raise awareness about data, detail national strategies, enact relevant regulatory frameworks, and encourage effective engagement in international processes.

Commit to a pledge on our P2C Pledging Platform here. See guidelines on how to make your pledge in *Pledging for universal meaningful connectivity* and example pledges here"

2.3.2.3 Digital economy

A digital economy is characterized by online transactions and engagement – a virtual, paperless and cashless world. It harnesses a range of technologies, services and business models that improve personalization through human-centred design and create new opportunities and markets. It involves the following ambitions:

- All transactions are electronic, integrated, and secure – from registration through to employment, reporting, marketing, banking, accounting and security
- People have the capabilities to confidently use and create digital technology, forming the skilled workforce needed to help businesses reach and operate at the digital frontier
- Government services are all easily and safely accessible online, saving people time and money
- The government's delivery of targeted services, policies and programmes is supported by the availability and sharing of public data
- Smart regulations and initiatives are implemented to ensure the safest and most cyber-secure environment for working online, building trust in the digital economy and opening up new economic opportunities

Key issue: Financial exclusion

Financial inclusion has been a recurring priority for many countries to empower individuals and MSMEs to meet their basic needs and engage in meaningful economic activities. Yet there approximately more than 1 billion unbanked adults worldwide, who do not have a basic transaction account.[122] A barrier for about 67 per cent of them is cost.[123] Services are unaffordable and the locations of financial service providers are often inaccessible. Other barriers to financial inclusion would be customers' mistrust of providers and lack of required documentation and/or knowledge, and banks' failure to offer suitable products, including safe and secure online banking services. As the digital economy is dependent on banked transactions, these unbanked adults are excluded from it. Without access to financial services, individuals and MSMEs struggle to partake in and contribute to the digital economy meaningfully. The growth of this economy increases the need for people to be banked, and if the status quo persists, the consequences of financial exclusion will become ever more burdensome.

Potential interventions: Digital financial inclusion

Innovations in the financial technology (fintech) space are enablers for expanding financial inclusion, as they help remove barriers. For example, mobile phones have addressed the inaccessibility of financial service providers and facilitated more direct, immediate, convenient and user-controlled access. Other digital channels such as online banking platforms, mobile apps and software have helped extend digital financial services (DFS) to unbanked people. However, there is still room for improvement as only 62 per cent of individuals in the developed economies and less than 35 per cent in developing economies leverage Internet banking (see Figure 26). Safe and secure online banking should be scaled up rapidly, particularly in developing countries.

[122] ITU. (2020). Mapping ICT infrastructure and financial inclusion in Mexico.

[123] World Bank. (2018). UFA2020 Overview: Universal Financial Access by 2020.

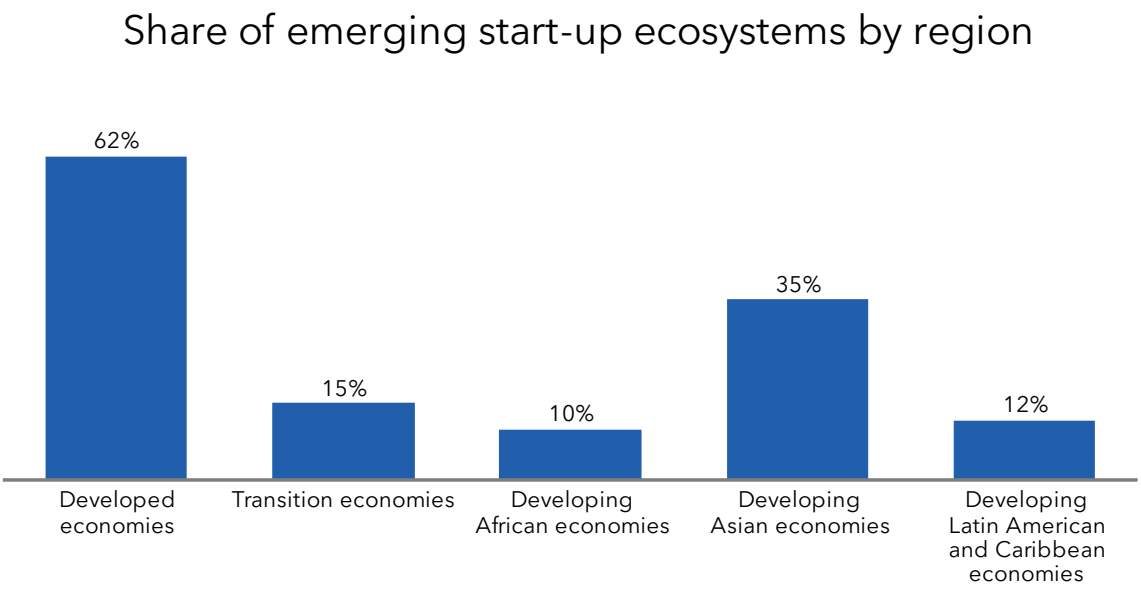


Figure 26: Proportion of people who use Internet banking by development level and region[124]

DFS are delivering a new frontier in economic growth and financial inclusion. They are strengthening the capacity of domestic financial institutions and encouraging and expanding access to banking, insurance and financial services for more of the population than ever before. In particular, they are increasing the access of small-scale industrial and MSMEs to financial services including affordable credit, especially in economies without suitable credit markets.

In parallel, financial health and literacy should be improved to ensure that people gain from their inclusion. People need to trust that their money is secure in a digital account and that transactions will be performed as instructed with an accurate record. Using DFS should be affordable not only for consumers but also merchants. Systems should be convenient, user-friendly, and easily accessible, with simple onboarding. As DFS continue to be scaled up, policies that encourage innovation, multistakeholder collaborations and responsible finance should be established. This includes generating a service-based approach to DFS, consumer protection regulations that are applicable to DFS, and market conduct regulations for non-bank agents that are on a par with those of bank agents.

[124] UNCTAD. (2021). Digital Economy Report 2021.

The COVID-19 pandemic is driving a large-scale shift toward digital markets and finance. The digitalization of finance, for both individuals and businesses, can decrease costs and introduce new market and livelihood opportunities, enabling countries to rebound as the pandemic subsides. However, the pandemic has also hindered the growth of the industry's smaller players and emphasized individuals' unequal access to digital infrastructure. To allow everyone to build back better, it is essential to strike a balance between enabling financial innovation and mitigating risks and challenges (e.g. the need to enhance financial and digital literacy, foster affordable access to digital infrastructure, guarantee data privacy, and tackle data biases and cyberthreats).

Spotlight[125]

Africa's largest fintech platform, M-PESA, is a mobile money service provided by **Vodafone** and **Safaricom** that is committed to allowing both banked and unbanked users to make payments safely. It has given more than 49 million people access to sending and receiving money, buying airtime, paying bills, receiving salaries and obtaining short-term loans safely, securely and affordably.

Key issue: Slow digitalization of businesses

As the world continues to invent more digital technology and operate more digitally so too do economies growing increasingly more digital. The digitalization of businesses can increase productivity, reduce costs, and increase the potential market, resulting in economic growth. Countries have considerable differences in their readiness, which risk widening the gap with those that are not sufficiently prepared. Similarly, large corporations have mostly been able to transition but MSMEs lag. MSMEs, particularly in developing countries, may face more barriers such as limited access to ICT, unaffordable technologies, high cost of entry and a lack of capabilities to adopt interventions. The digitalization of key activities in an economy can build the resilience of the ecosystem. During the COVID-19 pandemic, the benefits and criticality of digitalizing health care, education, remote working and essential B2C commerce were made apparent. The other challenge is encouraging consumers to partake in e-commerce. People who are connected to the Internet use it to perform various activities. In developing countries, less

[125] Vodafone. (2022). What is M-PESA?.

than 10 per cent of Internet users shop online but in European countries more than 80 per cent of users do.[126] Figure 27 illustrates the gap between developed and developing economics in other Internet activity across global regions.

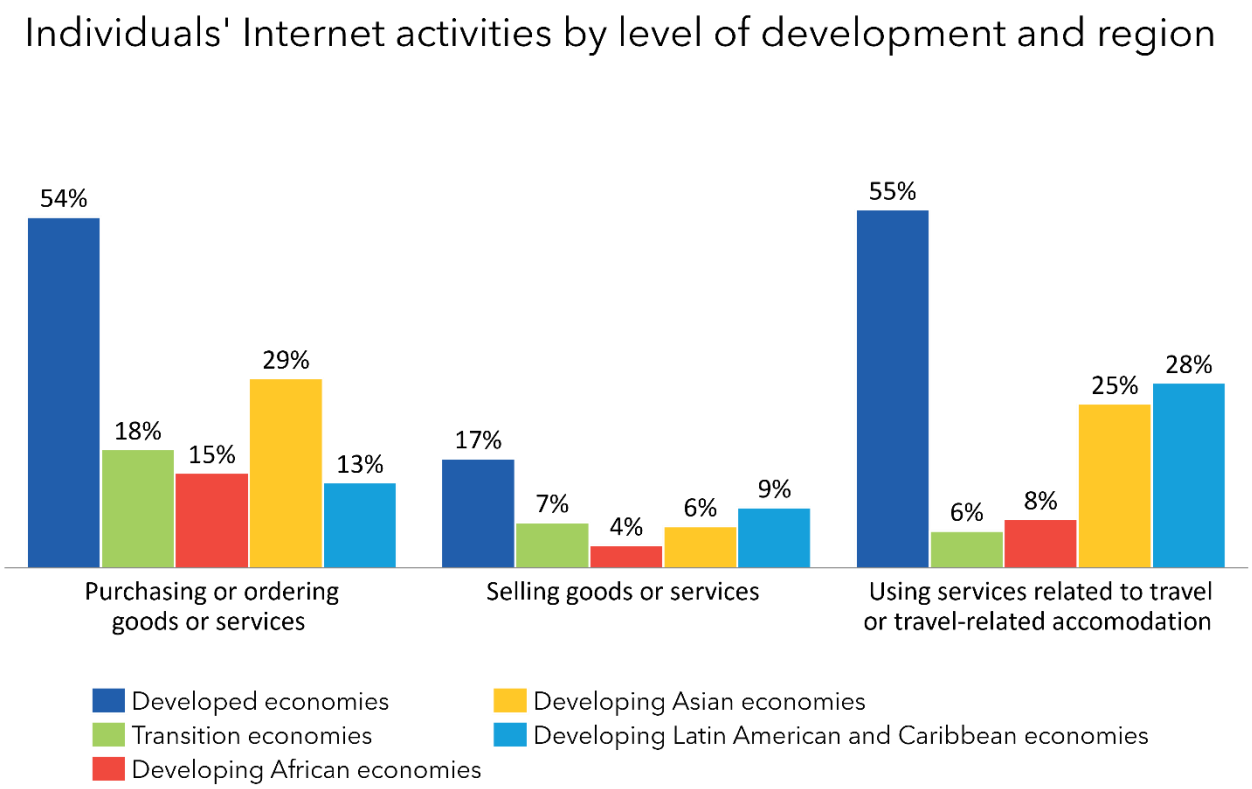


Figure 27: Individuals' Internet activities by level of development and region[127]

Potential interventions:

a. E-commerce enablers

[126] UNCTAD. (2021). The UNCTAD B2C E-commerce Index 2020: Spotlight on Latin America and the Caribbean.

[127] UNCTAD. (2021). Digital Economy Report 2021.

The rate at which the digital economy is expanding demands quick global action to minimize the inequalities among countries, businesses and individuals. Updated or new policies and regulatory frameworks that tackle the barriers to digitalization are critical. These should be informed by research, data and statistics on local economic digitalization and potential outcomes. Digital public infrastructure and goods should be utilized to ensure inclusion. Alternatively, digital technology can be made accessible and affordable for all through financing or investments. Addressing the high cost of entry into e-commerce for global MSMEs will make innovation possible at the grassroot levels. Technical support can be provided to LDCs, LLDCs and SIDS through partnerships with the private and social sectors or even multilateral agreements. A coordinated approach to implementing and regulating e-commerce should be prepared through multistakeholder engagement at an international level. E-commerce software interventions can be made available in off-the-shelf products to enable MSMEs to digitalize easily and quickly without needing IT capabilities.

b. Digitalization of B2B commerce and supply chains

The digitalization of B2B commerce has expanded commercial opportunities, broadened companies' reach to new buyers and markets, improved sales, increased efficiency and delivery speed, reduced costs, strengthened data analytics and enhanced scalability. At five times the value of B2C, the global B2B e-commerce has a market value of about USD 14.9 trillion.[128] Nearly 80 per cent of the market share is in the Asia Pacific region, excluding not only other developed regions (e.g. North America and Europe) but also developing countries in Latin America and Africa.[129]

Digital technology is redefining supply chain management by incorporating strategic considerations facing the business, considering the end-to-end visibility and implications, interacting dynamically with integrated business-planning capabilities, and leveraging advanced analytics for agile and smart decision-making. Similar to B2B e-commerce, it also delivers significant impact, including increasing revenue, improving service, driving profitability, optimizing supply chain costs and strengthening resilience.

[128] Statista. (2021). In-depth: B2B e-Commerce 2021.

[129] Statista. (2021). In-depth: B2B e-Commerce 2021.

To enable MSMEs to benefit from both B2B trade and digital supply chains, there needs to be a clear digital strategy supported by the capacity to operate efficiently, integration with existing business models and processes, and financing to obtain and implement the necessary digital tools. Both digital B2B and supply chains should be expanded beyond multinational corporations and MSMEs to include the social sector, especially education and health care. Multistakeholder partnerships across sectors and industries can help by making digital tools accessible, developing expertise, and assisting with financing. CSPs are already collaborating with cloud service providers and technology partners to accelerate the digital transformation of cloud businesses, such as the partnership between Airtel, Cisco and Google Cloud.

Spotlight[130]

HeHe, the largest e-commerce business in Rwanda, has established its own Innovation Academy (iHAC) to drive non-profit research and provide an innovation tank to prepare potential entrepreneurs. One of its initiatives, Innovate for Impact, is an executive fellowship programme that is committed to helping African organizations develop digital interventions, including digitalizing rural supply chains in Africa.

Key issue: Cyberthreats, cyberattacks and cybercrimes

Cybersecurity continues to be a growing concern as digital economies grown with innovative digital products and services. With more economic activity occurring online, there is a greater incidence and risk of cybercrimes. On average, more than 4,800 unique websites are compromised per month by formjacking attacks (where cybercriminals steal shoppers' credit card details). Ransomware (malware that holds personal information for ransom) attacks on enterprises increased by 12 per cent in 2018.[131] In the same year, supply chain attacks increased sharply by 78 per cent.[132] About 10 per cent of groups launching targeted attacks utilize malware to sabotage, damage or halt business operations.[133] Although MSMEs are at greater risk of

[130] VC4A. (2022). HeHe Innovation Academy.

[131] Symantec. (2019). Internet Security Threat Report.

[132] Symantec. (2019). Internet Security Threat Report.

[133] Symantec. (2019). Internet Security Threat Report.

cyberthreats, only about 60 per cent of countries have or are working to improve cyber awareness among MSMEs and the private and public sector, as shown in Figure 28.

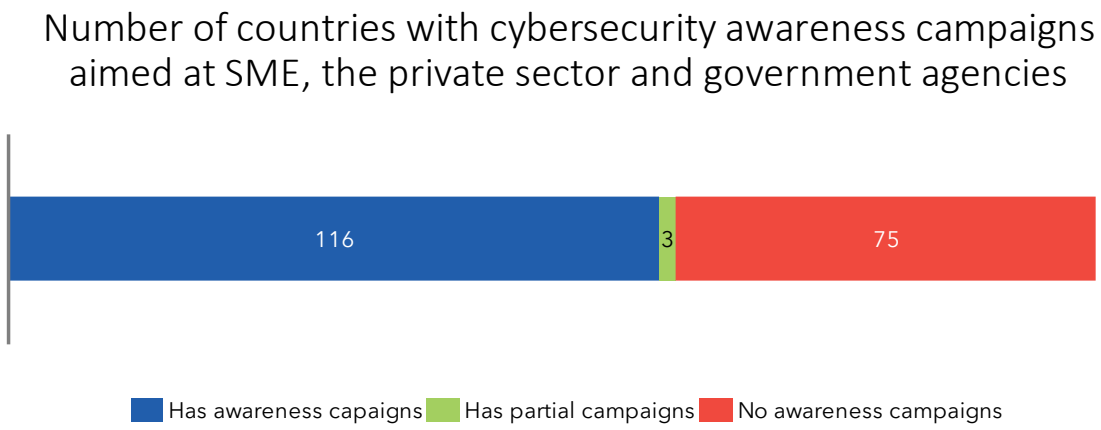


Figure 28: Number of countries with cybersecurity awareness campaigns aimed at SMEs, the private sector and government agencies[134]

Potential interventions:

a. National cybersecurity strategies

To address cybersecurity holistically across the national digital economy, each country should develop and implement a national cybersecurity strategy (NCS). Through the strategy, governments can define the vision, objectives and priorities relevant to the country, e.g. governance, preparedness, resilience, data protection, and safeguarding critical infrastructure. Countries can develop their NCS by establishing the necessary leadership, and committees; identifying the stakeholders who should be included in the process; evaluating the national cybersecurity landscape and risks; developing a strategy, with corresponding targets, in line with recommendations from the evaluation; and consulting with beneficiaries from across industry, the social sector, and civil society. The NCS should also be aligned with other objectives related to ICT. Once finalized, the strategy should be translated into legislation, actionable policies, roadmaps and initiatives for implementation. In addition, these should be supported by sufficient resources and budget. Implementation of the strategy should be monitored to determine the progress against objectives, measure the efficacy of actions, and identify areas for improvement.

[134] ITU. (2021). Global Cybersecurity Index 2020.

b. Cybersecurity capacity building of MSMEs

MSMEs are at greater risk of falling victim to cybercrimes as they are not always well-equipped to handle them, especially in developing markets. It is important that these enterprises are empowered with adequate knowledge, skills, cyber hygiene and security resources (software, hardware and education) to protect themselves and respond appropriately when exposed to a cyberthreat. PPPs are mechanisms that can help make cybersecurity frameworks, best practices, training materials and programmes more accessible and affordable for MSMEs. In addition, private sector organizations could collaborate with MSMEs to share expertise, experience and skills. Governments can advocate for and incentivize partnerships and collaborations by including or even prioritizing cybersecurity for MSMEs in the NCS and bringing together key stakeholders to engage and commit to action.

Spotlight[135]

To ensure that SMEs are capable of finding and addressing cyberthreats independently, the **SMESEC consortium** (in partnership with the EU and Switzerland) has developed a "lightweight" cybersecurity framework. The framework provides training tutorials and tools to empower SMEs with cybersecurity capabilities.

Key issue: Unsustainable practices and impact of the digital economy

Connecting the world to ICT has had a significant impact on the sustainability of the planet. Digital technology usage is estimated to account for 3.7 per cent of global greenhouse gas (GHG) emissions.[136] The production and transporting of digital devices can be energy-intensive and heavily dependent on raw materials, contributing further to GHG emissions. Using ICT is heavily reliant on electricity. Although there has been a shift towards renewable energy, approximately 60 per cent of global electricity production is still from fossil fuels.[137] For the ICT

[135] SMESEC. (2022). Cybersecurity for Small and Medium-Sized Enterprises.

[136] The Shift Project. (2019). "Lean ICT" – Towards digital sobriety.

[137] Our World in Data. (2020). Share of electricity production from fossil fuels.

industry to comply with the Paris Agreement, GHG emissions need to be reduced by 45 per cent between 2020 and 2030.[138]

As the uptake of digital technology grows, so too does the resultant waste. Waste electrical and electronic equipment (WEEE), also called e-waste, is among the fastest-growing waste stream globally. Between 2014 and 2019, e-waste increased by 9.2 Mt.[139] WEEE poses a threat to human and environmental health if not handled and disposed of appropriately. Yet if it is recycled effectively, a potential value of USD 57 billion or more could be recovered each year from the raw materials, based on figures from 2019.[140] However, as of 2019, only 78 countries had legislations, policies or regulations to address e-waste.[141]

[138] ITU. (2020). Press release: ICT industry to reduce greenhouse gas emissions by 45 % by 2030.

[139] Forti, V., Baldé, C.P., Kuehr, R., & Bel, G. (2020). The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential.

[140] Forti, V., Baldé, C.P., Kuehr, R., & Bel, G. (2020). The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential.

[141] Forti, V., Baldé, C.P., Kuehr, R., & Bel, G. (2020). The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential.

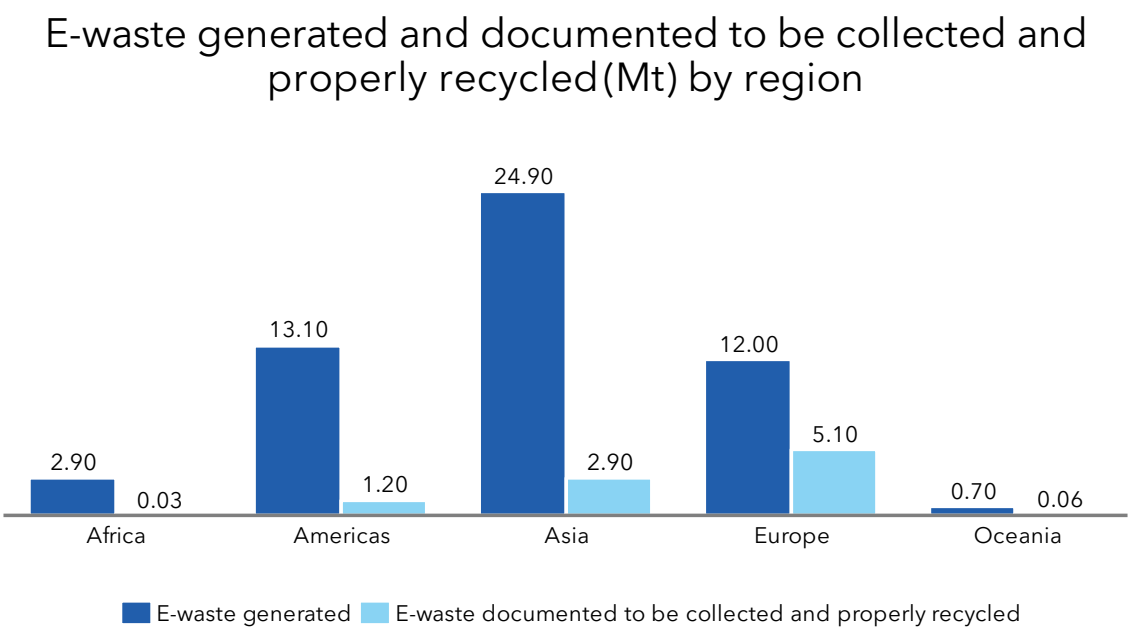


Figure 29: E-waste generated and documented to be collected and properly recycled (Mt) by region[142]

Potential intervention: Integration of sustainability in the digital economy

Sustainability should be central to how the public, private, social, and civil society sectors engage in the digital economy. Policy-makers can enact legislation and regulatory frameworks that mandate and incentivize sustainable practices. Enterprises need to embed sustainability as their way of operating and align it with their business objectives. The adoption of principles like the circular economy, carbon neutrality, and net-zero green software engineering, can guide how businesses approach sustainability. Establishing committees and identifying leaders to champion the sustainability agenda in an organization can help provide strategic guidance to drive progress on targets, initiatives and best practices. A shift from the linear economy of take-make-dispose to one of a circular economy for electronics is key, where ICT equipment is designed with waste management in mind, reuse and repair are encouraged, and discarded equipment is collected and properly recycled. These factors are critical in order to ensure the necessary rise in ICT penetration rates over the long term.

Digital innovations that reduce the environmental footprint of these technologies should be commercialized and scaled across industries. Civil society organizations need to be made aware

[142] Forti, V., Baldé, C.P., Kuehr, R., & Bel, G. (2020). The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential.

of the impact of their ICT-related activities on global sustainability. With increased awareness through campaigns, media attention, and transparency from businesses as well as access to more accurate data, individuals should be empowered to make more sustainable decisions. Partnerships involving the public, private and social sectors can help industries to agree on strategies and targets, produce more environmentally responsible innovations, increase demand, and source funding to support a sustainable digital economy.

Spotlight[143]

ITU, **UNIDO** and other partners are collaborating on a project funded by the **Global Environmental Facility** (GEF) that aims to bolster regional cooperation in Latin American countries. This has led to the production of a case study on how Costa Rica implemented ITU's guidelines on "achieving e-waste targets of the Connect 2030 Agenda" and "certification schemes for e-waste recyclers". Furthermore, ITU has assisted with the creation of the Regional E-waste Monitor for Latin America.

Spotlight [144]

The **Coalition for Digital Environmental Sustainability** (CODES) is a global, multistakeholder alliance that consists of governments, companies and civil society organizations and is committed to utilizing digital transformation as a positive proponent for sustainability and climate action. CODES has collaborated on the development and advancement of the Action Plan for a Sustainable Planet in the Digital Age, which will determine the key shifts and strategic priorities to drive development environmentally and socially.

Commit to a pledge on our P2C Pledging Platform here. See guidelines on how to make your pledge in *Pledging for universal meaningful connectivity* and example pledges here"

[143] ITU. (2022). E-waste: ITU's work to combat e-waste.

[144] SparkBlue. (2020). Coalition for Digital Environmental Sustainability (CODES).

2.4 Focus Area 4 – ACCELERATE: Incentivizing investments

The previous chapters have outlined the need to build both telecommunications and data centre infrastructure, digital skills and also digital businesses in the developing economies and the LDCs, LLDCs and SIDS to close the digital divide.

Closing the connectivity gap requires accelerated investment to ensure that the underserved countries does not end up with a lesser quality of experience than is available across the developed world. What is evident is that there is a funding gap. It is also apparent that existing models of funding and distribution are insufficient to fill the gap. For example, traditional models for universal service and access funds (USAF) – which are designed to take contributions only from nationally licensed network operators and issue grants to operators to build infrastructure in underserved areas – are known to be inadequate.

There is a need to examine ways to augment and expand on the current financing and investment models. This approach requires new paradigms including:

- broadening the base of contributors
- ensuring that all who derive benefits from the digital economy, as consumers or as producers contribute objectively, equitably, and fairly towards connecting the offline
- for such contributions to be made by all ecosystem players, considering the new realities of the disaggregation of digital service provision and, therefore, revenue generation from underlying network infrastructure investments
- making such contributions sustainable and predictable; and
- for such contributions to be managed efficiently and disbursed in a timely and prioritized manner.

2.4.1 Key challenges for accelerating investment in digital connectivity

Capex needs

A recent report by ITU has assessed that globally USD 382 billion investment into telecommunications infrastructure is needed.[145] Another USD 40 billion is needed for investment in skills, summing up to total investment of USD 428 billion – not yet taking investments for Building Digital Ecosystems into account the investments required in infrastructure and skills in the LDCs, LLDCs and SIDS are – given the low starting point – relatively high on both a per capita and per GDP basis. While globally this represents investments of USD 55 per capita and 0.5 per cent of GDP, for sub-Saharan Africa this represents USD 85 per capita and 5.7 per cent of GDP. For the LDCs, LLDCs and SIDS the challenge is even bigger with required investment of USD 100 per capita and 10 per cent of GDP.

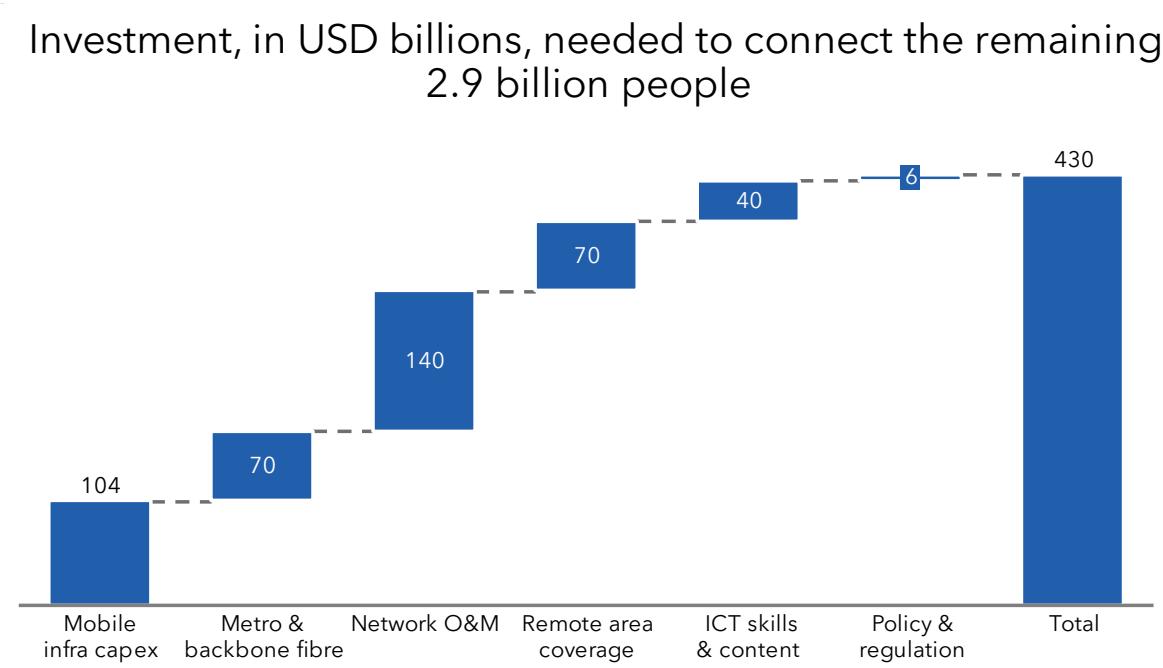


Figure 30: Investment, in USD billions, needed to connect the remaining 2.9 billion people[146]

Infrastructure deployment at scale

Achieving the target of connecting all of humanity to broadband Internet by 2030 is, above all, an infrastructure investment challenge. Around 2.6 million 4G BTS and 700,000 km of backbone fibre transmission infrastructure would have to be rolled out on top of the existing broadband

[145] ITU. (2020). New ITU study estimates US$ 428 billion are needed to connect the remaining 3 billion people to the Internet by 2030.

[146] ITU. (2020). Connecting Humanity.

network capabilities. 5G deployments will be increasing globally. Data centres are also key for development of the digital ecosystem. As of January 2021, almost 80 per cent of all collocated data centres are in the developed countries and Africa currently has the least number (~ 69) as compared to some of the other developing regions like LATAM and transitioning economies.

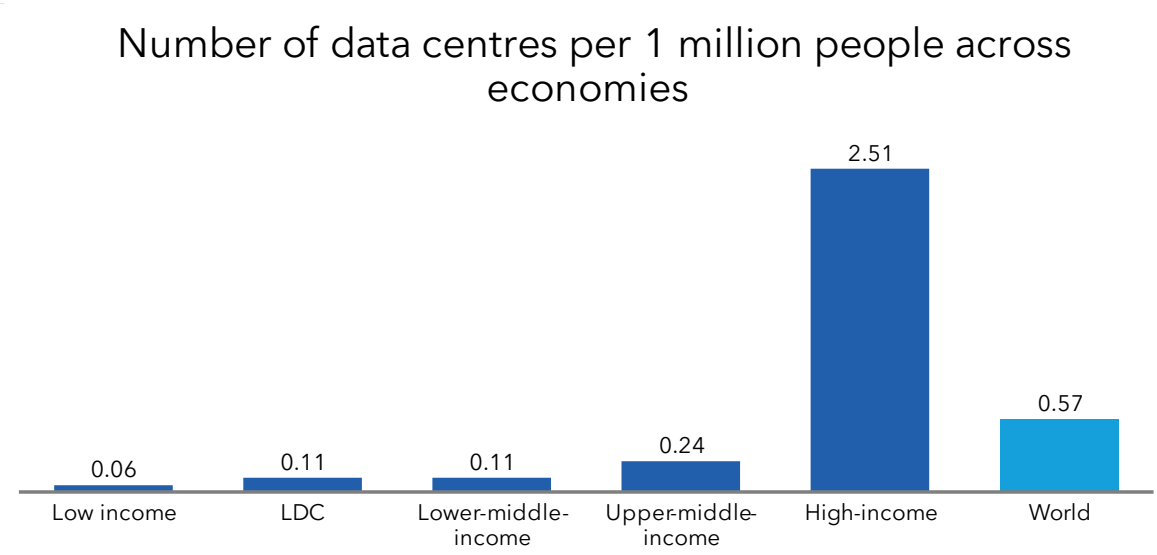


Figure 31: Number of data centres per 1 million people across economies[147]

Venture capital (VC) investments

There is limited data available about the total investment flow into the LDCs, LLDCs and SIDS related to ICTs. A few indicators however show that the current level of investment is clearly insufficient. VC investment into the LDCs is only USD ~500 million compared to over USD 11 billion for Africa as whole. Also the increase in number of servers and base stations per pop is clearly lagging not only versus developed countries but also versus other countries in Asia and Africa.

Projects financing dipping

The COVID-19 crisis caused a dramatic fall in foreign direct investment (FDI) in 2020. Global FDI flows dropped by 35 per cent to USD 1 trillion, from USD 1.5 trillion in 2019. This is almost 20 per cent below the 2009 trough after the global financial crisis. The decline was heavily skewed towards developed economies, where FDI fell by 58 per cent. FDI patterns contrasted sharply

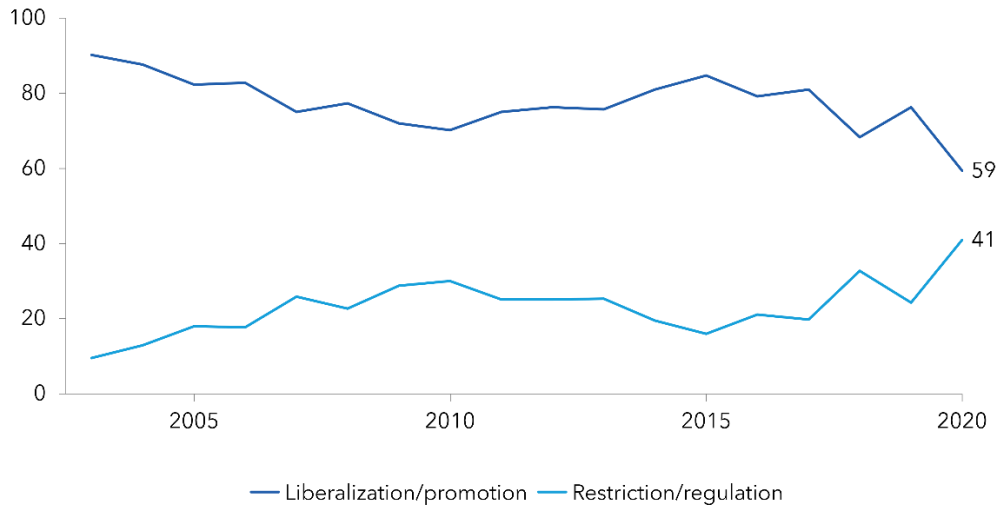
[147] PeeringDB. (2022). The Interconnection Database.

with those in new project activity, where developing countries are bearing the brunt of the investment downturn. In developing countries, the number of newly announced greenfield projects fell by 42 per cent and the number of international project finance deals – important for infrastructure – by 14 per cent.

Regulatory environment

As forecast in the World Investment Report (UNCTAD) 2020, the trend towards more regulatory or restrictive policy measures accelerated in the wake of the pandemic.[148] These measures amounted to 41 per cent of all the new investment policy measures reported for 2020 (not considering measures of neutral or indeterminate nature) – compared with only 24 per cent in 2019 and 28 per cent in 2009, during the global financial crisis. Although developed economies adopted the vast majority of these measures, several developing countries and emerging economies also began to strengthen their FDI review mechanisms. This surge in regulatory or restrictive investment policy measures is not only a response to an extraordinary crisis but also a continuation of a policy trend in the era since the global financial crisis.

Changes in national investment policies, 2003-2020 (%)



[148] UNCTAD. (2020). World Investment Report 2020.

Figure 32: Changes in national investment policies, 2003-2020 (%)[149]

2.4.2 Three key pillars to address

Based on initial research, discussion with industry experts and leaders, the challenge of incentivizing the investments can be categorized into the subsequent three pillars. The grouping of the issues under the pillars try and give a perspective on what could be some of the potential areas to work on so that an environment can be created to enable higher investments specially in the LDC, LLDC or the SIDS if the eventual target of connecting the 2.9 billion people needs to be met by 2030.

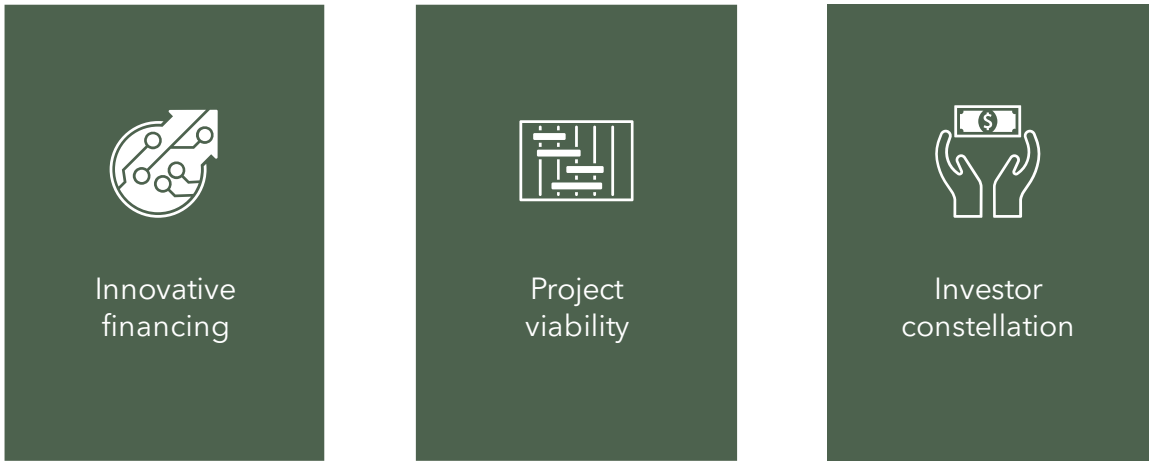


Figure 33: Key pillars for ACCELERATE: Incentivizing investments

Under each pillar, there is a detailed list of issues to factor in to be able to make large scale investments in the most under connected regions of the world:

Innovative financing: The financing ecosystem is evolving today which includes many different avenues for a country to leverage for financing. However, most of the developing nations are yet to take full advantage of this emerging trend due to multiple factors:

- Divergent financing models and complexities

[149] UNCTAD. (2021). Investment Policy Hub.

- Financing models linked to type of project (e.g. backbone, last mile, capacity or digital infrastructure)
- Leveraging new developments like blockchain and cryptocurrencies and associated security

Project viability: For any project to be a success and be able to achieve the objectives, it is important that the project environment has strong stability and continuity. Any changes either in terms of laws, regulation or political environment will influence the viability of the project. Some of the key issues impacting the viability are:

- Attractiveness of business cases on stand-alone basis dependent on ecosystem
- Compliance with the local economic, political and social environment
- Political and regulatory risk profile – impact on state of ecosystem and local co-operation and ease of doing business
- Alignment to local needs and expertise development – high dependence on expensive foreign skills/resources

Investor constellation: To achieve the goal of connecting 2.9 billion people will mean that the investor community may have to focus on and help the target countries to be able to achieve the sustainable changes. The traditional investment methods will have to relooked and reassessed. Some of the factors to weigh in are:

- Traditional donor aids as primary source of funding
- Co-financing between IDBs and private investors
- Focus of private investors on LDCs/LLDCs/SIDS
- Cyber risk assessment and execution related challenges for complex infrastructure projects
- Governance model influencing the investment climate

2.4.2.1 Innovative financing

Meeting the 2030 Agenda will require unprecedented investments in areas such as health and education, environmental protection, infrastructure and sustainable energy, rural development, peace and security and actions to tackle climate change. Every dollar will also need to be used

effectively in support of sustainable development, and in particular reach those communities and peoples furthest behind. While financing needs for the new agenda are unquestionably high, there are also more opportunities for countries to mobilize new and additional sources of finance (public and private, domestic and international) as well as experiment with innovative new financing approaches.

Key issue: Complex and divergent finance model

Globally, most of the funding for infrastructure investment in LDCs are obtained from the public sector, particularly government budgets. The way in which public resources are mobilized varies across countries. For example, in resource rich LDCs, at least 50 per cent of government budgets are generated from non-tax revenue such as natural resources, while in other LDCs, a large part of public expenditure is financed by tax revenue. As most of the infrastructure funding in LDCs are from public financing, concessional financing has been the dominant financing instrument. The developing countries face a challenge in adopting new and innovative financing models due to the inherent complexities. It can be extraordinarily difficult for a country to understand how it can maximize new financing opportunities, understand new and innovative financing approaches, comply with many different application requirements, and understand how to blend and sequence various financing flows to achieve transformational change.

Potential interventions:

Financing is being used in increasingly sophisticated and creative ways to meet public policy objectives. More and more countries are adopting the financing model best suited to their requirements and prevailing conditions. Some examples of the different modes of financing available to take advantage of:

- Public financing: In the developing nations, since domestic public finance is a key source of funding, steps like improved tax administration through tax reforms would allow expansion of fiscal scope.
- Blended finance: Concessional public finance is blended with non-concessional public or private finance.
- Green and Blue bonds: Bonds are issued on domestic and international capital markets for the financing of environmentally sound infrastructure.
- Other instruments include (not exhaustive): Lending in local currencies, Islamic funding instruments, diaspora funding, crowdfunding, social impact bonds, etc.

Spotlight[150]

Nigeria became the first country on the African continent and the fourth globally to issue a security that raises funds for environmental projects after the launch of its first and second tranches of a N150 billion Sovereign Green Bond programme. The Nigeria Sovereign Green Bond is a financing mechanism to facilitate and assist Nigeria in meeting its nationally determined contribution (NDC) target.

Key issue: Project-specific finance model

The financing needs of different ICT infrastructure projects will vary on factors such as geographical constraints, complexity, duration, national and international parties involved etc. It is very challenging if the financing model chosen does not adapt to the specific needs of the infrastructure.

Potential interventions: Depending on the geographical constraint or type of infrastructure being deployed, the financing model can be adopted along with policy adoption.

- Private financing are bonds, loans, listed equity capital, and corporate social responsibility (CSR) grants. This kind of financing tends to be more independent, customizable to the type of role and risk return/interest of investors project based and associated to faster roll-outs. Successful cases of backbone deployment also may involve active and strong private sector participation in the form of multi-sector partnerships.
- Supporting start-ups through CSR: Defining and promoting the application of CSR policies to enable start-ups is another potential intervention. Some of these policies could be a way to generate funds, which can be leveraged for training purposes.
- Transit pricing: In many instances, landlocked countries might incur higher costs for accessing submarine optical fibre cables. They may opt for contracts which are long term and also covers bulk purchase. E.g., Rwanda with the fund from World Bank purchased bulk amount of international transit. The length of the contract and volume, and the price were very favourable.

[150] Department of Climate Change. (2020). Green Bonds.

- Financing and leasing to finance IT infrastructure. By transforming large one-off investments (capex) into periodic expenses (opex), it supports the weight of capex and therefore cushions the impact on the company's cash flow. Thus, the funds are available for other overriding priorities. This requires a funding partner that helps modernizing IT infrastructure in sync with business imperatives. This makes it possible to define a digitalization strategy which is therefore indexed to the financial resources available to the company.

Key issue: Emerging technologies like blockchain and cryptocurrency

In the span of a few years, cryptocurrencies have grown from digital novelties to trillion-dollar businesses with the potential to disrupt the global financial system. Bitcoin and hundreds of other cryptocurrencies are increasingly held as investments. Blockchain acts as the underlying technology. Cryptocurrencies are typically exchanged on decentralized computer networks and the transactions are recoded on distributed, tamper proof ledgers known as blockchains.

Potential intervention: Decentralized finance

Cryptocurrencies and blockchains have given rise to a new constellation of "decentralized finance" or DeFi businesses and projects. Essentially the cryptocurrency version of Wall Street, DeFi aims to offer people access to financial services – borrowing, lending, money transfer and trading – without the need for legacy institutions such as banks and brokerages, which often take large commissions and other fees. Instead, "smart contracts" automatically execute transactions when certain conditions are met. DeFi is surging in popularity, with investors pouring tens of billions of dollars into the sector. Most DeFi apps are built on the Ethereum blockchain. Because of its usefulness in tracking transactions, blockchain technology has a range of potential applications beyond cryptocurrency, experts say, such as facilitating real estate deals and international trade.

Spotlight[151]

UNICEF CryptoFund: The CryptoFund is a pooled fund of bitcoin and ether. It is a part of UNICEF's Innovation Fund, with the distinction that investments made through the CryptoFund are denominated in crypto. By sharing the public records of crypto transfers, the CryptoFund aspires to create visibility for the donor and the public, adding a layer of transparent accounting to the donation and investment processes. The CryptoFund is a prototype fund for UNICEF to explore the use of digital currencies, and what it means to operate in a digitally financed future.

Spotlight[152]

Nigeria's federal government is reportedly developing an ambitious plan to facilitate national crypto adoption with the vision of creating a "Digital Nigeria." The blueprint also alluded to the creation of a National Blockchain Consortium aimed at driving adoption initiatives, particularly in applications in the public sector. Nigeria's mission is to drive adoption of the technology in public administration, leading to improved efficiency, transparency and accountability, according to the document.

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2.4.2.2 Project viability

The financial attractiveness of many of the investment in the infrastructure sector is either low, too far into the future or too risky. For illustration, investment in one 4G base station in a rural setting may cost USD 75,000 with annual operating costs of USD 10,000. To make this business case viable, the base station would need to drive at least 500 new customers to generate a 7 year pay-back. For rural areas realizing this uptake is unrealistic without additional actions on making the devices and the broadband plans affordable, skill sets, local content and stimulating demand for

[151] UNICEF. (2020). The UNICEF CryptoFund.

[152] CoinDesk. (2020). Nigeria Is Developing Strategies for National Blockchain Adoption.

broadband in the community. The above example also shows the importance of holistic action across all focus areas to ensure such investments become attractive as it helps drive the business case for private investors.

Key issue: Attractiveness of business case/project preparation

Project preparation and viability is a complex process involving large teams and multiple stakeholders (ministries like ICT, Finance etc.), private/public entities, banks/financial institutes as well as multitude of interfaces between different functional entities. It is of paramount importance that a thorough business case analysis is conducted including the sensitivity analysis on key risks and potential economic scenarios.

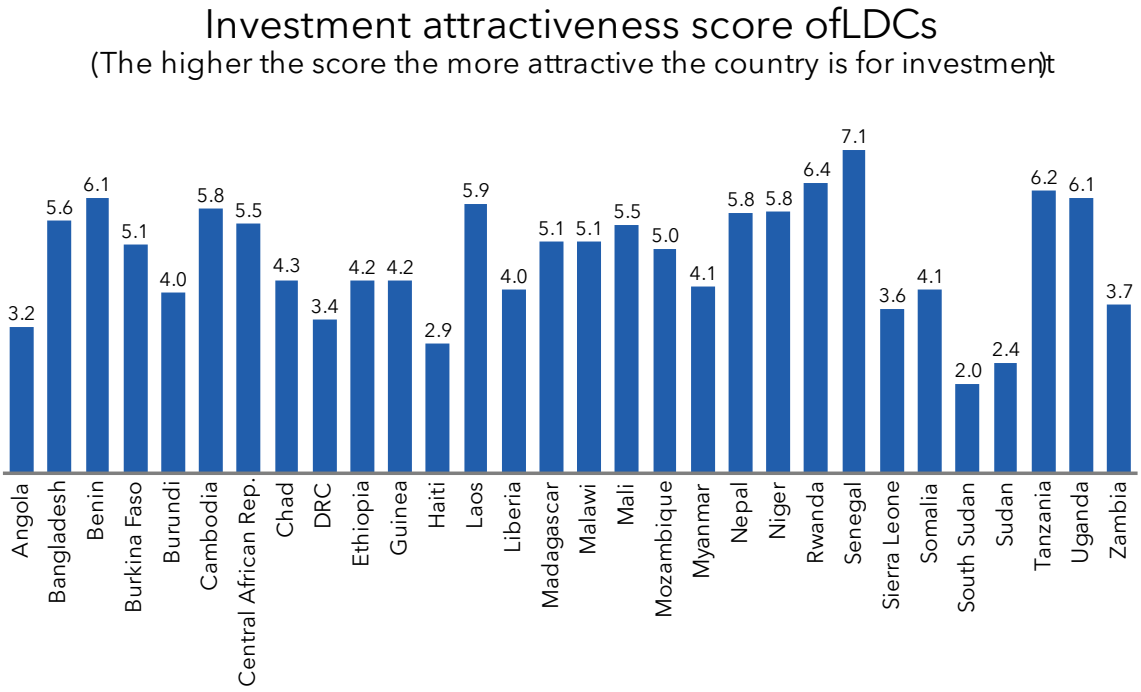

Figure 34: Investment attractiveness of LDCs[153]

Potential interventions: Project preparation

- Rigorous project preparation: team and leadership, governance structure with clear roles and responsibilities

[153] The BCG analysis is based on World Bank and Oxford Economics data.

- Bankable feasibility study: technical scope, sustainability requirements, adequacy with the economic, political and social environment, commercial attractiveness
- Risk allocation and regulation: incentives, risk mitigation and safeguards

Key issue: Political and regulatory risks

Political and regulatory risk is a categorization that includes those risks arising from individual political and regulatory decisions that affect an infrastructure project or an existing asset. In particular, the approach distinguishes political and regulatory risk affecting specific projects and those affecting the whole economy.

During the different stages of a project's life cycle, infrastructure projects are exposed to very different types of political and regulatory risk. Among the risks are, for example: during the planning and construction phase – delayed construction permits, and community opposition; during the operating phase – changes to various asset-specific regulations, and outright expropriation; towards the end of a contract – the non-renewal of licences and tightened decommissioning requirements.

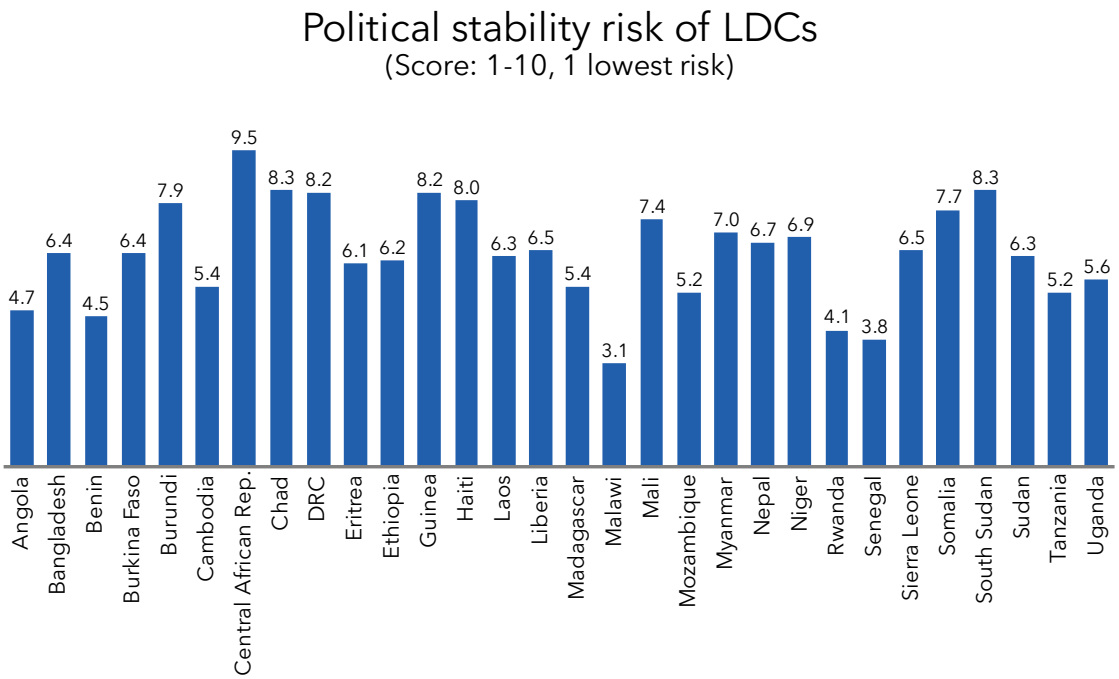

Figure 35: Political stability risk in LDCs[154]

[154] Oxford Economics. (2020). Economics and Political Risk Evaluator.

As Figure 35 shows, most of the LDC countries have a very high-risk score (lower the score, less the risk). The risks can be categorized as follows:

- Specific project related: Change of scope, Permit and environmental risks, Community risks
- Sector or whole economy: Change of regulation, taxation, Currency related, Corruption/market-distortion risks
- Demand volatility: Linked to income volatility in many of the developing countries or LDC

Potential interventions: Risk management and mitigation

a. Optimization of regulatory levies and sector specific taxes: ICT infrastructure is an essential utility and core pillar on which digital technology rides. Governments should explore optimizing levies and taxes to exploit the public good and multiplier effect of telecommunication networks.
b. Infrastructure regulation and contracts: Ensuring that any changes to sector rules are as predictable as possible is important for maintaining a balance between public and private interests over time.
c. General stability of laws and regulation: Investors look for reassurances to sector specific and general laws
d. International commitments: To reduce uncertainty about national political decisions, governments can commit to international treaties. The longer an investment is committed to, the more important investment protection becomes – which is why international investment agreements (IIAs) are of such relevance for infrastructure assets.
e. Sustainability and environmental policy: Define investment policies considering the standards in force in terms of sustainability and respect for the environment.
f. Private sector interaction with public sector: To mitigate political and regulatory risk, private companies should make a conscious effort to facilitate constructive interaction with the public sector.
g. Demand volatility: One approach could be to follow a multi-country portfolio approach like targeting regional trading blocks whose existing political and economic cohesion can help in projects and fund disbursal. These blocks could also give a higher priority to the funding of the regional broadband connectivity and accessibility to advance their cohesive agenda.

Key issue: Capacity development

At each phase of the life cycle, considerable skilled manpower is needed – for planning, engineering, legal, financial, economic, or administrative work. Many governments, particularly local or regional governments in low-income countries, simply do not have enough of that vital resource. But even in high-income countries where PPP skills may be available in central units of government, civil servants in the agencies implementing PPPs will often lack the necessary expertise – in particular, they might lack skills that may be non-essential in traditional public procurement but that are crucial to PPPs (such as financial, legal, and transaction skills). All too often, the civil servants assigned to plan and manage a PPP are inexperienced and untrained for the role. Governments would do well to introduce dedicated training programmes or to upgrade them if they already exist.

Potential intervention: Capacity building

Individual and institutional capacity building need to complement each other.

- Country-level capacity building: Broad government capacity building strategy
- Institutional capacity building: Standardization of guidelines and tools, data collection and analysis/evaluations
- Individual capacity building: Training and knowledge sharing, Talent, and leadership development.

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2.4.2.3 Investor constellation

Nearly every major financial institution, organization, company and government agency that deals with the ICT development sector is almost constantly in some stage of self-evaluation, reorientation and exploration of new and improved modes of operation. Greater cross-sectoral and cross-institutional coordination of financing programmes and ICT development initiatives is needed to improve effectiveness and make better use of resources. The onus for coordinating inputs rests primarily with national governments (coordinating at the national, regional, and

international levels). Governments should identify priorities and ensure multi-sectoral participation in ICT programmes through strategic planning. Donors and other financial institutions should, for their part, be prepared to work within these national frameworks on a complementary basis, while making renewed efforts to coordinate planning, implementation and evaluation on an international and regional basis as well.

Key issue: Traditional funding sources

Some developing countries are now able to mobilize more domestic resources for development, attract private investment and experiment with innovative finance mechanisms, this is not the case for all. Progress in these areas can be attributed to mostly (large) middle-income economies, while many LDCs and some SIDS and fragile states have fewer financing 'options' and remain heavily reliant on traditional donor aid. In addition, some resource-dependent lower-middle income countries that had made significant headway in diversifying sources of external finance during the commodity price upswing in the 2000s have seen their fortunes reverse recently as commodity prices have slumped since mid-2014. For these countries, concessional finance is becoming important again as many face widening fiscal deficits and risks to debt sustainability. Most donors meanwhile are far from achieving the longstanding United Nations target of allocating at least 0.7 per cent of GNI to official development assistance (ODA) (donors achieved just 0.3 per cent on average in 2016), and the share of total aid allocated to LDCs, and SIDS has in fact declined in real terms over recent years. Financing gaps in many countries remain high.

Developing countries as a whole have increasingly turned to private sources of finance to fund sustainable development. FDI in particular is viewed as a tool to fund economic development and modernization, employment and technology transfer. It is the largest source of international private finance for developing countries. Many developing countries have liberalized policies related to FDI over the last fifteen years and pursued other measures (e.g. tax incentives) to attract investment.

Potential interventions:

a. Diversity and innovation in financing approaches

The ways in which resources are both mobilized and spent have become increasingly 'innovative' and diversified. This has been supported in turn by innovations in technology that have led to the financialization of 'real' markets, increased interdependence/integration of financial markets,

the introduction of new crypto-currencies, and facilitated access to financial markets by previously excluded people (e.g. via mobile and smartphone technology). Collaborations between public and private actors to deliver sustainable development outcomes have also become commonplace.

- Bonds: Digital bonds, Sovereign bonds, social impact bonds, Development impact bonds, etc.
- Funds: vertical funds (e.g. GAVI, securities and structured funds), microfinance investment funds
- Loans and guarantees, including from multilateral and bilateral development banks, other official flows (OOFs), counter-cyclical loans, contingent credit facilities, development policy loan deferred drawdown options
- Grants: ODA, philanthropic and private funds
- Co-financing between IDBs and private investors

b. Effective use of the USAF

A USAF is the fund collected by governments to reach universal service. When not entirely financed by the government (as in Chile), USAFs can be financed through a contribution mechanism from licensed telecommunication operators, typically in the form of a percentage of gross revenues, or a fixed recurrent fee. In some countries, the USAF fee is not a separate fee but rather a portion of an overall regulatory or licensing fee. In such cases, the portion of the fee to be directed to the USAF may be fixed. According to an ITU report surveying 69 USAFs, almost 50 per cent have a low level or no level of activity.[155] Given that the largest part, if not all, of the funds come from sector-specific taxation, many operators see contributions to USAFs as potential investments not being pursued. Some examples of best practices for management and disbursement of USAFs:

- Autonomous/independent structure
- Consultation with stakeholders to ensure operational efficiency
- Flexible regulatory frameworks to permit USAF adjustments

[155] Broadband Commission for Sustainable Development. (2019). The State of Broadband: Broadband as a Foundation for Sustainable Development.

Spotlight[156]

FITEL, Peru: Fondo de Inversion de Telecomunicaciones (FITEL), a USAF established in Peru in 1993, has implemented lowest-subsidy auctions for the deployment of telecoms infrastructure in rural areas.

- FITEL collects 1per cent of gross revenues from all telecoms and cable TV operators for its fund, which is managed by a technical secretary and six professionals appointed by the Telecoms Ministry.
- The 2016 FITEL fund has initiated 21 regional projects (worth USD1.8 billion in financing) for connectivity in rural areas and is expected to provide broadband access to 6,000 localities.

Key issue: Cybersecurity risks to investment

In this year's WEF Risk Report, cyberthreats are considered be one of the top five risks facing organizations and governments over the next two to five years; in addition, cyberthreats are among the top ten risks that have worsened since the start of the pandemic.[157] Developing countries will have limited resources to enhance cyber defences against critical infrastructure breaches or cyber regulations to protect data and privacy. The WEF Risk Report recognizes that "there is a risk that concerns over cybersecurity could further hamper attempts to promote rapid and inclusive digitalization".[158]

Potential interventions:

a. **Cybersecurity regulation**: Financial and technical support in implementation of National Cybersecurity strategy.
b. **Data protection laws**: Although already covered in Focus Area 3 – VALUE CREATION: Building digital ecosystems, it is important from an investor perspective that the data protection laws are enacted and stringently implemented.
c. **Digital security risk management**: Collaborative approach between government and private sector and individual users.

Key issue: Governance influencing investment

[156] ITU. (2013). Universal Service Fund and Digital Inclusion for All.

[157] WEF. (2022). Global Risks Report 2022.

[158] WEF. (2022). Global Risks Report 2022.

Regardless of the type of market, governments must have a coherent vision, political will, and strong leadership when developing their broadband strategies and digital agendas. Thus, government intervention should be based on clear policy objectives and an open mindset toward developing a cooperative and trustworthy relationship with the private sector. Having specific and attainable targets for their national broadband strategies, an independent agency, open access, and diversified public and private funds are some of the guidelines at the general level.

Potential interventions:

- An independent regulator with the capacity to impose asymmetric measures to create a level playing field between the incumbent and competitors
- Liberalization of the market to allow competition
- Tools to improve transparency and accountability:
    - Use technology to promote transparency and to make initiatives more effective
    - Make use of open-data policies and platforms to allow stakeholders, including fund contributors, to track progress
    - Use open data to coordinate projects and collaborate across funders and beneficiaries
- Access to information and data: The public sector, at national, regional and local levels should generate and provide market research or other studies or data, including GIS maps, surveys and other geographic information, that it has compiled as a matter of course (e.g. location of schools, hospitals, police stations, levels of connectivity, households, etc.) to assist providers in making strategic deployment decisions.
- Improvement of cross-sector collaboration and cooperation among regulators to accelerate the deployment of ICT-driven and digital interventions

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3 Pledging for universal meaningful connectivity

3.1 Pledging for P2C

3.1.1 Partnering for meaningful connectivity

In the preceding chapters we have highlighted the imposing size of the multiple gaps – financial, skills, affordability, adoption just to name a few – that impede progress towards meaningful connectivity. It is clear these gaps cannot be bridged by any one institution. That is why we are calling on all institutions to step forward and make bold new pledges, to forge new partnerships, and to advocate with their constituents so that together we can meet these critical challenges.

The P2C Digital Development Coalition serves a platform to convene relevant stakeholders, to promote the important work underway to bridge the digital divide, and to nurture partnerships that will accelerate progress towards digital transformation. One critical way to engage is to make a pledge through the Coalition. The Coalition welcomes four types of pledges: financial, policy, advocacy, and programmatic.

1. A financial pledge consists of an entity or groups of entities announcing a monetary contribution in line with the objectives of the P2C Digital Coalition and/or a specific P2C Focus Area.
2. A policy pledge is one where a legislative or regulatory reform or policy change is proposed or enacted to advance the objectives laid out by the P2C Digital Coalition and/or the P2C Action Framework.
3. An advocacy pledge is one where an entity or group of entities publicly supports, recommends, or promotes (e.g. through research, MOUs) the objectives laid out by the P2C Digital Coalition and/or the P2C Action Framework in their industry, network, events, or publications.
4. A programmatic pledge regards the creation or expansion of existing programmes that are in line with the P2C Focus Areas.

The diverse types of pledges allow an equally diverse set of stakeholders to participate. The following types of organizations are encouraged to make a pledge:

- Governments (including local governments and municipalities)

- Private sector (including philanthropic organizations)
- UN agencies and other international or regional organizations (including multilateral development banks)
- Civil society
- Academia and research associations
- Youth groups
- Media and entertainment organizations

A strong or impactful pledge will have the following attributes:

- **Addresses key issues** of the **four focus areas** of the P2C Digital Coalition
- **Helps drive** transformational change towards **universal connectivity** and the **digital transformation of societies**
- Helps **mobilize resources** across one or more of the four focus areas of P2C
- **Brings together** multiple entities committed to endorse, implement, or scale the pledge
- Can be easily **quantified, monitored and tracked**, and its impact can also be **measured** and **reported over time** and against the overall objective of achieving universal connectivity

To submit a pledge, please click on this link. This link provides you access to the P2C online Pledging Platform and all necessary materials explaining the process. Once pledges have been submitted on the platform, they can be displayed on the website. Users who have entered a pledge will be able to come back at a later date and provide updates regarding progress on pledge implementation. The expectation is for regular self-reporting on progress, complemented by impact stories at a later date.

4 Moving forward

The publication of this report marks the official launch of the Focus Areas Action Framework of the P2C Digital Coalition. This is also a call to organizations across sectors and industries to continue to step up and contribute to achieving meaningful connectivity for all by pledging concrete action using our P2C Pledging Platform. The platform will remain open for new pledges after the WTDC event in early June.

As governments, the private sector, UN agencies and other international or regional organizations, civil society, and youth groups continue to commit to more pledges, P2C will publicly announce and promote these pledges on a regular basis. In some instance, pledge-makers will be spotlighted in guest blogs discussing their commitments, implementation, progress and impact.

ITU will play a coordinating role to help track and monitor the fulfilment of the pledges made. For a few select pilot countries, ITU will play a more active role and help coordinate the implementation of the pledges in partnership with the pilot country government and together with all key stakeholders (e.g. UN country team, donors, private sector, civil society) as well as any already planned ITU activities.

There will also be periodic reporting, updates and events planned to share progress on implementation, facilitate collaboration and highlight best practices and impact stories. The key issues outlined under each of the pillars as well as the potential interventions/sample pledges will continued to be discussed and refined at the P2C Web Dialogues planned for 2022:[159]

- Web Dialogue 2 on ADOPTION: Empowering Communities (16 March)
- Web Dialogue 3 on VALUE CREATION: Building digital ecosystems (20 April)
- Web Dialogue 4 on ACCELERATE: Incentivizing investments (11 May)

[159] Web Dialogue 1, on 'ACCESS: Connecting people everywhere', took place on 6 December 2021 at the Internet Governance Forum in Katowice, Poland.

Finally, at the P2C Digital Development Roundtable, which will take place in Kigali, Rwanda from 7-9 June 2022 during ITU's WTDC, several discussions around concrete pledges addressing the key issues outlined in the Action Framework will be conducted. After the WTDC, some of the assumptions and recommendations for the key issues outlined in the framework will be tested and implemented in selected "pilot countries" (TBD).

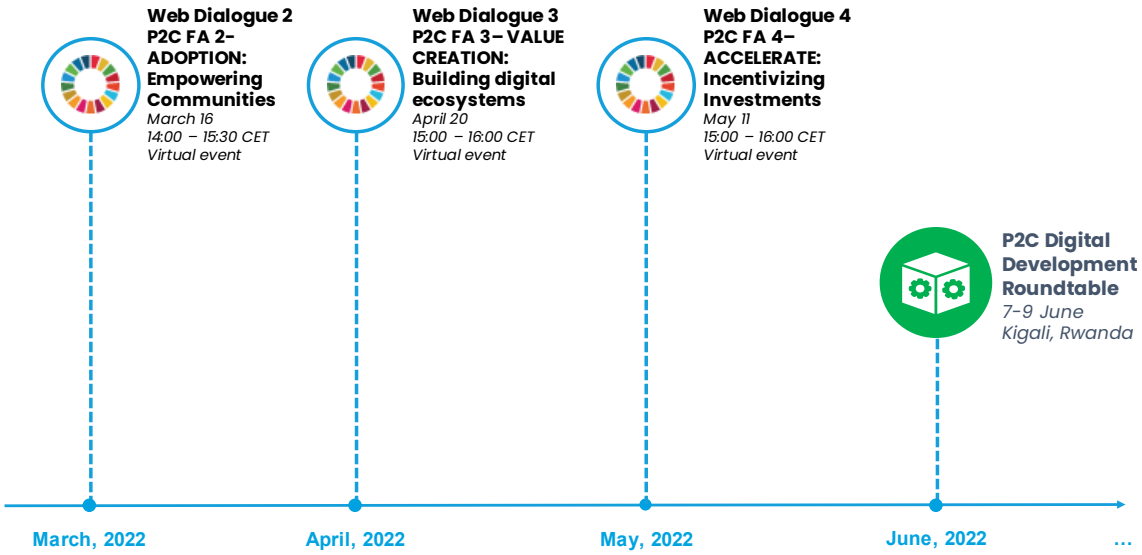

Figure 36: P2C's timeline of events from March to June 2022

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Examples of potential P2C pledges

This section contains examples of P2C pledges, and has been developed based on existing language in ITU documents such as the Global Symposium for Regulators Best Practice Guidelines, inputs of actions to the ITU Global Network Resiliency Platform (REG4COVID), and the ITU-D Study Group Reports and Guidelines. The examples are intended to serve as an illustration of how pledges could be framed under the different focus areas and pillars.

We encourage organizations interested in making a pledge to contact the P2C Secretariat for support on specific questions and advice on pledge formulation.

➔ FOCUS AREA 1

Affordable, resilient, and trustworthy connectivity for all

Objective

Facilitate attainment of universal and affordable connectivity through resilient infrastructure deployments that ensure ubiquitous network coverage including "last mile" and hardest-to-connect uneconomical areas.

ACCESS
Connecting people everywhere

1.1. Connectivity and digital infrastructure (Infrastructure)

1.1.1. Financial

[Insert pledger(s)] pledge to donate [insert number] broadband global area network (BGAN) terminals and training to use the BGANs, and [insert number] million USD worth of satellite airtime.
[Insert pledger(s), e.g. organizations] commit to invest [insert number] USD to power [insert number] mobile towers with renewable energy / to turn [insert number] towers into secondary source of energy for local communities, improving the reliability and reducing cost of connectivity for [insert number] people by [insert date].

1.1.2. Policy

[Insert pledger(s), e.g. government] commits to implementing the "6 mobile" golden rules by [insert date]: adopt a national broadband plan, adopt converged licenses, allow spectrum sharing agreements, adopt number portability, open to foreign telecom operators, and create a competition authority.

[Insert pledger(s), e.g. government] commits to review universal service strategy /policies to allow for a greater array of players (for example community networks, municipal networks, etc.)
[Insert pledger(s), e.g. government] commits to implement universal service projects to achieve coverage of X% of villages with over 500 inhabitants by [insert date] (or specific marginalized communities)
[Insert pledger(s), e.g. government] commits to use X% of USF funding to finance [insert number] satellite broadband user terminals by [insert date].
[Insert pledger(s), e.g. government] commits to finance/ use X% of USF funding for national digital connectivity initiatives, and electricity generation, transmission, and distribution vital for digital service provision by [insert date].
[Insert pledger(s), e.g. government] commits to putting in place mechanisms for collaboration (e.g. MoU, regulation, cabinet decree etc.) with ICT stakeholders and other infrastructure sectors (energy, payment systems etc.) to achieve comprehensive mapping of digital infrastructure by [insert date].
[Insert pledger(s), e.g. government] commits to adopt data-driven tools in decision-making (including big data and open data schemes), machine learning tools and online platforms, including national GIS systems to identify white and grey areas and coordinate the deployment and sharing of digital infrastructures, such as national infrastructure mapping systems by [insert date].
[Insert pledger(s), e.g. government] commits to improve coverage, in particular of rural and remote areas by for example: allowing more flexible IMT spectrum, increased IMT spectrum and fibreized backhaul, fixed wireless access (5G at mid- and high-band spectrum), as well as rural and remote broadband satellite services, the release of additional spectrum, and making specific bands technology neutral, making available lower band spectrum (e.g. 700 MHz) and transitioning from 2G/3G to 4G/5G sooner / by [insert date]
[Insert pledger(s), e.g. government] commits that every household has access to high-speed broadband / fibre by [insert date] to support working and learning from home through increase investment and deployment.
[Insert pledger(s), e.g. government] commits to develop open access regulations and measures to international capacity and international gateways to enhance network redundancy and resilience by [insert date].
[Insert pledger(s), e.g. government] commits to apply the open access principles of non-discrimination, effectiveness, and transparency to foster both active and passive infrastructure sharing by [insert date].
[Insert pledger(s), e.g. government] commits to create a multi-sector and multistakeholder committee with a view to develop a contingency and emergency telecommunication plans, using the ITU guidelines (National Emergency

Telecommunications Plans) and through a multistakeholder approach at a national and local level.
[Insert pledger(s) e.g. regional regulatory associations] commit to support regional harmonization of broadband mapping systems through [insert action(s)] by [insert date].
[Insert pledger(s) e.g. regional regulatory associations] commit to collaborate to support strategies, policies, regulations and methods of migration and adoption of digital broadcasting.
[Insert pledger(s)] commit to providing free and shared spectrum [insert number] for rural connectivity by [insert dates].

1.1.3. Advocacy

Over the period of [insert number] years, [Insert pledger(s) e.g. regional regulatory associations] will join forces with ITU to cross promote the P2C Digital Coalition and its Action Framework through [insert action(s)].
Over the study period 2022 to [insert date], [insert pledger(s)] commits to share its experiences on [insert topics] through the ITU-D Study Group platform where [insert number] contributions will be submitted for expert analysis in meetings and reference in publications of ITU-D Study Groups.

1.1.4. Programmatic

[Insert pledger(s),organizations] partner to train and assist in the implementation of last mile connectivity intervention (e.g. community networks, municipal networks, etc.) in countries [X, Y, Z] by [insert date].
[Insert pledger(s)] commit to provide free connectivity data to support the Disaster Connectivity Map project by [insert dates].
[Insert pledger(s)] pledge to support the development of [insert number] community networks in countries [insert locations] by [insert dates].
[Insert pledger(s)] pledge to accelerate 4G connectivity in [insert locations] by increasing coverage to [insert amount] % by [insert dates].

1.2. Connectivity and digital infrastructure (Affordability)

1.2.1. Financial

[Insert pledger(s)] partner to invest [insert number] USD to support the development of feature phones, localized to non-mature market needs.

1.2.2. Policy

[Insert pledger(s), e.g. government] commits to provide fiscal incentives for ICT providers and end-users by [insert date], which may include [insert number] incentives or [insert number] deductibility for new investments in infrastructure, tangible and intangible assets such as ICT equipment and software, and remove sector specific taxes on digital services, devices and equipment.
[Insert pledger(s), e.g. government] commits to review licensing criteria to include targets for innovative special affordable ICT service packages for low-income and vulnerable groups by [insert date].

1.2.3. Advocacy

[Insert pledger(s)], commit to meeting the Broadband Commission target of entry-level broadband services costing less than 2% of monthly GNI per capita by [insert date], through [insert actions].
[Insert pledger(s), e.g. governments] collectively recognize resilient broadband as a basic right.

1.2.4. Programmatic

[Insert pledger(s), e.g. operators] pledge to increase data allowances on all/their cheapest mobile data packages in countries X, Y, Z.
[Insert pledger(s)] partner to create a smartphone financing scheme to equip [insert number] people with affordable smartphone / computer devices.
[Insert pledger(s), e.g. operators] pledge to develop special affordable ICT service packages for low-income and vulnerable groups by [insert date].

1.3. Cybersecurity

1.3.1. Financial

[Insert pledger(s)] pledge to invest [insert number] USD to create [insert number] cybersecurity innovation centers in LDCs, LLDCs and SIDSs.
[Insert pledger(s) pledge to invest [insert number] USD to make their products and services more secure by [insert date].

1.3.2. Policy

[Insert pledger(s), e.g. government] commits to enhance cybersecurity capabilities, including through the creation of national CIRTs or CERTs, and the adoption of a national cybersecurity plan by [insert date]
[Insert pledger(s), e.g. government] commits to implementing a Critical Information Infrastructure strategy including the identification of CII sectors, the appointment of a

coordinating agency, security requirements and legal obligations, supported by sustainable PPPs, cooperation mechanisms and public awareness campaigns.

1.3.3. Advocacy

[Insert pledger(s)] partner on a research initiative to assess cybersecurity challenges / develop guidelines / identify affordable interventions in LDCs, LLDCs, SIDSs, by [insert date].

1.3.4. Programmatic

[Insert pledger(s)] partner to invest [insert number] USD to provide cyber-awareness training to [insert number] individuals in LDCs.

➔ FOCUS AREA 2

Inclusive, equal and safe access and use of ICTs for all

Objective

Taking a people-centred approach by ensuring communities are digitally skilled and empowered to use digital technologies, content and e-government services safely, inclusively and equally

ADOPTION
Empowering communities

2.1 Skills

2.1.1. Financial

[Insert pledger(s)] partner to invest [insert number] USD in local training centres to reach [insert number] people in rural areas by [insert date].

2.1.2. Policy

[Insert pledger(s), e.g. government] commits to achieve 70% of adults with basic digital skills and 50% with standard digital skills by [insert date], through, inter alia, including basic ICT skills education in national education plans, implementing digital skills programmes in local communities, developing and implementing digital skills strategies, and digital skills programmes.

2.1.3. Advocacy

[Insert pledger(s), e.g. governments] commit to collect annual disaggregated data on levels of ICT skills of individuals and on the share of employment in the tech sector by [insert date].

2.1.4. Programmatic

[Insert pledger(s)] partner to train [insert number] youth in basic digital skills, with a focus on marginalized communities, in country X, Y, Z by [insert date].
[Insert pledger(s)] partner to equip [insert number] schools with ICT devices by [insert date].
[Insert pledger(s)] pledge to provide [insert amount] million people with digital skills by [insert dates].
[Insert pledger(s)] pledge to provide digital literacy for 1-3 million people in [insert location] by [insert date].

2.2. Digital inclusion

2.2.1. Financial

[Insert pledger(s)] commit to invest [insert number] USD to provide [insert number] accessible ICT/devices (including Assistive Technologies) to enable persons with disabilities access to and use of ICTs by [insert date].
[Insert pledger(s)] commit to invest [insert number] USD to empower [Insert pledger(s), e.g. government] with the ICT accessibility knowledge necessary to ensure that all government websites in that country are available in digitally accessible formats, thus allowing all citizens (including those with disabilities) to benefit from all government products and services in an equal and equitable manner. The programme will also ensure self-sustainability through the transfer of knowledge and ensure in country development of capacities.

2.2.2. Policy

[Insert pledger(s), e.g. government] commits to use X% of USF funding to support affordable and digitally accessible access to health, education, humanitarian, and emergency services to vulnerable groups such as indigenous, remote, or marginalized communities by [insert date].
[Insert pledger(s), e.g. government] commits to include as beneficiary in the USF persons with disabilities (PwD) and older persons to further develop ICT accessibility related activities to enable these vulnerable groups to also benefit from government services as any other citizens.
[Insert pledger(s), e.g. government] commits to dedicate 20% of Universal Service Funds to connect [insert number] schools / hospitals / libraries by [insert date] (or other anchor institutions)
[Insert pledger(s), e.g. government] commits to dedicate 10% of USF for gender mainstreaming and empowerment of women and girls by [insert date]
[Insert pledger(s), e.g. government] commits to dedicate 10% of USF to consult with and empower persons with specific needs such as: persons with disabilities, older persons, or indigenous people and remote /marginalized communities by [insert date]
[Insert pledger(s), e.g. government] commits to adopt regulations defining sustainable financing models to allow for free access to key services (e.g. education, health) by 2027.
[Insert pledger(s), e.g. government] commits to dedicate 10% of USF for mainstreaming ICT accessibility within their e-government platforms (products and services) to enable all their citizens have equal and equitable access and use of e-government key digital services (including, education, health, emergency) without any discrimination of gender, age, or ability.

[Insert pledger(s), e.g. government] commits to defining / adopting / implementing a Child Online Protection strategy by [insert date].

2.2.3. Advocacy

[insert number] organizations pledge to develop and implement a set of policies, regulations, strategies related to ICT accessibility to ensure that their ICT products, devices and/or services are developed under the principle of "inclusive by design" by [insert date]
[Insert pledger(s)] commit to adopt a set of business performance indicators for digital inclusion by [insert date].

2.2.4. Programmatic

[Insert pledger(s)] partner on a research initiative to develop digitally accessible products and services in line with accessibility standards and universal design principles, to extend their end users by enabling that these products and services are inclusive for all people (including persons with disabilities) by [insert date]
[Insert pledger(s), e.g. government] commits to provide all necessary infrastructure to primary and secondary schools across the country to enable/ ensure the effective delivery of ICT training to pupils by [insert number]
[Insert pledger(s)] commit to train [insert number] community network facilitators from [insert amount] communities in countries [insert locations] on economic, social and technical aspects of community networks and receive continuous support to ensure the creation, strengthening and sustainability of community networks by [insert dates].
[Insert pledger(s)] partner to fund the commitment to setting up and carrying out an ICT household survey in countries [insert location] within 2 years.

2.3. Relevant / local content and services

2.3.1. Financial

[Insert pledger(s)] partner to invest [insert number] USD towards the development of local content in countries X, Y, Z through supporting digitalization in media, art, educational content by [insert date].
[Insert pledger(s), e.g. organizations A, B, C] partner to invest [insert number] USD to enable development of digital content in Indigenous language and related networks for dissemination of the content, to support conservation of the indigenous cultural legacy and thus global patrimony by [insert date].
[Insert pledger(s)] commits to create more content in local languages to ensure inclusive access to digital technologies and remove barriers inhibiting utilization of ICT.

2.3.2. Policy

[Insert pledger(s), e.g. government] commits to setting up online educational platform in local languages by [insert date].

2.3.3. Advocacy

[Insert number] organizations partner to research interventions to stimulate local content creation through activities A, B, C by [insert date].

2.3.4. Programmatic

[Insert pledger(s)] partner to provide open and accessible tools, platforms and training to support local content development in countries X, Y, Z.

➔ FOCUS AREA 3

Thriving, local ecosystems that drive relevant local content, services and digital businesses – rapidly adopting innovations from elsewhere

VALUE CREATION
Building digital ecosystems

Objective

Accelerate the digital transformation of societies through an inclusive whole-of-ecosystem approach that nurtures entrepreneurship, innovation, start-ups, SMEs, trade, and job creation, through collaborative policy and regulation practices supported by data.

3.1. Digital innovation and entrepreneurship

3.1.1. Financial

[Insert pledger(s)] partner to fund [insert number] USD for Research and Development in countries X, Y, Z by [insert date].

3.1.2. Policy

[Insert pledger(s), e.g. government] commits to achieve 25% of adults with job-relevant digital skills by [insert date] through the adoption of relevant policies, strategies and regulations.
[Insert pledger(s), e.g. government] commits to implement [insert number] incentives for in-cash or in-kind support to entrepreneurship such as internships, coaching, facilities.
[Insert pledger(s)] commit to enact a Start-up Act or holistic strategy fostering digital innovation across sectors [insert sectors] by [insert date].
[Insert pledger(s)] commit to launch an innovation framework to build collaboration in the digital ecosystem by [insert date].

3.1.3. Advocacy

[Insert number] higher educational institutions pledge to mainstream advanced digital skills training in their programmes by [insert date] to ensure that all higher education students have developed concrete knowledge of at least one advanced digital skill before entering the job market.

3.1.4. Programmatic

[Insert pledger(s)] commit through a public-private partnership to the creation of [insert number] entrepreneurship universities / hubs / seed funds by [insert date] (model given is for the public actor to finance infrastructure and connectivity and for the private actor to operate).

[Insert pledger(s) commit to the hosting of [insert number] regional start up events by [insert date].
[Insert pledger(s)] partner to develop and innovative, job-oriented, locally relevant curriculum for digital entrepreneurship skills to reach [insert number] people in country X, Y, Z by [insert date].
[Insert pledger(s)] partner to develop [insert number] programs on [AI/ML coding, blockchain, design thinking, data literacy, etc.] for [insert number] by [insert date].
[Insert pledger(s)] pledge to provide advanced skills training on cloud storage and cloud computing to [insert number of people and location] by [insert dates].
[Insert pledger(s)] pledge to create an Innovation Lab in [insert location] by [insert date].

3.2. Applications and services

3.2.1. Financial

[Insert pledger(s)] commit invest [insert amount] USD to equip [insert number] people with data gathering and analysis skills to support evidence-based policy and decision-making including through [hackathons or competitions in schools; training trainers in low-income economies; public online courses on ITU academy for keeping skills up to date; etc] by [insert date].
[Insert pledger(s)] commit to invest [insert number] USD to support local platforms in regions X, Y, Z by [insert date].

3.2.2. Policy

[Insert pledger(s), e.g. government] commits to developing trusted and secure digital public platforms based on open-source and open-data to serve as a foundation for the development of the digital economy by [insert date].

3.2.3. Advocacy

[Insert pledger(s)] commit to making their AI translation tools open source to spur the development of content in local languages.
[insert number] organizations and countries pledge to adopt a Charter for Digital Public Goods.

3.2.4. Programmatic

[Insert pledger(s)] commit to invest [insert number] USD in developing AI based translation tools
[Insert pledger(s)] partner to create the “open-source digital data package” by [insert date] to prepare for future crises.

[Insert pledger(s)] commit to make 10 key business software free for MSMES in LDCs, LLDCs, and SIDs until [insert date].
[Insert pledger(s)] commit to expand operations to integrate [insert number] million MSMEs into their digital platform by [insert date].
[Insert pledger(s)] commit to co-create with local communities [insert number] smart cities / villages in countries Z, W, by [insert date].
[Insert pledger(s)] commit to create a program to accelerate the digitalization of services in sector [insert sector] by [insert date].

3.3. Digital economy

3.3.1. Financial

[Insert pledger(s)] partner to invest [insert number] USD to provide 1 billion adults with access to digital financial services by [insert date].

3.3.2. Policy

[Insert pledger(s), e.g. government] commits to put in place regulatory sandboxes to address the sustainability of emergency COVID-19 measures by [insert date]
[Insert pledger(s), e.g. government] commits to adopting an overarching national Digital Strategy, with concrete implementation mechanisms and targets by [insert date].
[Insert pledger(s), e.g. government] commits to adopting a start-up / innovation / entrepreneurship / MSME strategy with a digital component and collaboration between ministries of e.g. Trade, Education, Technology, private sector council.
[Insert pledger(s), e.g. government] commits to incorporate regulatory and socio-economic impact analysis into the policy development to measure the impact of broadband (fixed and mobile) and digital transformation on the economy at national level, working in collaboration with academia and research institutions.
[Insert pledger(s), e.g. government] commits to adopt and implement policies and regulations fostering localized Internet traffic to achieve at least X% of localized Internet traffic through the addition of YY IXPs by [insert date].
[Insert pledger(s), e.g. government] commits to digitalize X% of government services by [insert date].
[Insert pledger(s), e.g. government] commits to digitalize all processes to start and operate a business by [insert date].
[Insert pledger(s), e.g. government] commits to digitalize government subsidies to stimulate demand in ICTs and digital financial services by [insert date]

[Insert pledger(s), e.g. government] commits to reach 40% of the population using digital financial services through, inter alia, lowering of fees for digital payments, lowering limitations, government campaigns to increase adoption by [insert date].
[Insert pledger(s), e.g. government] commits to decrease special taxes on e-transactions to achieve X% of adults using digital financial services.
[Insert pledger(s), e.g. government] commits to create a multi-sector and multistakeholder committee for digital transformation by [insert date], including, inter alia, energy, transport, and finance regulators and policy-makers.
[Insert pledger(s), e.g. government] commits to create a multi-sector and multistakeholder committee in Universal Service Strategy/ Fund by [insert date], including entities X, Y, an Z.
[Insert pledger(s), e.g. government] commits to make public consultations with relevant stakeholders a mandatory part of decision-making processes for decisions X, Y, Z, by [insert date]
[Insert pledger(s), e.g. government] commits to enable capacity for joint action between government entities X, Y, Z by [insert date] (binding, formal collaboration mechanisms).
[Insert pledger(s), e.g. government] commits to work with central government and other relevant agencies to develop shared approaches to misinformation, personal data protection, cross-border data flows and responsiveness to cultural sensitivities about content published on digital platforms.
[Insert pledger(s), e.g. government] commits to implementing the 3 key policies to foster trust in the digital economy: consumer protection, data protection and e-transaction by [insert date]
[Insert pledger(s), e.g. governments] commit to establishing a national policy or a regulation on the management of e-waste which sets targets for increased e-waste collection and recycling by [insert date].
[Insert government] commit to increase the rate of e-waste officially documented to be collected and recycled to [insert number] % by [insert date].
[Insert pledger(s), e.g. governments] commit to collect official data on the generation of e-waste in their country by [insert date] using the internationally harmonized methodology developed by the Global E-waste Statistics Partnership.
[Insert pledger(s)] commits to infrastructure and digital technologies being compatible with net-zero/carbon neutral targets by [insert date].
[Insert pledger(s)] supports country Y to advance implementation of digital climate technologies identified in Technology Needs Assessments to reach National Determined Contributions.

[Insert pledger(s)] commits to making climate information datasets available as digital public goods.
[Insert pledger(s)] commits to tracking and disclosing ICT/telecommunication sector specific greenhouse gas emissions annually, with a breakdown of specific emission scope data.
[Insert pledger(s)] commits to the green procurement of ICT/telecommunication equipment and services and puts in place a green purchasing/procurement policy.
[Insert pledger(s)] commit to adopt or update statistical legislation requiring access to anonymized data from the private sector by [insert date].

3.3.3. Advocacy

[Insert pledger(s)] commits to supporting the global tracking of e-waste generation and the collection and recycling rate through the Global E-waste Monitor [insert year], in collaboration with the Global E-waste Statistics Partnership.
[Insert pledger(s)] join forces to champion a global movement of funding, implementation and standardization of digital public goods.

3.3.4. Programmatic

[Insert pledger(s)] commit to produce a programme supporting the development of B2B platforms in [insert sectors] by [insert date].
[Insert pledger(s)] commit to jointly spend [insert number] USD on the training of YY number of regulators and policy-makers on digital regulation aspects to foster collaborative regulatory practices.
[Insert pledger(s)] commit to launch a global digital for sustainability programme together with ITU and other relevant UN agencies, for an estimated value of insert number] USD, to support [insert number] countries in their sustainability efforts, including the following components: • Co-create a collaboration platform around best practice sharing and training for regulators and policy-makers for digital sustainability; • Build a Green Data Centre Innovation program to build capacity on green data center innovation initiatives; • Co-create a voluntary/enforceable charter and/or code of conduct to root environmental sustainability into business practices
[Insert pledger(s)] partner to create a tech park focusing on [insert sectors] to achieve national ambition of [insert details].
[insert pledger(s)] to provide access to anonymized data to support effort [insert] by [insert date].

➔ FOCUS AREA 4

Innovative approaches to leverage existing and new forms of investment

Objective

Structure innovative financing models and streams as well as adaptations to public policy and regulation to incentivize and facilitate public and private sector sustainable investment for financing meaningful access and affordable connectivity.

ACCELERATE
Incentivizing
investments

4.1. Innovative financing

4.1.1. Financial

[Insert pledger(s)] partner to raise [insert amount] USD through innovative financing schemes (Blended finance (PPP), Public financing, Bond financing, FDI, etc.) by [insert date].
[Insert pledger(s)] commit to raising [insert amount] USD for a digital bond to finance infrastructure and/or digital transformation by [insert date].
[Insert pledger(s)] commit launch [insert amount] billion USD bond to finance digital infrastructure by [insert date].

4.1.2. Policy

[Insert pledger(s)] commits to enact laws to protect from a wide array of frauds (data theft, financial fraud etc.) by [insert date].
[Insert pledger(s), e.g. government] commits to the implementation of existing e-waste regulation using the concept of extended producer responsibility as a mean to raise sustainable financing by [insert date] for the management of end of life / use electronics.

4.1.3. Advocacy

[Insert pledger(s)] partner to conduct research in innovative financing mechanisms and best practices through activities X, Y, Z by [insert date].
[Insert pledger(s)] commit to advocate for the importance of investment in digital infrastructure through research and engagement with governments by [insert date].

4.1.4. Programmatic

[Insert pledger(s)] commit to adopt new technologies (blockchain, cryptocurrencies) to drive change in investment or financing options by [insert date].

4.2. Project viability

4.2.1. Financial

[Insert pledger(s)] partner to invest [insert amount] USD in interdependent projects by [insert date].

4.2.2. Policy

[Insert pledger(s)] commits to develop a "fit for purpose" regulatory and political risk mitigation instruments by [insert date].

4.2.3. Advocacy

[Insert pledger(s)] pledge to increase transparency in their projects by [insert date].

4.2.4. Programmatic

[Insert pledger(s)] pledge to train [insert amount] policy-makers and regulators on digital enablement by [insert date].

4.3. Investor constellation

4.3.1. Financial

[Insert pledger(s)] commit to spend [insert amount] USD on infrastructure investments by [insert date].
[Insert pledger(s)] pledge to create a new fund of [insert amount] hundred million USD for infrastructure investments in [insert location] by [insert date].

4.3.2. Policy

[Insert pledger(s)] commits to review foreign ownership restrictions to facilitate joint development projects by [insert date].

4.3.3. Advocacy

[Insert pledger(s)] commit to dedicate [insert amount] % of their investments to LDCs, LLDCs, SIDSs by [insert date].
[Insert pledger(s)] commits to arrange a focused discussion with select CEOs around financing digital infrastructure and to advocate for digital inclusion in their organizational programmes.

[Insert pledger(s)] commits to arrange events around financing digital infrastructure with ICT and finance ministers with the aim of ensuring such investments are prioritized in the planning of countries [insert number]

4.3.4. Programmatic

[Insert pledger(s)] partner to enable impact investing, through defining measurable social, environment impact and financial returns by [insert date].