

Financing universal access to digital technologies and services



Financing universal access to digital technologies and services



Acknowledgements

This report was prepared by ITU expert Ms Mandla Msimang, CEO of Nozala Women Investments and Founder and Chairperson of Pygma Consulting, with support from Ms Thabisa Faye. It benefited from peer review by Mr Andile Ngcaba, Founding Partner and Chairman, Convergence Partners, and ITU expert Mr Peter Ulanga, under the direction of the Regulatory and Market Environment Division of the ITU Telecommunication Development Bureau (BDT).

The views expressed in this report are those of the author and do not necessarily reflect the opinions of ITU or its membership.

Disclaimer:

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of ITU concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by ITU in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by ITU to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader.

The opinions, findings and conclusions expressed in this publication do not necessarily reflect the views of ITU or membership.

ISBN:

978-92-61-34431-3 (Electronic version)

978-92-61-34441-2 (EPUB version)

978-92-61-34451-1 (Mobi version)



Please consider the environment before printing this report.

© ITU 2021

Some rights reserved. This work is licensed to the public through a Creative Commons Attribution-Non-Commercial-Share Alike 3.0 IGO license (CC BY-NC-SA 3.0 IGO).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited. In any use of this work, there should be no suggestion that ITU endorse any specific organization, products or services. The unauthorized use of the ITU names or logos is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the International Telecommunication Union (ITU). ITU is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition". For more information, please visit <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/>

Foreword



This report on *Financing universal access to digital technologies and services* comes at a time when the COVID-19 pandemic has forever changed the way we live, work, study, conduct business and interact. The crisis has led to increased digital adoption in countries where connectivity is high, while exposing glaring digital inequalities in less developed economies. Financing connectivity is recognized as a key priority in the United Nations Secretary-General's Roadmap for Digital Cooperation and for the attainment of the Sustainable Development Goals (SDGs).

As universal access in the digital era goes beyond extending networks to bolster use and adoption, the level of investment required is huge, necessitating a considerable shift in the approach to funding universal access. Whether it is pooling financial resources, sharing open access infrastructure or leveraging public money to raise private funds, the goal is to extend limited financial and non-financial resources as far as possible. Today's fundamental funding challenge is to make rural and low-income areas and marginalized populations "worth" the investment risk for the private sector and co-investors, as the economic cost of exclusion is higher than the cost of closing the digital divide. Ensuring the effective participation of vulnerable and marginalized communities should be part of all universal access initiatives and projects. There are various financing options and innovative models, which are examined in the financing toolbox section of this report.

Designed to provide practical guidance to our members and other stakeholders, this new report will contribute to reviewing and rethinking funds as a concept, exploring alternative models using a combination of monetary and non-monetary contributions and implementing innovative risk-mitigation mechanisms and financial solutions for smarter investments. It also provides guidance on the policy and regulatory frameworks needed to attract greater private sector participation in financing universal connectivity, access and uptake and explores business models for deploying supply and demand-side projects and initiatives in the digital era.

A handwritten signature in black ink, appearing to be 'DB' with a flourish.

Doreen Bogdan-Martin
Director, ITU Telecommunication Development Bureau

Table of contents

Acknowledgements	ii
Foreword	iii
List of figures and tables.....	vi
1 Executive summary	1
Part A - The universal access financing context.....	4
2 The universal service imperative: Why it matters.....	4
2.1 Social returns: it matters for inclusion	4
2.2 Economic returns: it matters for economic growth	5
2.3 Financial returns: it has to be worth the risk.....	9
3 Priorities: connectivity, adoption and inclusion	10
3.1 Funding follows good policy.....	11
3.2 Funding priorities.....	12
3.3 Beneficiaries.....	13
4 Funding gaps	14
4.1 Overview	14
4.2 Measuring infrastructure gaps	16
4.3 Measuring adoption gaps.....	20
5 Who is funding broadband and digital transactions?	20
5.1 Infrastructure funding actors	20
5.2 Funding actors for adoption and innovation.....	22
5.3 Digital inclusion: key actors	23
Part B - The financing toolbox	26
6 Blended finance	26
6.1 Context.....	26
6.2 Blending as a tool	26
6.3 Blending for additionality	27
7 Funding instruments	28
7.1 Overview	28
7.2 Risk mitigation mechanisms	29

7.3	Creative financial solutions	32
8	Structural funds	34
8.1	Introduction to structural funds.....	34
8.2	National, regional and community-level intervention: USAFs	34
8.3	Regional-level intervention: State aid and ESIFs.....	35
8.4	Funds for innovation.....	35
8.5	Key observations.....	39
9	USAF 2.0: Evolving the USAF for effectiveness and relevance	40
9.1	Introduction to USAFs	40
9.2	Context of fund review	41
9.3	Steps to review funds	42
9.4	Low-utilization funds.....	44
9.5	Scope of funds.....	45
9.6	New mandates and roles for USAFs	46
9.7	Sources of funding.....	47
9.8	Beneficiaries.....	49
9.9	Approaches to Funding	49
9.10	Fund administration.....	50
9.11	Programmes that do good and facilitate investment.....	51
	Part C - Non-finance mechanisms: Regulatory incentives to reduce risk and costs	55
10	Background	55
11	Connectivity, network and access incentives.....	55
12	Adoption and inclusion incentives	59
12.1	Consumer protection, privacy and data protection policies, laws and regulations	59
12.2	Investment enabling regulation	60
13	Sandboxes: Spurring innovation and development incentives	60
14	Tools to implement incentives.....	62
15	Regulatory forbearance	62
16	Play policies: In-kind contributions	63
16.1	Measured “play” strategies.....	63
16.2	Key considerations: play obligations.....	66

Part D – Programmes, projects and practices	67
17 Infrastructure business models.....	68
17.1 State ownership: direct investment/equity	68
17.2 Public-private partnerships (PPPs).....	69
17.3 Privately-owned municipal, local government and regional PPP models.....	70
17.4 Publicly owned regional and municipal networks (design, build, operate).....	71
17.5 Community ownership	72
18 Financing adoption, use, innovation and inclusion	74
18.1 Overview	74
18.2 Adoption, use, inclusion and innovation models	75
18.3 Project and Initiative selection	76
18.4 Supporting tools: research and mapping	76
18.5 Public connectivity	77
18.6 Adoption: uptake and use	78
18.7 Innovation and SME development	87
Part E – Using funding to mainstream the inclusion of women and girls	90
19 Conclusion	91

List of figures and tables

Figures

Figure 1: Evolution of ICTs over the past decade	5
Figure 2: Rural/urban divides	5
Figure 3: GDP growth impact of a 10-per-cent increase in broadband penetration (in %), globally, by level of development.....	8
Figure 4: Classification of risks linked to infrastructure. Source: OECD	10
Figure 5: Investment requirement by region, Connecting Humanity report	14
Figure 6: Narrowing the global divide by 2025	15
Figure 7: Determining additionality; Source: IFC 2020	28
Figure 8: Co-investment fund model – European Investment Fund case	37
Figure 9: Structure of the Republic of Korea's fund of funds	38
Figure 10: Steps to review funds.....	42
Figure 11: USAF 2.0 decision tree	45
Figure 12: The Internet user gender parity score, 2013 and 2019.....	46
Figure 13: Financing mechanisms for the provision of universal service, 2020	49

Figure 14: Digital regimes, UNCTAD.....	60
Figure 15: Broadband PPP models	69
Figure 16: Project and initiative selection process.....	76
Figure 17: Rwanda, Giga mapping	82
Figure 18: Digital inclusion framework	91
Figure 19: Private participation in the financing of universal access.....	92

Tables

Table 1: Financing toolbox overview	29
Exhibit: Mobile network coverage requirements in select OECS countries	63
Table 2: School prioritization scorecard	83

1 Executive summary

COVID-19 has led to unprecedented limitations on people's mobility as governments have sought to curb the spread of the airborne virus and avert crises in unprepared health systems across the world. Following the varying levels of restrictions put in place globally at different periods throughout 2020 and into 2021, people have been forced to turn to e-learning, remote working, online shopping and even virtual funerals. The pandemic has opened the door to the use of digital technology in ways never before imagined and given real meaning to the prefixes "e-", "remote," "virtual," "online" and "distance." During this time, digital technology has been crucial - for those with access. While on the one hand, the crisis has led to the fast-tracking of digital adoption in countries that already had some level of digitalization; on the other, it has exposed digital inequalities, which are particularly large in less developed economies. Never has the impact of the digital divide been so glaring.

A sense of urgency was already felt as countries sought to meet fast-approaching deadlines for the meeting of national broadband targets and digital transformation strategies linked to the global attainment of the SDGs by 2030. Now, with economies still battling the effects of COVID-19 and some still in the throes of second and third waves, many countries are seeking to stimulate post-pandemic recovery through infrastructure investment. Past experience from the global financial crisis of 2008/2009 has shown that recovery will need to be facilitated by public investment, both financial and non-financial. Governments will have to find ways to ensure economic growth and productivity by harnessing innovative business models and strategies that support the expansion of broadband networks, as well as digital adoption, use and inclusion.

Over the last 20 years, as the digital sector has evolved and become more central to people's lives, there have been significant shifts in the approach to funding universal access. These shifts have occurred in the broader development financing sphere, as well as specifically in the infrastructure space, and need to be reflected in the public broadband and digitalization funding mindset. Whether it is pooling financial resources, sharing open-access infrastructure or leveraging public money to raise private funds, the goal is to stretch limited financial and non-financial resources as far as possible. To that end, key trends include:

- a) Using a combination of monetary and non-monetary, or in-kind, contributions, based on project needs and the various strengths of collaborative financiers;
- b) Making smarter investments and thus a move away from "funding" (out of a moral imperative) to "financing," which is more commercially grounded and relates to making good investments, while contributing to socio-economic development;¹ and
- c) Collaboration between governments, commercial banks, development finance institutions (DFIs), the private sector and bilateral and multilateral donor organizations to meet funding gaps is increasing, including through blended finance or the strategic use of development finance to mobilize additional finance for sustainable development in developing countries.

[Part A](#) of this report provides the context for the collaborative and high-impact universal access financing required to bridge the digital divide. It explains why broadband and digital transformation matter, i.e. for economic growth and inclusion, and that a key factor that deters investment is risk. There are several types of risk to be mitigated - governments have a key role to play in reducing macro-economic, political and regulatory risk, which will in turn reduce costs

¹ <https://www.eurasia.undp.org/content/rbec/en/home/blog/2017/7/12/What-kind-of-blender-do-we-need-to-finance-the-SDGs.html>

and increase investment. Financing priorities are explored in [section 3](#), as are the potential funders for digital transformation. It is noted that there are myriad potential financiers for universal access and that public money should only be used where private capital does not intend to go, or where the injection of public money will bring about a significant step change without distorting competition.

[Section 4](#) addresses the fact that the funding gap is not monolithic and considers the different gaps that exist, in terms of gender, infrastructure and schooling, and the challenges that the significant costs of closing them pose. It is acknowledged, however, that in the medium term, the most significant funding gap, in quantum, is the one related to the deployment of broadband networks that support digitalization. Although the costs related to encouraging adoption, use and innovation are low relative to infrastructure deployment and maintenance costs, the associated risks are higher. Furthermore, all costs must be dealt with in parallel to create a people-centred and holistic user experience. Ultimately, this section of the report proposes that the fundamental funding policy and regulatory challenge is to make servicing rural and low-income areas and populations worth the investment risk for the private sector and co-investors.

[Part B](#) introduces the financing toolkit and the principle of blended finance as a means of mobilizing private investment. This is an important approach that carries through the rest of the report. Various funding instruments are discussed with a particular focus on structural funds, including universal service and access funds (USAFs). The fund journey has been bumpy, so much so that in many countries it is time to rethink the concept and institution. [Sections 8](#) and [9](#) provide alternative fund models, including co-investment funds and funds of funds, which have achieved some level of success in addressing more high-risk financing, such as for SME development and accelerators. Elements from these models are proposed as well as a way forward for “USAF 2.0” as the scope extends beyond infrastructure to digital transformation. Of course, just as there is no single financing solution for universal access, there is no single response to the question about the role and relevance of the 100 USAFs currently operational across the world, nor is there a single model for any future USAF 2.0. Solutions will differ according to the country context and each fund’s historical performance, which is informed by its legal and institutional framework and administrative and operational capacity, in addition to a number of other factors that are explored in the report.

In [Part C](#), discussion turns to the non-financial mechanisms that are available to mitigate risk - regulatory and policy incentives. Collaboration, pooling and leveraging are key themes - as much for non-financial incentives as for financial approaches. To that end, this section suggests some policy and regulatory actions that can assist in encouraging investment in infrastructure and promoting adoption, innovation and digital inclusion. They range from “dig once” and “dig smart” policies, which address infrastructure investment challenges, to regulatory sandboxes, which can facilitate innovation. All the regulatory measures in this section, including regulatory forbearance, are discussed as means of lowering costs, reducing risk and ultimately facilitating financing.

[Part D](#) addresses programmes, projects and practices. It focuses on business models for deploying various supply and demand-side projects and initiatives, ranging on the supply side from traditional public-private partnerships (PPPs) to bottom-up community-based wireless broadband models. On the demand side, the practices are wide ranging and address gaps in digital literacy and adoption by individuals, households, strategic public institutions (e.g. schools and hospitals) and SMEs. Filling these gaps requires innovative thinking that shifts the focus from connecting people to networks to connecting people to other people via networks.

In conclusion, this report emphasises that, given the various funding gaps, the myriad funders and financiers and the significant capital requirement, pooling, collaboration and cooperation will be central to financing universal access to digital technologies and services. In addition to the infrastructure funding challenges for high-cost, low-margin, rural and remote areas and underserved communities, there are additional funding requirements relating to facilitating people's participation in the digital era, i.e. digital adoption, innovation and digital inclusion. Ensuring the effective participation of vulnerable and marginalized communities, in particular, needs to be intrinsic to all universal access initiatives and projects. The economic cost of exclusion is higher than the cost of closing the infrastructure, affordability, gender and other gaps that persist as the world becomes increasingly digitalized.

Part A - The universal access financing context

2 The universal service imperative: Why it matters

2.1 Social returns: it matters for inclusion

In 2020, the world moved almost overnight into a digital future that had not been expected to arrive for another decade or more in many countries. Suddenly, students had to shift to distance learning, employees had to adapt to online meetings and “non-essential” workers, such as consultants, teachers, technicians, lawyers and farmers, had to figure out how to ply their trades virtually. COVID-19 found about half of the world unprepared for this shift. Needless to say, regardless of the region or country, the brunt of the problem has been borne disproportionately by people in rural and remote areas where there is no or insufficient connectivity. It has been experienced by the poor and people from already marginalized and vulnerable communities, such as women, the elderly, children and persons with disabilities.

Globally, only 55 per cent of households are connected to the Internet, despite the fact that, in 2020, about 85 per cent of the world had 4G coverage. Europe’s Internet penetration is 1.5 times the global average, while Africa lags the furthest behind with penetration six times lower than the global average. This is despite the significant gains that have been made over the past 20 years in the rolling out of mobile networks, which are the primary means of voice and broadband access for people in developing countries. Almost all urban areas around the world are covered by a mobile broadband network, but gaps persist in rural areas. A rural woman in Africa is at least four times less likely to live in an area with 4G coverage than her counterpart in Europe, CIS, the Americas or Asia and the Pacific, which all have 100-per-cent urban 4G coverage.² However, even where networks are present, adoption in many countries is low, suggesting that there are other, pervasive gaps linked to gender, digital literacy and relevant local content. In the current economic climate, this state of affairs is concerning, but more so when one considers that, by 2022, 60 per cent of global GDP will be digitalized, exacerbating the impact of exclusion for those left behind.³

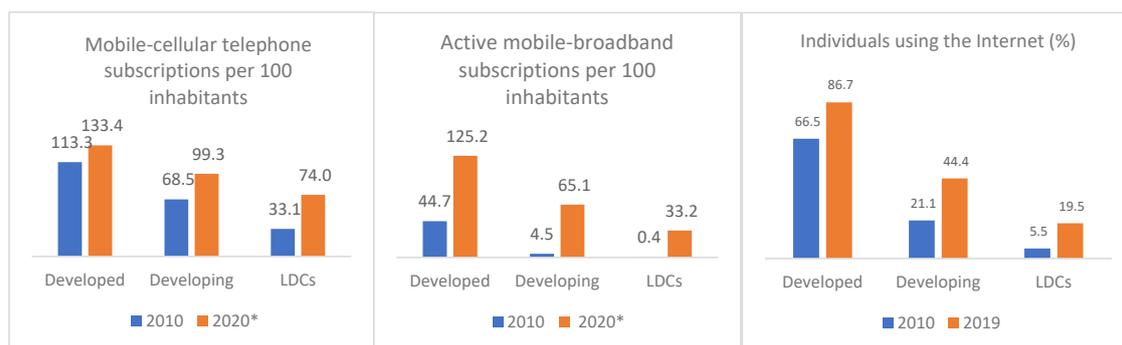
At the current rate, developing countries are unlikely to meet the Broadband Commission for Sustainable Development’s target of 65 per cent broadband user penetration by 2025.⁴ This demonstrates the need to urgently find innovative ways to close gaps and creative solutions to finance universal access.

² ITU Facts and Figures 2020

³ <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/02/Digital-Equity-Policy-Brief-W20-Japan.pdf>

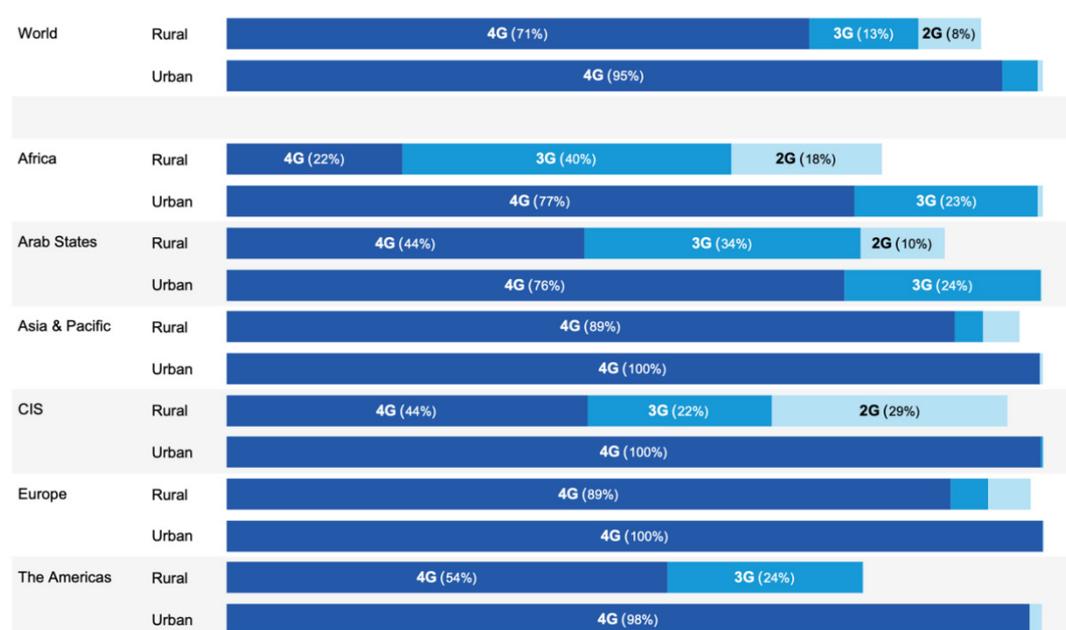
⁴ <https://digitalregulation.org/access-for-all/>

Figure 1: Evolution of ICTs over the past decade



Source: ITU, estimates (2020).

Figure 2: Rural/urban divides



Source: ITU, Measuring digital development: Facts and figures (2020)

2.2 Economic returns: it matters for economic growth

Economies of all sizes have contracted, and public debt levels have increased dramatically because of the COVID-19 crisis. As with all economic crises, the most recent being the global financial crisis of 2008, infrastructure investment will likely be key to any stimulus or recovery package. The difference between 2008 and today is, however, significant in terms of technology, which has become more ubiquitous, while more economies are becoming digitalized. Over the past two decades, as broadband has been introduced, there has been a change in the understanding of what constitutes universal service and access to ICTs. The spread of broadband, digitalization and digital transformation have come to underpin the digital economy and digital society.

The use of digital technologies and digitized data enabling people to interact with each other and increasingly with machines, through machine to machine (M2M), and “things,” through the Internet of Things (IoT), is extensive. Running on broadband, digitalization includes digital-service

infrastructure, connectivity and digital transformation at individual, household, business and government levels. Given the all-encompassing nature and impact of digitalization, universal service and access must facilitate digital inclusion to the extent that all people, including women, youth, the elderly, persons with disabilities and other vulnerable and marginalized communities, have the capability to use the Internet to access the opportunities that it presents.

The magnitude of broadband's impact on society and economies is reflected in the 2020/2021 stimulus packages that have been put forward in response to the pandemic. Notably, many least developed countries (LDCs) with smaller fiscal room have not been able to put in place aggressive spending plans to mitigate the COVID-19 shock. Accordingly, the spending plans to date of countries in sub-Saharan Africa represent, on average, 0.26 per cent of GDP compared to an average of 9 per cent in Europe and Central Asia and 11.5 per cent in North America.⁵ By way of examples:

- a) The Australian Treasury released its 2020-2021 budget, which calls for a record budget deficit and USD 218.1 billion in stimulus spending. The budget includes USD 3.3 billion in spending on broadband and 5G infrastructure in the Economic Recovery Plan for Australia.⁶
- b) The United States American Rescue Plan Act (2021) includes USD 7.1 billion in emergency connectivity funding for remote learning and USD 1 billion for the Technology Modernization Fund (TMF). In addition, the United States' infrastructure plan announced this year includes USD 100 billion over eight years to ensure that everyone in the country, especially the 35 per cent of Americans in rural areas with no broadband access at all, are covered.⁷
- c) In Andorra, key above-the-line measures were put in place amounting to 2.6 per cent of 2020 GDP (EUR 65 million). The telecommunication and electricity public enterprises provided discounts on the monthly bills of firms that had to completely suspend activities or that experienced a significant decline in their business (EUR 5.1 million, 0.2 per cent of 2020 GDP), as well as the possibility of paying bills in up to 12 monthly instalments. In November 2020, the government approved subsidies on electricity and telecommunication services to the businesses most affected by the pandemic that had already received government support for rent/mortgage payments, as well as businesses whose workers are placed on furlough or short-time work arrangements.⁸
- d) In Peru, the government allocated PEN 3 billion (0.5 per cent of GDP) to tackle the COVID-19 health emergency and approximately PEN 7 billion (1.1 per cent of GDP) in direct transfers to support vulnerable households during national lockdown. In the second wave, the government launched its Everyone Connected programme (Todos Conectados) to bring free Internet to local and rural areas and close digital infrastructure gaps.⁹
- e) In December 2020, the Scottish Government announced that an additional GBP 11.8 million would go towards helping businesses, as part of its economic recovery measures, to adopt digital technologies and improve digital capabilities. Building on the success of existing digital support programmes, funding amounting to GBP 10 million would be provided for financial incentives and expert advice to support businesses to invest in digital and continue their digital journeys. The Data Lab, Scotland's innovation centre for data and artificial intelligence, will also receive GBP 1 million to help businesses to invest in more advanced technologies, such as data analytics and AI.¹⁰

⁵ IMF COVID Policy Response Tracker: <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>

⁶ <https://budget.gov.au/2020-21/content/overview.htm>

⁷ <https://www.whitehouse.gov/briefing-room/legislation/2021/01/20/president-biden-announces-american-rescue-plan/>

⁸ <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>

⁹ <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>

¹⁰ <https://www.gov.scot/news/harnessing-digital-for-economic-recovery/>

Stimulus as a funding mechanism

The United States' USD 1.9 trillion American Rescue Plan (ARP) includes provisions aimed at covering the cost of broadband services and devices, infrastructure deployment, mapping and adoption. While the rules for these funds have not yet been distributed, they function broadly as follows:¹

- a) **The Emergency Connectivity Fund** (USD 7.171 billion) – reimburses schools and libraries for providing free broadband service and connected devices to students and patrons at their homes.
- b) **The Coronavirus Capital Projects Fund** (USD 10 billion) – provides funds for states, territories and tribal governments to carry out critical capital expenditure for projects directly enabling work, education and health monitoring, including remote options, in response to the pandemic. The funding could be limited to broadband and broadband adoption.
- c) **The Local Fiscal Recovery Fund** (USD 350 billion) – distributes funds to municipalities and counties, tribes, territories and states to keep first responders, frontline health workers, teachers and other providers of vital services safely on the job as states, local governments, tribes and territories roll out vaccines and fight to rebuild “main street” economies. Digital inclusion is assumed to be an eligible use of funds.
- d) **The Homeowners Assistance Fund** (USD 9.961 billion) – provides grants to states to assist homeowners with mortgage payments and related costs, including Internet service.

¹ <https://www.digitalinclusion.org/blog/2021/03/25/digital-equity-stimulus-funding/>

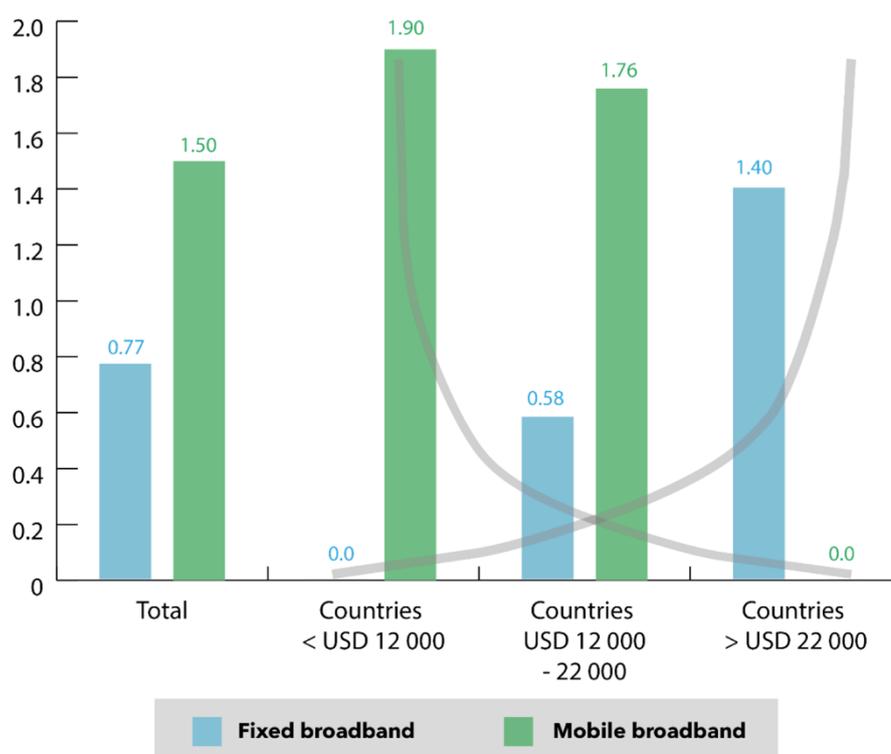
Many economic recovery plans are using public funds specifically to extend high-speed broadband connectivity, given the recognized and well-documented socio-economic impact of broadband. Recently, ITU modelled the impact of broadband relative to existing penetration and found that it affects developed and developing countries' economies differently:

- a) **The higher a country's or region's fixed-broadband penetration, the more significant the economic impact** – a 10-per-cent increase in fixed-broadband penetration would lead to an increase in GDP of between 0.6 per cent (CIS) and 2.9 per cent (Europe, high-income countries). It would have no impact on GDP in Africa or in low-income European countries;¹¹
- b) **Countries and regions with lower levels of economic development and lower relative mobile penetration experience a greater economic contribution from mobile broadband** – a 10-per-cent increase in mobile broadband would lead to an increase in GDP of between approximately 0.5 per cent (Asia and the Pacific) and 2.5 per cent (Africa). It would have no impact on GDP in high-income European countries.¹²

¹¹ https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.BDR-2020-PDF-E.pdf

¹² https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.BDR-2020-PDF-E.pdf

Figure 3: GDP growth impact of a 10-per-cent increase in broadband penetration (in %), globally, by level of development



Source: ITU¹³

Universal access in the digital era goes beyond extending networks, addressing the use of those networks and framing broadband as a key enabler of digitalization. Evidence of digitalization can be seen throughout society, whether in financial technology applications, such as mobile money and mobile wallets to ensure that anyone with a mobile phone can be banked, or in e-health and online education services, which have been transformative and had a significant economic impact. Globally, the economic impact of digitalization is on par with that of mobile broadband, with a greater impact enjoyed by advanced economies, which is understandable given that the digital economy by 2016 was already worth USD 11.5 trillion, equating to 15.5 per cent of GDP globally but about 18 per cent in developed economies and 10 per cent in developing ones, on average. The digital economy had grown two and a half times faster than global GDP had over the previous 15 years, almost doubling in size since 2000.

As the ITU study shows, a 10-per-cent increase in digitalization results in an increase of 2.62 percent in total factor productivity, a primary driver of GDP.¹⁴ Analysys Mason reports that a 1-per-cent increase in residential connectivity penetration in sub-Saharan Africa should lead to 0.47-per-cent growth in the number of firms and enterprises connected to the Internet and higher productivity (10 per cent higher in the service sector; 20 per cent in information; and 5 per cent in manufacturing). According to Statista, the worldwide app economy will achieve a compound annual growth rate (CAGR) of 37 per cent, growing from USD 1.3 trillion in 2016 to USD 6.3 trillion in 2021.¹⁵

¹³ https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.BDR-2020-PDF-E.pdf

¹⁴ https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.BDR-2020-PDF-E.pdf

¹⁵ <https://www.statista.com/statistics/267209/global-app-economy/>

Thus, extending broadband networks, increasing digital access and investing in broadband and digitalization makes economic sense on all levels. Public investment will be key in leveraging private capital and will also have a positive economic impact.

2.3 Financial returns: it has to be worth the risk

Governments and regulators can play a critical role in reducing political, regulatory and macroeconomic risks by creating enabling environments in the ICT sector, as well as in vertical sectors like environmental affairs, transport and finance. Reducing risk has the effect of lowering investment costs and thus funding needs.

A major barrier to closing the digital divide is funding, or lack thereof, in terms of financing both networks and access where networks are present. While for networks this relates to the financing of infrastructure and connectivity, for access it focuses on the development of programmes and initiatives which enable people to appreciate the value of being connected, such as ones relating to local content creation, skill development and training.

The current global 4G coverage rates of 71 per cent in rural areas and 95 per cent in urban areas have been achieved through mainly private capital investment by mobile operators, tower companies and ISPs. Despite this rosy picture at a global level, there are real gaps between regions and countries and both rural and urban coverage are disproportionately skewed towards developed countries. The gaps exist in areas that are considered commercially unviable because they are high cost and/or high risk at the infrastructure level. At the adoption level, low service take-up by communities is due to low income or lack of digital literacy, which accentuates the risk owing to uncertain returns. Put simply, low adoption means fewer customers, less traffic and less revenue, despite high network investment. Given that risk is necessarily expensive, the public sector has to assume responsibility for identifying potential risks within its purview and find ways to incentivize private capital, thereby making achieving universal access worth the risk.

While investors can broadly control technical and operational risks, they are exposed to different levels of political and regulatory risk and macro-economic and business risk when they invest in broadband and digitalization. These risks exist throughout the value chain and lifecycle of a project and may serve to limit funding or increase its cost in different ways, depending on where in the project capital is injected. In infrastructure projects, the risk is highest during the development phase, when costs are also highest, and the construction, operation and exit or termination phases. To make matters more complicated, a single project may require several funding models over its lifecycle, which can be up to 20 years.

Figure 4: Classification of risks linked to infrastructure. Source: OECD

Risk categories	Development phase	Construction phase	Opertion phase	Termination phase
Political and regulatory	Environmental review	Cancellation of permits	Change in tariff regulation	Contract duration
	Rise in pre-construction costs (longer permitting process)	Contract renegotiation		Decommission
				Asset transfer
	Currency convertibility			
	Change in taxation			
	Social acceptance			
	Change in regulatory or legal environment			
Enforceability of contracts, collateral and security				
Macroeconomic and business	Prefunding	Default of counterparty		
	Financing availability		Refinancing risk	
			Liquidity	
			Volatility of demand/market risk	
	Inflation			
	Real interest rates			
	Exchange rate fluctuation			
Technical	Governance and management of the project			Termination value different from expected
	Environmental			
	Project feasibility	Construction delays and cost overruns	Qualitative deficit of the physical structure/ service	
	Archaeological			
	Technology and obsolescence			
	Force majeure			

The risks related to initiatives to stimulate service uptake (demand side) present themselves differently and are closely linked to trust, or lack thereof, inhibiting users from taking up services and transacting online. They may also prevent service providers, intermediaries and ISPs from offering services that might not be paid for if demand is not confirmed or might be penalized if there is regulatory or legal uncertainty in the cybersecurity or electronic transaction regime, for example. Given the various elements involved in demand-side and adoption projects, there is no single project lifecycle that can be referred to. The projects, however, tend to be short term and high risk, given the skills required for execution and the lack of market or business model precedence where innovation is involved. Adoption stimulation projects are also often too small for large investors, even though their impact in terms of innovation, job creation and productivity might be significant. As is the case in supply-side projects, risks associated with financing demand-side projects can best be mitigated through enabling policies and strategies that engender trust both by and between government, businesses and consumers.

3 Priorities: connectivity, adoption and inclusion

As discussed above, enabling policies, plans and strategies are risk mitigation tools in and of themselves. A clear policy and regulatory framework sets the tone for the sector and makes a critical contribution to investment decisions. This section explores the relationship between the policy framework and the critical decisions of what and how to fund.

3.1 Funding follows good policy

Broadband and digitalization frameworks should include a visionary policy, a time-bound strategy and clear and measurable plans supported by a budget to enable the achievement of the agreed broadband and digitalization goals. The challenge is to weave policy imperatives into financing decisions. On the one hand, good policy will result in increased investment, as discussed above. On the other, it can be used to support public funding where, despite an enabling framework, private capital does not go. The linking of digital policy and strategy to funding is seen in the European Union, where funds issued by the European Structural and Investment Funds (ESIFs) requires that the beneficiary country meet *ex-ante* conditionalities in order to qualify for financing. This standard, set at a national level, to access regional funding can be applied in principle when funds are expected to flow from the national level, i.e. funds, to projects. In this instance, policy can require that funding be compliant with specific regulatory conditions, such as those relating to open access and infrastructure sharing, as a prerequisite for funding.

Case Study: EU ex-ante conditionalities - linking strategy, policy and regulation to funding

ESIFs support economic development and cohesion and depend on the presence of an enabling policy environment. All funding requires that ex-ante conditionalities (ExACs) are met before funds may flow. General ExACs include the following requirements:

- a) **Policy and strategic frameworks** must be in place to ensure that the strategic documents at national and regional levels which underpin ESIF investments are of a high quality and in line with commonly agreed standards;
- b) **Regulatory frameworks** must be clear to ensure that implementation of operations co-financed by ESIFs comply with the EU legislative framework; and
- c) There must be **sufficient administrative and institutional capacity**.

The ExACs that apply specifically to universal broadband and digital-growth investment in the European Union are:

- a) **Digital growth strategy and plans** - a strategic policy framework for digital growth should be in place to stimulate affordable, high-quality and interoperable ICT-enabled private and public services and increase uptake, including among vulnerable groups, businesses and public administrations, as well as cross-border initiatives;
- b) **Next-generation network (NGN) infrastructure strategy and plans** - the existence of national or regional NGN plans which take account of regional actions in order to reach high-speed Internet access targets, focusing on areas where the market fails to provide an open infrastructure at an affordable cost and of a quality in line with EU competition and State-aid rules, and on providing accessible services to vulnerable groups.¹

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R1303>

EU ex-ante conditionalities

Digital growth	Next-generation networks
<ul style="list-style-type: none"> • Strategic policy framework • Good quality, interoperable, ICT-enabled private and public services • Increase uptake by all, including vulnerable groups, business and public administrations • Cross-border initiatives 	<ul style="list-style-type: none"> • National and regional NGN plans which take into account regional actions • Meet high-speed Internet access targets • Focus on areas where markets fail to provide affordable, high-quality, open infrastructure in line with competition and State-aid rules • Services accessible to vulnerable groups

3.2 Funding priorities

At the national level, funding priorities should be derived from the policy priorities and, moreover, limited to addressing the gaps identified in a given country owing to insufficient funding through other sources. In the early 2000s, when many funds were established in law as a response to the critical need to finance universal access, the priority was to roll out broadband infrastructure and little consideration was given to demand-side strategies in many countries, a gap which spread into the public funding sphere. Currently, about 70 per cent of operational funds do not legislate for the funding of demand-side initiatives.¹⁶

Broadly, financing priorities in the digital era can be split into four categories: connectivity; adoption and use by individuals, strategic public institutions and SMEs; research and innovation; and digital inclusion, which cuts across the other categories.

- (1) **Improve connectivity, digital networks and access** – supply-side strategies which focus on encouraging investment in the deployment of last-mile and backbone network infrastructure, which is the main priority for enabling broadband access and network extension. On a local level, this includes investment in data centres and local Internet exchange points (IXPs). Such connectivity-based interventions will reduce costs and increase productivity for businesses, efficiency of public services and access to digital opportunities for all.
- (2) **Support adoption** – this helps to create an inclusive digital society and economy, benefiting from digital opportunities via the financing of demand-side interventions:
 - a) **Individual and strategic public institution support**, which is necessary to increase demand, with a focus on investing in digital literacy, promoting uptake and use. Historically, the financing of this gap has been left to government, academia, donor agencies, civil society and communities to address.
 - b) **Digitalize and support industry and in particular SMEs** to ensure that businesses, SMEs, digital and non-tech industries can benefit from digital innovations to create a higher value chain and to scale up projects. Funding should be locally oriented and meet the needs of the community in terms of creating decent jobs and other opportunities, which will in turn boost investment.

¹⁶ According to country responses to the ITU annual World Telecommunication/ICT Regulatory Survey, and reported on the ITU ICT-Eye, 2019

- c) **Digital literacy, skill development and relevant content development** will help to increase uptake and use in communities where broadband networks have been deployed. Funding should be geared towards projects that prioritize promoting the participation of women, children and members of other marginalized groups.
- (3) **Investment in research and development (R&D) and SMEs** to facilitate the development of innovative digital technologies. The SME funding gap is significant, with SMEs finding it difficult to raise finance for relatively high-risk, untested innovative business, despite the significant contribution that they make to economies. Furthermore, in terms of innovation, new technologies such as drones, IoT, M2M technologies, AI and augmented and virtual reality will require funding to make it past the start-up stage and into the mainstream. Given that they too are untested, the availability of financial support to facilitate such innovations may be limited, even though they are likely to be key in fast tracking SDG attainment in locally relevant ways.
- (4) **Digital inclusion support** to ensure that all finance provided includes requirements to include and promote the participation of women, persons with disabilities, the elderly and representatives of any other marginalized or vulnerable social groups. To date, this has been the preserve of civil society and donor agencies, in the main.

The above priorities are indicative and should be informed by country-specific national priorities. National policy and institutional frameworks should always inform the use of the various public funding instruments that exist in a country, whether they are sovereign funds, USAFs or other mechanisms. Overall, as described in this section, any positive impact from policy, regulatory and institutional reform will translate into increased capital spending and decreased need for public funding.

3.3 Beneficiaries

Beneficiaries of public funding have historically been operators and equipment providers, who then used those funds to deploy and run networks. In some cases, they have included individuals and public institutions such as schools and hospitals and may have received subsidies via regulatory and fiscal incentives, including vouchers, discounts and schemes, such as “e-rates.”

Digitalization has brought about an extension in funding priorities, most notably increased attention on digital adoption and the affordable and easy use of broadband networks, resulting in a focus on non-regulated and non-governmental priorities, such as SMEs, and on innovation. Such an approach leads to a recasting of potential beneficiaries of universal access on two levels to include:

- a) SMEs, research institutions and business accelerators which do not fall within the ICT-sector regulatory framework but do positively influence digitalization and digital uptake and use; and
- b) Financial intermediaries, such as equity firms and venture capitalists, which then on-invest or co-invest in the above (see fund of fund discussion in [section 8](#)). It can, however, be argued that these intermediaries are vehicles rather than beneficiaries since they will ultimately finance beneficiaries.

In all instances, the principle remains that the provision of public funding should be administered in a way that does not give an undue preference for a beneficiary of public funding over its competitors.

4 Funding gaps

4.1 Overview

Estimating the cost of connecting the unconnected by 2030 is a mammoth task:

- ITU's Connecting Humanity report (2020) estimates that USD 428 billion is needed to connect the 3 billion unconnected to the Internet (aged 10 and above) by 2030, given that more than 12 per cent of the unconnected live in remote and rural locations where traditional networks are not easily accessible.¹⁷ As a result, a significant portion of the funding required is to finance capital expenditure (CAPEX).
- According to Boston Consulting Group (BCG), however, it will cost five times as much (about USD 2.1 trillion) to merely halve the current connectivity gap and increase the percentage of high-speed Internet users from 53 per cent to 80 per cent by 2025. BCG suggests that this will translate to almost 100-per-cent use in high-income countries, 80 per cent in middle-income countries and 70 per cent in low-income countries.¹⁸

Figure 5: Investment requirement by region, Connecting Humanity report ¹⁹



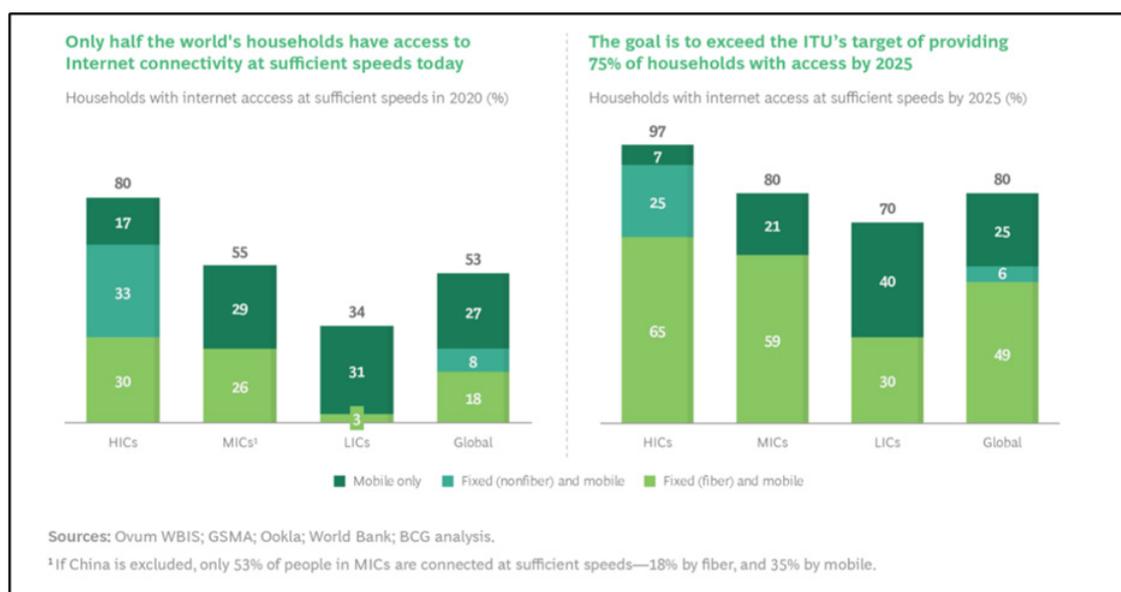
Sources: Estimates based on ITU, GSMA, A4AI, operator and regulator data

¹⁷ https://www.itu.int/dms_pub/itu-d/opb/gen/D-GEN-INVEST.CON-2020-PDF-E.pdf

¹⁸ <https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people>

¹⁹ Connecting Humanity: Assessing investment needs of connecting humanity to the Internet by 2030 (ITU, 2020) - https://www.itu.int/dms_pub/itu-d/opb/gen/D-GEN-INVEST.CON-2020-PDF-E.pdf

Figure 6: Narrowing the global divide by 2025²⁰



The reality is that there is no single digital divide that needs to be addressed, but rather a number of elements of gaps that contribute to the digital divide. It is important that countries identify and address the “sub-gaps” by recognizing that they are interrelated. Gaps that have been identified in many areas include:

- Infrastructure gaps**, revealed through market gap analysis and mapping of infrastructure to reveal areas of limited coverage - BCG proposes that around USD 1.5 trillion would be required globally to roll out and operate infrastructure, with initial CAPEX amounting to about USD 0.5 trillion by 2025.²¹ The gap between the available estimates is significant. It is, however, clear that most of the capital would have to be allocated as CAPEX in LDCs and remote and rural areas within countries in order to cover both backhaul, fibre backbone and mobile infrastructure at the access level.
- Gaps in adoption, uptake and use**, as shown by penetration rates - BCG suggests that driving adoption would require USD 0.6 trillion globally over a five-year period to enable 100 million households to adopt and use the Internet where coverage exists;²²
- Skill gaps** - these need to be addressed through ICTs and digital literacy in school programmes and targeted programmes for out-of-school and on-the-job learners. In sub-Saharan Africa, it is estimated that over 230 million jobs will require digital skills by 2030, resulting in almost 650 million training opportunities according to the International Finance Corporation (IFC), which forecasts that sub-Saharan Africa has a USD 130 billion investment opportunity in digital skilling through 2030.²³
- SME development and innovation gaps** - about half of formal SMEs do not have access to formal credit and are forced to rely on internal funds or friends and family to start up their businesses. In emerging markets, approximately 131 million, or 41 per cent, of formal SMEs have unmet financing needs.²⁴

²⁰ <https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people>

²¹ <https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people>

²² <https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people>

²³ Digital Skills in Sub-Saharan Africa, Spotlight on Ghana: https://www.ifc.org/wps/wcm/connect/38390d15-e30e-4d6e-b0d2-bb09f6146efa/Digital+Skills+Report_Flyer_5-22-19_web.pdf?MOD=AJPERES&CVID=mHwcBU8

²⁴ <https://digitalfrontiersinstitute.org/2020/10/06/promoting-digital-and-innovative-sme-financing/>

- e) **Gaps in school connectivity, or “homework gaps”** – school closures in the wake of COVID-19 forced 94 per cent of learners across the globe to learn from home, though not all had reliable internet access. The ITU-UNICEF led Giga initiative,²⁵ which identifies the mapping of schools, school connectivity and access to digital public goods to ensure meaningful connectivity, will inform countries’ school connectivity strategies and facilitate the calculation of school connectivity funding gaps. UNESCO’s e-school initiative is another example.
- f) **Disability gaps** – these refer to how much less likely persons with disabilities are than persons without disabilities to own or use ICTs and digital technologies. Around 15 per cent of the world’s population, or an estimated one billion people, are persons with disabilities,²⁶ and only 10 per cent of these people have access to assistive technology that can improve their connectivity and quality of life.²⁷
- g) **Gender gaps** – such gaps are reflected in lower adoption and use of ICTs and digital technologies, participation in SME ownership, employment and digital literacy among women.

What the various estimates have in common is that the funding required for the bridging of each of these gaps and holistic SDG attainment is considerable and beyond the means of any single funding actor. The investment requirements and types of project and initiative to be funded vary from region to region as they are influenced by the type of network selected for implementation, the region’s population density, geography and topology, the cost of labour and the country’s regulatory framework for infrastructure. The costs of closing demand-side gaps are affected by different factors, including literacy, availability of relevant local content, high device costs and SME development.

4.2 Measuring infrastructure gaps

The traditional universal access model that was applied primarily to the quantifying of the extension of fixed, 2G and 3G networks measures coverage and affordability. It identifies market access gaps by determining what geographic areas and communities are likely to remain unserved by commercial activity. It considers where private capital is; where private capital will go soon based on technical and financial plans provided to regulators – market efficiency gaps; where a one-off subsidy is needed to spur private sector investment – smart subsidy zones; and where private capital is not likely to ever go and long-term investment is needed – true access gaps.

While helpful in terms of identifying coverage and affordability gaps, the traditional market gap analysis model will not lead to the identification of all areas needing attention in the digital era. On one level, while it provides for a focus on future roll-out thanks to information asymmetries between the regulator or USAF and operators, the analysis is often limited. In addition, it excludes consideration of gaps relating to more subjective areas of digital literacy, local content and language. If anything, relying on traditional market gap analysis alone might further delay the urgent action required to address universal access in a holistic manner, particularly in developing countries.

²⁵ Giga aims to connect every school to the Internet and every young person to information, choice and opportunity. Giga - Connect every school to the Internet (gigaconnect.org)

²⁶ World Health Organization: https://www.who.int/disabilities/world_report/2011/report.pdf

²⁷ GSMA: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/12/GSMA_Principles-for-driving-the-digital-inclusion-of-persons-with-disabilities_Final-accessible-file.pdf

Given the urgent need to get everyone connected, broadband access gap analyses have to pre-empt roll-out to a greater extent, in addition to the previous market gap analysis model. The European Union's broadband guidelines of 2009 address this by following a colour coded schema of areas that should be awarded funds, taking into account not only existing infrastructure but also operators' concrete forward-looking investment plans to deploy such networks in the near future.²⁸ According to the schema, areas with no broadband infrastructure are considered "white" and more likely to receive aid, while "black" areas, with at least two or more broadband network providers, and "grey" areas, with just one, may find it harder to pass a State-aid market test which seeks to limit market distortion (see *United States infrastructure funding gap* below). Grey areas would need to demonstrate a "step change" to qualify for assistance, and funding in the more competitive black areas is exceptional as in such areas the risk of the crowding-out of private funding is highest. Like the traditional market gap analysis used in many developing countries, this analysis produces an evidence-based approach to identifying and quantifying gaps in a way that takes into account operators' future roll-out plans.

Regardless of technology choice - and the choices are many, from wireless broadband to fibre and satellite and beyond - infrastructure is a long-term investment. Beyond the initial financial outlay required to build out networks, additional ongoing investments are required to maintain and upgrade infrastructure. Furthermore, particularly in developing countries, due account needs to be taken of the readiness of the community and the location for broadband infrastructure. A key consideration in this regard is the electricity supply, a pre-requisite for broadband and the absence of which will increase deployment costs and time-frames. With this in mind, policy-makers should factor in the impact of upfront costs, even if they are indirectly related to broadband. In addition, consideration must be given to the potential cost savings associated with various technologies when it comes to the longevity of the build, extensions and upgrades.

²⁸ The broadband State-aid rules explained - an eGuide for Decision Makers, Wik Consult: https://ec.europa.eu/regional_policy/sources/conferences/state-aid/broadband_rulesexplained.pdf

United States infrastructure funding gap

The estimated cost of closing the infrastructure gap in the United States is USD 80 billion. According to the US Federal Communications Commission (FCC) in 2017, the total upfront CAPEX required to deploy fibre to the premises (FTTP) to the 14 per cent of locations lacking access in the United States would be about USD 80 billion but, because of the shape of the cost curve, roughly 98-per-cent coverage could be attained for USD 40 billion. The definition of “broadband Internet” in the United States includes a minimum download speed of 25 Mbps and an upload speed of 3 Mbps. In 2017, about 19 million Americans – roughly 6 per cent of the population – did not have broadband access. The vast majority of those, approximately 14.5 million, were based in rural areas.¹

Closing the infrastructure gap in Africa

The cost of closing the infrastructure gap in Africa by 2030 is USD 100 billion. Nearly 1.1 billion new unique African users must be connected to achieve universal, affordable and good-quality broadband Internet access by 2030 at a total cost of about USD 100 billion, of which approximately USD 90 billion would be required for sub-Saharan Africa alone. Nearly 250 000 new 4G base stations and at least 250 000 km of fibre would have to be deployed across the region, as well as satellite and Wi-Fi-based solutions to reach the nearly 100 million that live in remote areas currently out of reach of traditional mobile networks. The costing is based on the assumption that good-quality broadband Internet has an average download speed of at least 10 Mbps and is technology neutral.²

From last mile to Edge

In order to close the digital gap between 2020 and 2030, the world requires USD 428 billion, of which Africa needs USD 100 billion to provide connectivity, as well as 500 000 km of fibre over the next ten years. The approach to building this new architecture will be different to that for the “last mile” of the 20th century. The architecture must consider the latest developments in Edge cloud and computing. Edge server infrastructure and accessories will be more than five times bigger than hyper-scale public cloud. Therefore, the language of the last mile must transform to Edge because of the 50 billion IoT devices to be connected to the new infrastructure. Funding this unique ecosystem will also be driven by blockchain, hence the need for a different funding model.

¹ FCC’s Broadband Progress Report: <https://www.fcc.gov/document/improving-nations-digital-infrastructure>

² https://www.broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica_Report.pdf

Also, the Telco Edge cloud or last mile will need to be decoupled from the traditional network. Regulators will need to liberalize the Edge network because of the quantum and complexity of IoT devices and architecture that will cut across agriculture, health, education, manufacturing, automotive and many other sectors. The introduction of Wi-Fi 6 is another compelling issue for deregulation. Funding connected cars, for example, will be different from the traditional last-mile funding model. Consideration must be given for fractional ownership and tokenization models of the last mile, which would involve putting the ownership of the last mile on the blockchain to facilitate fractional ownership. This approach exposes the last-mile asset to blockchain funds placed on initial coin offerings and security token offerings.

The financing of the last mile will benefit from a market-creation perspective that addresses non-consumption. Globally, 3.7 billion people do not have Internet access; in Africa, more than 700 million people lack stable and affordable electricity, and 258 million youths and adolescents are not in school. These digitally excluded populations are ready for market creation. The exponential growth of IoT and the billions of devices connected to the Internet are pointing to the last mile of the digital era, which represents IoT proliferation on the Edge. Edge is the modern reconfigured last mile and a foundation of the next-generation Internet. The last mile is changing from basic Internet connectivity to a place of significant value-added, with new applications leading to the creation of new markets. The last mile is no longer just about traditional communication networks, but about the emerging Edge ecosystem.

In framing the funding and financing of the last mile, it is clear that the unit of analysis has shifted. Advances in technology are making it possible to focus on Edge high-performance computing, storage and networking beyond human communication, resulting in a lower cost of data transport, decreased latency and local data compliance. Focus shifts from voice to enable the next-generation applications of connected machines. This age of the Internet and IoT provides new opportunities. Last-mile connectivity is a disruptive tool that allows access to products and services beyond human communication and once out of reach.

The last mile is about unlocking markets with sustainable long-term impact. The last mile of the IoT era is about unlocking and connecting education with educational technology, increasing yields for food security with agricultural technology, achieving universal health with health-care technology, mitigating climate change with green energy microgrids and reducing carbon dioxide emissions with connected vehicles: enabling the Edge for all is redefining the last mile.

Furthermore, Edge computing and networking space has led to growth in open-source projects enabling organizations to deploy Edge applications at a fraction of the cost and limit the risks of vendor lock-in, while facilitating standardization across the industry.

Source: Andile Ngcaba, Founding Partner & Chairman, Convergence Partners.

4.3 Measuring adoption gaps

Estimating the cost of closing the multiple gaps linked to adoption and use is a complex task. On the adoption side, cost varies depending on the aspect of adoption and use being addressed, i.e. digital literacy, skill development, affordability or connectivity for strategic public institutions and SMEs. It also depends on the skills and capacity available in a country and the prevalence of relevant and local content. Given the various elements involved, there is no single lifecycle for demand-side interventions; however, these initiatives tend to be short, “soft” and high risk.

Digital adoption will have different impacts on different players in the digital value chain. A key consequence of adoption is an increase in traffic, which will in turn increase the revenue of ISPs and the average revenue per user (ARPU) of operators. Increased traffic will put pressure on networks that will be required to have sufficient capacity to support more users, which could necessitate additional investment.

Closing the digital literacy gap in Africa

The Broadband Commission for Sustainable Development estimates that it would cost USD 18 billion to close the digital literacy gap in Africa, i.e. for skill and content development to connect the nearly 1.1 billion new unique users in order to achieve universal, affordable and good-quality broadband Internet access by 2030 in Africa.¹

¹ https://www.broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica_Report.pdf

5 Who is funding broadband and digital transactions?

Broadband and digitalization funding is diverse. Just as the reach of the ICT sector has expanded, across sectors and throughout the economy, the investment landscape has changed and possibilities for potential sources of funding have also increased. Funding needs have extended beyond broadband infrastructure, and yet there is a distinct set of actors who have historically been focused on this area. Today, financiers include actors involved in supporting the development of broadband skills, digital literacy and innovation. As discussed in Part A, because digital transformation has a cross-cutting impact, traditional approaches to funding digital universal access are giving way as an interest in and need for a collaborative approach grow.

5.1 Infrastructure funding actors

Infrastructure investors tend to be risk averse and focused on the long term. Traditionally, the private sector, in the form of fixed and wireless network operators, tower companies, ISPs and sometimes equipment vendors, have been the primary funders of ICT infrastructure. Recently, this pool of financiers has expanded to include investors in data centres, digital platforms and content providers. The ICT policy framework in developing economies has focused on enabling private participation and has not specifically promoted the use of funding from multilateral and bilateral donors and Development Finance Institutions (DFIs) to roll out infrastructure in

the same way as the energy and transport sectors have. Compared to economic infrastructure sectors such as energy (USD 12.1 billion) and banking and financial services (USD 11.8 billion), the USD 600 million spent by DFIs in 2017/18 on financing ICT projects was minimal.²⁹ DFI spending on ICT projects has historically been significantly less than on projects in other sectors, despite the central role that broadband plays in development and the alignment of broadband projects with DFI development mandates. As projects in the ICT sector become more complex and more expensive, and their impact broader, there is an increasing need to further expand the investment pool and find new ways, including via blended finance, which is discussed in [section 6](#), to leverage private capital in combination with public and development funding.

In addition to the private sector, the potential actors in the infrastructure funding space include:

- a) DFIs, such as the African Development Bank (AfDB), the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), the Asian Development Bank (ADB), the Inter-American Development Bank (IDB) and the International Monetary Fund (IMF). DFI funding for infrastructure is often backed by developed countries and provides loan guarantees as direct financing or, in some cases, equity contributions to a project proven to benefit the development of underserved countries or regions.³⁰
- b) Multilateral and bilateral agencies such as ITU and the World Bank, which can provide financial and in-kind support for projects.
- c) Global aid agencies, such as those from the United States (USAID), Germany (GIZ), Canada (CIDA) and Sweden (Sida), and bilateral DFIs, such as Proparco in France and KfW in Germany, can provide financial and in-kind support for projects that meet developmental goals.
- d) Private-philanthropic investors, such as foundations, non-profits, impact investors with sub-commercial return expectations, etc.
- e) Banks and private commercial investors, including private equity firms, venture capital firms and impact investors with commercial return expectations.
- f) Governments may make contributions from the budget at national, regional and municipal levels, including financial support through structured funds, such as USAFs, which are financed by private-sector contributions.

New actors in the ICT funding landscape

Impact investment funds are often used in socially driven sectors, such as education and health, and combine financial returns with positive social, environmental and/or governance-related outcomes. Given the social impact of broadband and digitalization, these funds are increasingly relevant to this sector in the digital era. The sources of these funds vary greatly and can include, inter alia, governments, DFIs, foundations, pension funds and the private sector, or a combination thereof.

²⁹ OECD (2019). Amounts mobilised from the private sector by development finance interventions See: https://issuu.com/oecd_publishing/docs/amounts-mobilised-from-the-private-sector-by-dev-fi

³⁰ Submarine Cables: Structuring and Financing Options. Saliency White Paper. See: <https://saliencyconsulting.ae/wp-content/uploads/2018/09/Submarine-Cables-Structuring-and-Financing-Options-Jan-2015.pdf>

5.2 Funding actors for adoption and innovation

Funders that are involved in the financing of initiatives and investments geared towards the adoption of broadband and innovation tend to have a higher risk appetite and to be more interested in short-term returns. In addition to the funders mentioned above, key stakeholders that can play a role in financing adoption and innovation-related projects and initiatives include:

- a) Local content providers, data centre providers, telecommunication operators and global digital platform providers whose core business relates to and depends on aspects of digital adoption, use and inclusion;
- b) Private equity and venture capitalists who are seeking to monetize “the next big idea” by investing in innovation; and technically-oriented entrepreneurs primarily through investment in incubation hubs and accelerators; and
- c) Governments, academia, NGOs and donor organizations interested in local content development, advancing the digital agenda, achieving the SDGs and creating jobs.

All actors in the digital value chain can, along with USAFs and other structural funds, play an important role in increasing digital literacy, jump-starting the development of SMEs and promoting digital content ecosystems by investing in relevant, local business processes and content to help build a user base large enough to reach critical mass and therefore decrease the need for funding.

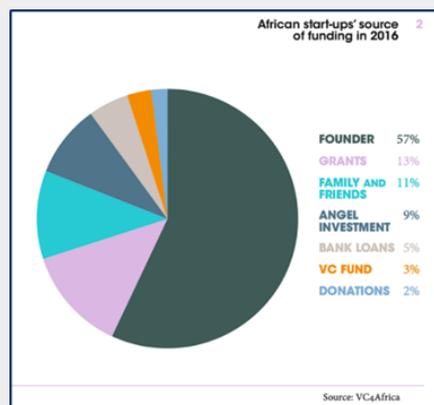
New players in the SME and innovation game

Asset managers, pension funds and private equity funds which participated in the financing of ICT infrastructure such as submarine cables and mobile networks are now complemented by venture capital funding, which is ideal for higher risk, innovative start-ups. Venture capital is well suited for early-stage investment when a company begins to commercialize its innovation but does not have the balance sheet to attract private equity investment. It fills the void between sources of funds for innovation (e.g. corporations, government bodies and the entrepreneur’s friends and family) and traditional, lower-cost sources of capital available to ongoing concerns with solid balance sheets. The venture capitalist requires a sufficient return on capital to allow it to exit successfully by selling more mature companies on to private equity funds and other investors.¹

¹ <https://hbr.org/1998/11/how-venture-capital-works>

Venture capital in Africa, 2016

Venture capital and angel investment represented only 12 per cent of the total pool of funding invested across all African technology start-ups in 2016. Within financial technology (FinTech) specifically, the emerging markets pale in comparison to the rest of the world in terms of backing from venture capital. In 2016, although FinTech investments increased by deal value – over USD 13.8 billion was deployed to a variety of FinTech companies globally, more than double the value of venture-capital investment in FinTech in 2014 – investment remained dominated by China, the United States and the United Kingdom. With the exception of India (with USD 272 million across 82 FinTech investments in 2016) and Brazil (with USD 161 million in value in 2016), the global proportion of venture capital supporting FinTech development across the rest of Africa, Asia and Latin America is minimal.



Source: VC4Africa and The Mastercard Foundation Partnership for Finance in a Digital Africa : <https://www.financedigitalafrica.org/wp-content/uploads/2017/12/FiDA-Snapshot-11-What-ecosystem-improvements-will-unlock-investment-in-digital-finance.pdf>

5.3 Digital inclusion: key actors

Too often, digital inclusion funding is lumped together with adoption funding as discussed in 5.2 above; digital inclusion funding, however, has to cut across all initiatives relating to connectivity – from infrastructure to adoption and use. Thus, the key actors for funding inclusion are not NGOs and donor organizations, but all financiers. This approach moves inclusion from the periphery to the mainstream, placing it at the core of broadband roll-out and digitalization.

Actor	Profile	Role in blended finance
Public and philanthropic donors	Medium risk, medium term. Primary consideration – social and economic returns.	<ul style="list-style-type: none"> a) Convene different stakeholders. b) Provide technical assistance grants to develop projects and make initiatives investable – grants are especially important in riskier countries and less mature sectors. c) De-risk projects through the use of several de-risking instruments. d) Advocate for the sustainable development agenda. e) Increase the sustainable development impact of investments.
Private philanthropic investors (Foundations, non-profits, impact investors with sub-commercial return expectations, etc.)	Short term, high risk. Primary consideration – social and economic returns.	Given their higher risk tolerance, these investors are well positioned to experiment in projects, sectors and/or locations with high potential development impact and to influence capital flow through demonstration as well as by taking subordinated positions.
Development finance institutions	Long term, low risk. Primary consideration – social and economic returns; financial returns also key.	<ul style="list-style-type: none"> a) Signal the market about commerciality of certain investment opportunities through demonstration. b) Provide large ticket sizes (compared to other public investors and private-philanthropic sources). c) Mitigate risks by taking risk layers, providing guarantees, etc. d) A critical intermediary to get institutional investors on board as they can meet the ticket-size and risk-return expectations of institutional investors and get them on board.

(continued)

Actor	Profile	Role in blended finance
Private commercial investors	<p>Private equity - medium to long term, medium to low risk.</p> <p>Consideration - financial return on investment.</p> <p>Venture capital - short term, high risk.</p> <p>Consideration - financial return on investment.</p> <p>Impact investors - Medium to long term, medium to low risk.</p> <p>Consideration - financial return on investment and social and economic impact.</p>	<p>a) Hold the resources necessary to bridge the funding gap to achieve the SDGs.</p> <p>b) Can manage a large spectrum of investments, from small-venture stage to large-scale investment.</p> <p>c) Play an important role in aggregation.</p>
Institutional investors, including pension funds and insurance	<p>Long term, low risk.</p> <p>Consideration - financial return on investment for institutional investors (sometimes by nature combined with socio-economic impact).</p>	<p>a) Have the resources necessary to bridge the funding gap to achieve the SDGs.</p> <p>b) Due to the large amount of capital held, have to deploy capital in large amounts, limiting their ability to invest in smaller propositions.</p> <p>c) Focus on less risky sectors and countries due to low risk appetite.</p>
Banks (especially those based in emerging markets)	<p>Long term, low risk.</p> <p>Consideration - financial return on investment.</p>	<p>a) Aggregating role at the national level.</p> <p>b) Often small-scale investments (or larger projects through scale syndicated loans).</p> <p>c) Focus on less risky sectors owing to low risk appetite - guarantee mechanisms in combination with technical assistance often effective to demonstrate new business models.</p>

Part B - The financing toolbox

6 Blended finance

6.1 Context

With the broad range of potential financiers discussed in Part A and the number and magnitude of gaps in terms of connectivity, adoption, SME, innovation and inclusion, it is necessary to find strategic ways to pool resources to increase the available funding to close the related funding gaps. Collaboration is the name of the game, and the complementary roles and mandates of the various finance actors facilitate this.

Blended finance allows organizations that have different objectives to collaborate and invest alongside each other while achieving their own financial and/or developmental objectives. It is described by the World Economic Forum and OECD as the strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets. Overall, according to the OECD, between 2012 and 2018, the development finance sector mobilized about USD 205 billion from the private sector, across different economic sectors, through guarantees, syndicate loans, direct investment in companies, credit lines and co-financing projects. Most private-sector funding was raised through guarantees (39 per cent), followed by syndicated loans and direct investment (both 18 per cent).³¹

6.2 Blending as a tool

As a structuring approach, blended finance is a tool in the financing toolbox but is not a panacea. The IFC cautions that it fits a very specific context and “should only be used when the public benefit of a project exceeds the returns to private investors, usually because there are externalities, market failures, affordability constraints, or information deficiencies in the market that prevent dynamic development of the private sector.”³² Where blended finance is applied, it should seek to develop and encourage future sustainable commercial markets.³³ In this report, blended finance is presented as a tool. In addition, the leveraging, mobilizing and catalysing principles that underpin it are elevated as they are considered valuable for financing universal access to broadband and digital technologies in general.

³¹ <https://issuu.com/oecd.publishing/docs/amounts-mobilised-from-the-private-sector-by-dev-fi>

³² <https://openknowledge.worldbank.org/bitstream/handle/10986/30377/125904-BRI-EMCompass-Note-51-BlendedFinance-April-13-PUBLIC.pdf?sequence=1&isAllowed=y>

³³ <https://openknowledge.worldbank.org/bitstream/handle/10986/30377/125904-BRI-EMCompass-Note-51-BlendedFinance-April-13-PUBLIC.pdf?sequence=1&isAllowed=y>

Good-practice guidance

In funding broadband infrastructure, the public sector should ensure that interventions are based on the following principles:¹

- a) **Leverage** – use of funds should be structured to attract private capital;
- b) **Impact** – investments should seek to drive social, environmental and economic progress, meet national targets and close universal access and SDG gaps; and
- c) **Returns** – financial returns for private investors should be in line with market expectations, based on real and perceived risks.

¹ http://www3.weforum.org/docs/WEF_Blended_Finance_A_Primer_Development_Finance_Philanthropic_Funders.pdf

6.3 Blending for additionality

The blended-finance investment decision is not just about pooling resources, it has to demonstrate that there is an overall anticipated development impact, and that there is what the IFC describes as “additionality” being introduced by public, developmental and philanthropic funders, i.e. it is not substituting or crowding out private investment; rather, it should be crowding it in.

Additionality is an important concept in blended finance and refers to the extent to which development-oriented public money leads to private investment which would not have otherwise been made if not for the public investment. Additionality could be financial, e.g. financing on terms not available from the market, including mobilization; or non-financial, e.g. non-commercial risk mitigation, technical assistance and strengthening regulatory and policy environments.³⁴ It considers all forms of return so that, in addition to meeting development goals, a project should also ensure financial returns for private investors in line with market expectations, based on real and perceived risks.

³⁴ <https://www.ifc.org/wps/wcm/connect/768bcbe9-f8e9-4d61-a179-54e5cc315424/202011-New-IFC-Discussion-Paper.pdf?MOD=AJPERES&CVID=no0db6M>

Figure 7: Determining additionality; Source: IFC 2020³⁵

Financial additionality	Non-financial additionality
<ul style="list-style-type: none"> • Financing structure: Providing terms that are necessary for the investment but are not readily available on the market. Owing to their development mandate, higher risk tolerance and long-standing presence in emerging markets, DFIs can provide long tenor, extended grace period and loans denominated in specific currencies. • Innovative financing structure and instruments: Providing innovative financing structures or instruments that may lower the cost of capital, mitigate commercial risks or bring other financial attributes not available on the market. • Resource mobilization: Mobilizing capital from commercial banks, institutional investors, private sources and, under certain conditions, other DFIs. Owing to their syndication expertise, credit rating, convening power and privileges, DFIs are often able to mobilize these resources more effectively and efficiently. • Own-account equity: Providing of equity that addresses risk capital gaps faced by certain types of investors, enhances financial soundness of a project and/or credit-worthiness of the client. 	<ul style="list-style-type: none"> • Non-commercial risk mitigation: Providing comfort to clients and investors that political or regulatory risk are adequately mitigated. Non-commercial risk mitigation could be implicit (DFI lending its name and due diligence reputation to the project) or explicit (DFI providing non-commercial risk cover). • Policy, institutional, regulatory change: Triggering or supporting change in policy or regulatory frameworks to reduce sector risk or risk perceptions, improve capital flows and enhance sector development practices. • Knowledge, innovation and capacity building: Providing sector and market knowledge, expertise and innovation, as well as building public and private capabilities, which are essential for project design, risk mitigation and realization of expected development outcomes. • Standard setting: Raising environmental, social and governance standards applied by projects and clients.

In conclusion, the principles of blended funding can be applied to the use of public funds, including USAFs, which have many of the same characteristics as development and philanthropic funds. The ultimate goal of the investment is the fulfilment of an element of the public interest, i.e. meeting social and economic objectives; and simultaneously unlocking commercial investment, resulting in sustainable investment. The concept of additionality and SDG attainment are at the core of this approach to finance. Against this backdrop, the report will look at what other tools are available to finance universal access.

7 Funding instruments

7.1 Overview

There are many flavours of funding that can be applied differently depending on the type of initiative or project. For example, projects addressing connectivity and pricing challenges will differ, ranging from State ownership at the most “intrusive” public level to regulation, incentivization and in-kind support (section 7). In between these two extremes, there are other mechanisms such as subsidies, guarantees, grants and loans issued through structured funds, such as USAFs, sovereign funds and partnerships with development, multilateral and bilateral agencies.

Both debt and equity are used to overcome funding barriers for low and high-risk projects. The various financial products include established instruments, such as bonds and notes, loans and

³⁵ IFC (2020) The Why and How of Blended Finance. Recommendations to Strengthen the Rationale for and Efficient Use of Concessional Resources in Development Finance Institutions’ (DFI) Operations (Discussion Paper) See: <https://www.ifc.org/wps/wcm/connect/768bcbe9-f8e9-4d61-a179-54e5cc315424/202011-New-IFC-Discussion-Paper.pdf?MOD=AJPERES&CVID=no0db6M>

micro-finance and SME finance, all of which have been used by public and private institutions and DFIs to finance ICT infrastructure, services and devices for decades. An effective funding mix in a country includes: risk mitigation mechanisms; financial solutions; and non-financial incentives discussed in [Part C](#).

Table 1: Financing toolbox overview

	Risk mitigation mechanisms	Financial solutions
Objective	Reduced investment risk and linking of funds received to specific targets and outcomes.	Mobilize private funding from capital markets.
Principles	Result/outcome based	Commercially driven
Established instruments	a) Grants b) Subsidies (including USAFs and State aid) c) Guarantees d) Demand aggregation (advance market commitments)	a) Bonds and notes b) Infrastructure bonds c) Loans d) Micro-finance e) SME finance f) Private equity funds
Next-generation instruments	Social impact bonds	a) Digital bonds b) Impact investing funds c) Venture capital funds d) Funds of funds

7.2 Risk mitigation mechanisms

7.2.1 Overview

The risk mitigation measures discussed in this section serve to reduce investment risk and link funds received to specific targets and outcomes. [Section 2.3](#) discussed the risks associated with both infrastructure and adoption initiatives. Subsidies and guarantees are classic government-issued financial instruments that mitigate investor risk. In addition, governments may use demand aggregation to mitigate risk through, *inter alia*, availability payments and offtake agreements. Each of these instruments is discussed below.

7.2.2 Grants and subsidies

Subsidies are government-issued incentives, usually in the form of cash, grants or a targeted tax cut. They can be used at multiple stages in the investment process to either demonstrate a beneficiary's business case or reduce business model risk, e.g. through digital literacy programmes or local content and platform development. They can also be used to improve the developmental impact of a project through funding, e.g. through the mainstreaming of a service so that it is relevant for persons with disabilities, women or other marginalized communities.

In the ICT sector, subsidies are intended to encourage network deployment or local manufacturing by businesses and increase affordability for individuals. Subsidies can be issued via structural funds, such as USAFs, digital connectivity funds and national development banks, which enable projects to attract maximum private capital in conjunction with public funding. Importantly,

modern subsidies can incentivize delivery in terms of how they are structured, in tranches, and how they are measured. In order for subsidies to be effective, they must be outcome based and linked to certain policy conditions, such as the ExACs discussed in [section 3](#).

Case study: Structural funds for broadband network financing in French Guiana

Digital coverage is a challenge for the regional authority of French Guiana, owing to specific geographic and demographic challenges. An EU-funded project for the design and installation of a local optical fibre infrastructure aimed to solve some of the broadband access issues in the area.

Infrastructure sharing

The project promotes infrastructure sharing to ensure coherent digital-infrastructure deployment across French Guiana, as defined in its Territorial Road Map for Digital Development (Schéma Directeur Territorial d'Aménagement Numérique - SDTAN). The new optical fibre network was designed to benefit:

- a) Municipalities;
- b) Public Wi-Fi connection points;
- c) Sites of economic interest (public authorities, business zones, etc.); and
- d) The future fibre-to-the-home (FTTH) network.

Providing the population with an optical fibre connection

The first phase in the deployment of FTTH infrastructure will enable operators to provide Saint-Laurent-du-Maroni with a high-speed Internet connection in the near future. This project involves the digging of 85 km of trenches and the laying of 345 km of optical fibre cables.

Total investment and European funding

Total investment for the design and installation of the local optical fibre infrastructure project is EUR 6 367 086. The contribution of the European Regional Development Fund is EUR 2 564 025 through the Guiana Regional Council's operational programme for 2014-2020. The investment falls under the "services and applications for citizens" and "urban areas" priorities.

Source: https://ec.europa.eu/regional_policy/en/projects/france/lamenagement-numerique-de-louest-guyanais

7.2.3 Guarantees

Risk-mitigation instruments include guarantees and insurance, which do not comprise direct financing but do protect financiers against regulatory, liquidity and sometimes technology risks, facilitating access to commercial finance at a lower cost. Guarantees and insurance protect the investor if the borrower defaults and therefore mitigate risk. Several types of guarantee can be considered:

- a) **Minimum revenue guarantees** where there is the possibility of commercial viability but demand is uncertain, which would apply for guaranteeing roll-out in areas where the market gap arises due to uncertainty surrounding traffic volumes. This needs to be approached with caution, however, as governments providing guarantees do not want to do so at the expense of quality of service since the customers and revenue are guaranteed.
- b) **User subsidies** may also be considered as a form of guarantee in order to increase demand and, thereby, also revenues. Subsidies can be provided to categories of vulnerable user, ideally via a USAF or other well-established public-sector financing scheme.

The disadvantages of guarantees and insurance include:

- a) They are not ideal for rural and remote areas where the level of commercial viability is likely too low for guarantees to be used;
- b) There is a significant amount of risk that is transferred to the guarantor, which is the public financing agency, but the guarantor has limited ability to control the risks;
- c) There may be an impact of broader fiscal debt; and
- d) The guarantee is tailored to each project and therefore the transaction costs can be high.

7.2.4 Demand aggregation (advance market commitments)

Demand aggregation mitigates risk by reassuring investors that there will be users and revenue for their networks or users of their services and devices. This is achievable through availability payments, offtake agreements and other contractual mechanisms.

In public-private partnerships (see section 17.2 on business models), availability payments are made for performance, irrespective of demand. Governments can use these where there is no predictable direct revenue, e.g. in low-income areas, or in scenarios where end users do not pay for the use of public facilities via a user fee, but rather via a broader tax pool.³⁶ Public Wi-Fi or aggregated government demand to service schools or e-government initiatives are such instances where the service is generally available to users who may not pay directly for the service.

In this case, public funds are used to pay private partners for the provision, maintenance and operation of the network and services, which may be complemented by fees paid by the public entity to ensure broadband delivery.³⁷ Another mechanism is offtake agreements, which allow the private sector to invest on the back of a commitment to supply a minimum amount of capacity at a pre-agreed price, thereby guaranteeing a certain amount of revenue upfront.

³⁶ <https://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf>

³⁷ <https://www.oecd.org/finance/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf>

7.3 Creative financial solutions

Financial products, like the sector itself, have evolved over the years. Some key developments demonstrating how technology is influencing the finance sector for the benefit of the ICT and other sectors are highlighted below. The use of technology has enabled solutions and facilitated the funding instruments already discussed, while adding a technological twist to them, reducing the cost of financing and speeding up the pace of the transaction, which is important as financing processes can be lengthy and therefore expensive:

- a) **Infrastructure bonds**, whether secured or serviced by project cash-flows, are used to raise debt. The bond lifecycle – from issue to settlement – has been sped up through the emergence of digital bonds, which apply distributed ledger technology, AI/machine learning, big data analytics and cloud computing.³⁸ Digital bond issues, such as EIB's recently announced EUR 100 million two-year digital bond (see case study below: *First digital bond on a public blockchain launched by the European Investment Bank in a multibank collaborative effort*), make finance available at a faster pace. Additionally, such a high-profile digital bond may pave the way for market players to adopt blockchain technology for the issuing of financial securities.
- b) **Crowdfunding** can include equity and non-equity funding, for businesses as well as projects and causes. Crowdfunding feeds off of momentum, which can be generated by: the project, cause or business; or the reputation of investors that have already committed to the transaction. It can also lead to a relatively fast securing of finance at a low cost.
- c) **Bitcoin and cryptocurrencies** are starting to be used for development financing. In this context organizations and funders can use a decentralized impact exchange to create verified impact claims, essentially "proof of impact," which can be used to access social impact bonds and government subsidies. The data from these impact claims becomes part of a global impact ledger which governments and researchers can access to make informed decisions and optimize impact initiatives.³⁹

UNICEF cryptocurrency fund announces its largest investment in start-ups in developing and emerging economies¹

UNICEF reported that it is "seeing the digital world come at us more quickly than we could have imagined – and UNICEF must be able to use all of the tools of this new world to help children today and tomorrow ... The transfer of these funds – to eight companies in seven countries around the world – took less than 20 minutes and cost us less than USD 20. Almost instant global movement of value, fees of less than 0.00009 per cent of the total amount transferred and real-time transparency for our donors and supporters are the types of tools we are excited about."

¹ <https://www.unicef.org/press-releases/unicef-cryptocurrency-fund-announces-its-largest-investment-startups-developing-and-emerging-economies>

³⁸ <https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/fintech/new-fintech-applications-in-bond-markets/>

³⁹ <https://jbba.scholasticahq.com/post/106-crypto-philanthropy-new-financing-for-social-impact>

The beneficiaries included technology-related projects selected from almost 40 start-ups that graduated from the UNICEF Innovation Fund, having gone through technical evaluations, quality assessments of their open-source tech solutions, consideration of evidence of impact and more:

- a) **Afinidata** (Guatemala) is further developing its AI-based app to provide parents with personalized early childhood educational activities.
- b) **Avyantra** (India) is expanding the functionality of its health app which uses data science to support frontline health workers in the early diagnosis of neonatal sepsis.
- c) **Cireha** (Argentina) is scaling up the reach of its accessible app in three countries to help more children with speech impairments communicate using symbols.
- d) **OS City** (Mexico) is issuing blockchain-based government assets, heading towards issuing 1 000 blockchain IDs to allocate children's educational diplomas.
- e) **Somleng** (Cambodia) is scaling up its low-cost interactive voice response platform by partnering with the Government of Cambodia to send vital COVID-19 information.
- f) **Utopic** (Chile) is transitioning its learning game from VR to WebVR and empowering educators to assess, track and help to improve children's reading skills from their homes during COVID-19 containment measures and beyond.

Source: UNICEF press release, June 2020

First digital bond on a public blockchain launched by the European Investment Bank in a multibank collaborative effort¹

On 27 April 2021, the EIB launched a digital bond issue using blockchain and distributed ledger technology for the registration and settlement of digital bonds, in collaboration with Goldman Sachs, Santander and Société Générale. In partnership with Banque de France, the payment of the issue monies from the underwriters to the EIB has been represented on the blockchain in the form of Central Bank Digital Currency (CBDC). The EUR 100 million two-year bond, placed with key market investors, represents the market's first multi dealer led, primary issue of digitally native tokens using public blockchain technology.

Source: European Investment Bank press release, April 2021

¹ <https://www.eib.org/en/press/all/2021-141-european-investment-bank-eib-issues-its-first-ever-digital-bond-on-a-public-blockchain>

8 Structural funds

	Structural funds
Objective	To facilitate the attainment of national goals and targets
Principles	Transparent application
Established instruments	<ul style="list-style-type: none"> a) Subsidies b) Grants c) Guarantees d) Loans
Next-generation instruments	<ul style="list-style-type: none"> a) USAF 2.0 b) Funds of funds c) Co-investment

8.1 Introduction to structural funds

Structural funds are financial tools set up to implement national (e.g. Uganda, Peru, Chile and Hong Kong, China) and regional (European Structural and Investment Funds (ESIFs)) policies. USAFs are common ICT-specific structural funds, especially in developing countries. They aim to close gaps and reduce geographic, income and gender-based and other structural disparities in a given society. Given these objectives, the bulk of structural funds' financing tends to be directed at rural and remote areas or low-income, vulnerable and marginalized communities. The use of structural funds requires that there be a delicate balance between the use of public money in areas where market failure has been identified and the crowding out of investment.

Structural funds can provide support through a range of funding instruments, including subsidies, grants and loans to ensure that no one is left behind. Some may soon follow the EIB model of using innovative instruments like crypto-currencies and digital bonds for development funding.

As the costs of funding universal access to broadband and digital technologies and services has increased, and as the actors involved in the funding landscape become more in number and type, there is a need to consider ways in which structural funds can be strengthened and positioned for partnerships. This section looks at established models, i.e. co-investment funds and fund of funds, that may provide lessons for USAFs in particular as they are reformed to keep up with sector development and financing trends, such as blended financing.

8.2 National, regional and community-level intervention: USAFs

Funded primarily through levies imposed on operators as part of "pay" strategies in the traditional universal service funding "pay or play" equation, USAFs have been set up in some markets as a mechanism to finance the closing of gaps between rural and urban areas, the rich and the poor and men and women, both among and within countries. Funds seek to stimulate private-sector investment through subsidies, grants, loans and other funding instruments.

The concept of the fund has been embraced in about half of countries, 100 in total, around the world. Most of the established Funds (67) are relatively mature in that they were already established and operational by 2010. Today, Africa (35), the Americas (22) and Asia and the Pacific (22) have the highest number of funds.

Overall, there has been a growth in the number of operational funds, with most being in Africa and Latin America; in the Arab States, Asia and the Pacific and CIS, however, the number of operational funds declined between 2015 and 2019. In Europe, a number of funds have been established in digital markets, some niche and some general, including funds which support digitalization of vertical sectors, such as agriculture and health, and structural funds, such as ESIFs, which bolster regional connectivity, as well as others promoting adoption by SMEs and entrepreneurs.

Fund performance has been mixed, with many criticised for over-collection or underutilization. In addition, notwithstanding the effectiveness of any given fund, the ICT and digital landscape has changed drastically over the last 20 years, necessitating a review of individual funds and fund strategy. [Section 9](#) discusses USAF 2.0, which is a strengthened and more effective fund that benefits from the lessons learned from first-generation fund experiences over the last two decades, as well as other types of structural funds, such as those discussed in the remainder of this section.

8.3 Regional-level intervention: State aid and ESIFs

There are seven European Structural and Investment Funds (ESIFs), with one particularly relevant for the purposes of this analysis. Under the EU Cohesion Policy, the priorities of the European Regional Development Fund (ERDF) are divided into the thematic areas of: innovation and research; the digital agenda; support for SMEs; and the local carbon economy. Notably, unlike USAFs, the ERDF is not sector specific, although it does have thematic areas. The ERDF has a managing authority, which in the EU context, is akin to a USAF. The managing authority may be a national ministry, regional authority, local council or another public or private body that has been nominated and approved by a Member State.⁴⁰ ESIFs have to be aligned with State aid rules which require that any public financing does not serve to distort competition.

8.4 Funds for innovation

8.4.1 Overview

With the need to fund beyond networks, it is important to have an understanding of government-backed fund models that are used to encourage skill development, growth and innovation – a role USAFs will have to consider going forward given digitalization and its economic and social impact.

These models appear to complement traditional USAF models, with lessons that can be learned for future application, particularly where a fund's mandate and scope change to account for digitalization. Two models worth considering as part of fund reforms are: co-investment funds;

⁴⁰ https://ec.europa.eu/regional_policy/en/policy/what/glossary/m/managing-authority

and funds of funds. Importantly, while these funds design programmes, their main objective is to improve access to funding. In addition, they have the following key features:

- a) Pooling resources and tapping into the funds of a number of public and private actors;
- b) Leaning on private-sector expertise in fund management and administration, addressing a weakness of many USAFs;
- c) Relying on the sector expertise of the funds and their role as intermediaries; and
- d) Focusing on SME development, R&D and innovation funding.

These funds recognize that there is mutual benefit that can be derived from working with other funders and financiers to invest in certain transactions and therefore have co-investment and the pooling of resources as a key characteristic.⁴¹ These principles apply in commercial transactions and are carried through to public and developmental funding with the objective of deriving impact and leveraging private investment in the cases of the Republic of Korea and New Zealand, which have turned to collaborative approaches including structural funds established by the government to support market reform, economic growth, employment, investment and structural change in the ICT and related sectors.

8.4.2 Co-investment/risk-sharing funds

Co-investment funds use public money to match private investment and typically focus on seed funding. They work by matching public funds with those of approved private investors, increasing the funding pool. Like the publicly funded European Investment Fund (EIF), they provide finance through a number of instruments, such as loans and guarantees, via private funds and banks. Co-investment in this case is seen not only as a way to leverage private money, but also as a driver in building, growing and professionalizing the seed and early-stage investment market by providing a more structured investment process.⁴²

New Zealand's Seed Co-investment Fund (SCIF) was set up to support the development of the angel equity finance market and create more innovative, knowledge-intensive, high-value firms and start-ups to grow and scale up in New Zealand. The role of the SCIF is as an intermediary of funds between investors and technology-based start-ups, increasing the depth of specialist skills needed to assess and manage early-stage investments, increasing the scale and enhancing networks for early-stage investment, catalysing investments that would not have been made without the programme, minimizing fiscal risk and covering costs.⁴³

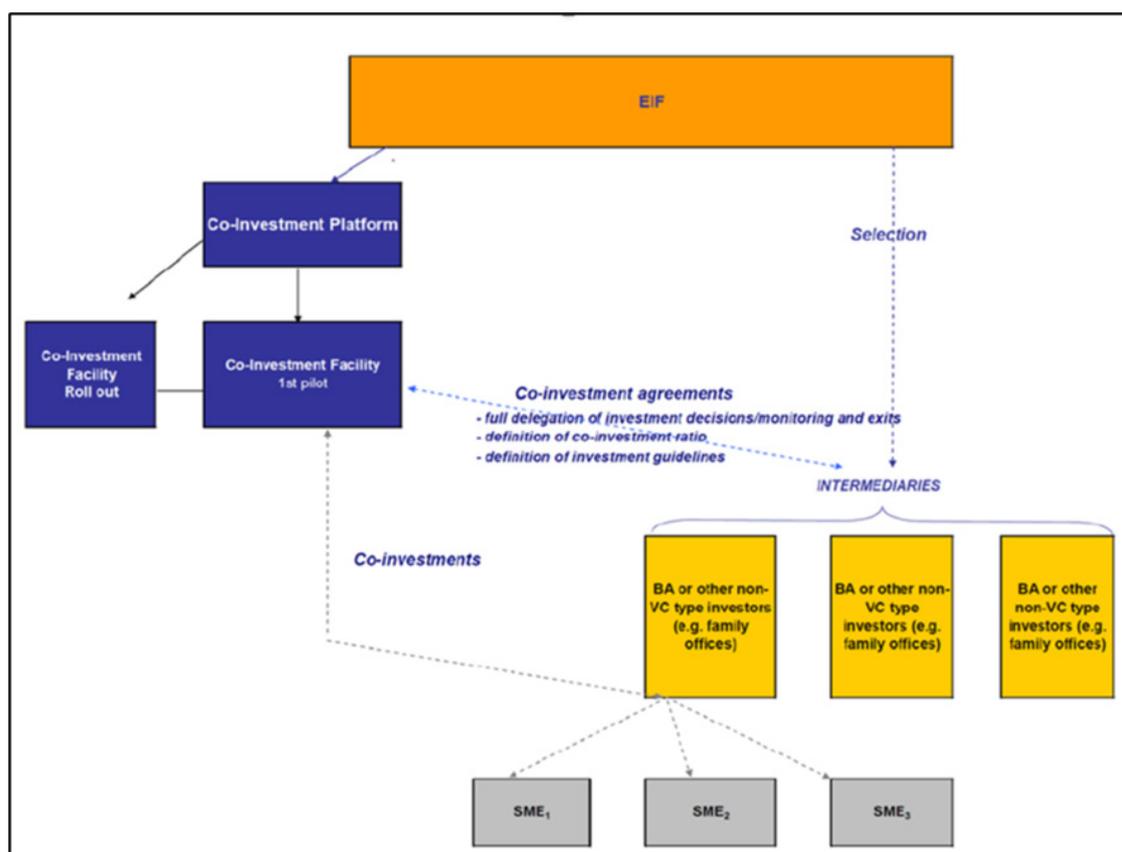
In another case, the EIF (fund manager) is a PPP fund with the European Investment Bank (61.4 per cent), the European Union (31 per cent) and private investors, in the form of financial institutions, (7.6 per cent) as shareholders. Co-investments are based on market terms and conditions. A recent example is the AI Co-Investment Facility established in 2020 in response to a gap identified in Europe's AI sector, which has shown potential but has a substantial funding gap.⁴⁴

⁴¹ <https://www.nortonrosefulbright.com/en/knowledge/publications/12c81c8a/private-equity-funds-and-co-investment>

⁴² https://www.researchgate.net/publication/271964857_Policies_for_Seed_and_Early_Stage_Finance_FINDINGS_FROM_THE_2012_OECD_FINANCING_QUESTIONNAIRE/download

⁴³ <https://www.nzgcp.co.nz/assets/Media/Pressrelease-SCIF-Nov19.pdf>

⁴⁴ http://www.eif.europa.eu/who_we_are/shareholder/index.htm

Figure 8: Co-investment fund model - European Investment Fund case ⁴⁵

8.4.3 Funds of funds

A fund of funds is a pooled fund that invests in other funds. Financing of micro-finance institutions could also be considered a fund of funds. A fund-of-funds model used by private equity firms could be instructive in the financing of development projects. A government-backed fund of funds could follow a strategy of investing in private funds that make the actual investment decisions in order to achieve broad diversification and asset allocation, thereby allowing investors broader exposure and reduced risks in terms of, for example, inflation and counterparty risk than when investing directly in projects. Eligible private funds must demonstrate their general capability and an ability to attract a certain minimum amount from the private sector before they get support from a fund of funds.⁴⁶

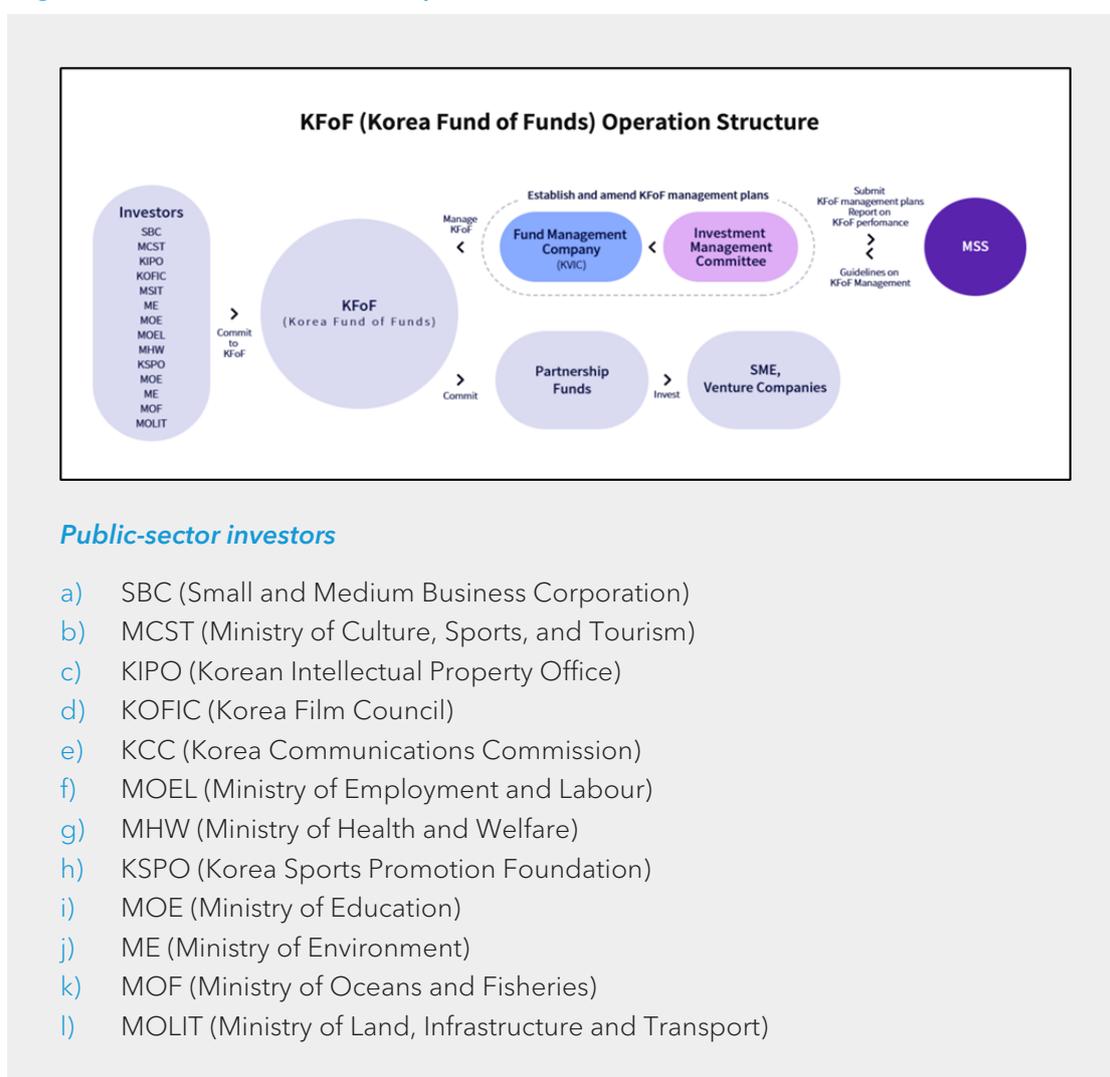
This approach was discussed in New Zealand, and a good practical example can be found in the Republic of Korea, where a fund of funds combines the interests of different government agencies with distinct policy objectives. In 2005, the government of the Republic of Korea pooled all funds in the country that support an aspect of SME development into a single vehicle as a fund of funds. There is now a single fund of funds with five funding streams that focus on SMEs, cultural content industries, film, broadcasting, telecommunications and intellectual

⁴⁵ https://www.researchgate.net/publication/271964857_Policies_for_Seed_and_Early_Stage_Finance_FINDINGS_FROM_THE_2012_OECD_FINANCING_QUESTIONNAIR E, Wilson, Karen & Silva, Filipe. (2013). Policies for Seed and Early Stage Finance FINDINGS FROM THE 2012 OECD FINANCING QUESTIONNAIRE. 10.1787/5k3xqsf00j33-en

⁴⁶ <https://www.treasury.govt.nz/sites/default/files/2019-08/deepening-early-stage-capital-markets-dev-18-sub-0316-4163334.p>

property/patents. The fund of funds then invests in venture capital funds with expertise in their field, which invest directly in SMEs. The concept is based on the use of public funds to mobilize private capital, which can then be invested in SMEs. The alternative would be for each separate fund, with varying levels of expertise, funding and risk appetite, to provide loans or guarantees to SME beneficiaries, in which case fund management is handled by a specialist fund manager that, keeping the commitments of each agency in separate accounts, co-invests in the creation of new funds which each meet the terms initially set by the corresponding government agency. Within that framework, there is sufficient flexibility to provide the right incentives for the private sector to participate. Additionally, the fund-of-funds model, with investors from a number of sectors from health to education to labour, and even the regulator, lends itself to a holistic, whole-of-government approach to financing projects and economic impact.

Figure 9: Structure of the Republic of Korea's fund of funds⁴⁷



⁴⁷ https://www.researchgate.net/figure/Structure-of-Korea's-fund-of-funds_fig4_271964857

Structural-fund models across the digital value chain				
	State aid and regional funds	USAF	Co-investment fund	Fund of funds
At a basic level, these funds have many similarities: <ul style="list-style-type: none"> a) The funding provided should not lead to market distortion; b) The funding should be transparent and accountable; c) Annual audit reports should be published; d) Eligibility requirements should be clear and available for all to consider; e) Projects should exist within a pre-defined strategy and operating programme. 				
Example	EU ESIF - with State-aid guidelines	100 countries - mainly developing countries and emerging markets	New Zealand Seed Co-Investment Fund European Investment Fund	Republic of Korea's fund of funds
Primary source of funding	Government	Operator levies	Government and private investors	Government and private investors Reinvested dividends
Fund manager	Managing authority - responsible for an operating programme Ministry, regional authority, local council or other public or private body nominated by a Member State	USAF Independent or under a Ministry, or Regulatory Authority	Government-backed fund investing via private equity or venture capital	Government-backed fund investing via private equity or venture capital
Objectives	Developmental mandate, limited to cases of market failure - network extension or step change	Developmental mandate - market access gaps in high cost, low-income areas Sometimes demand side	Demand side R&D Innovation SME development	Demand side Innovation SME development Early-stage start-ups

8.5 Key observations

As seen in this report, the monolithic fund does not exist. The broadening of the potential projects and beneficiaries in the digital landscape and the move to a whole-of-government approach to policy requires a reconsideration of the structure of USAFs, which are quite narrowly focused on the ICT sector and, in some cases, still on telecommunications as their legislation

has not been amended. Some key findings from an analysis of regional funds, co-investment/risk-sharing funds and fund-of-funds models that can assist in designing USAF 2.0 include:

- a) At a basic level, these funds have many similarities:
 - i) The funding provided should not lead to market distortion;
 - ii) The funding should be transparent and accountable;
 - iii) Annual audit reports should be published;
 - iv) Eligibility requirements should be clear and available for all to consider; and
 - v) Projects should exist within a pre-defined strategy and operating programme.
- b) Funding must be clearly linked to regional and national policy. Policy is critical to creating an enabling environment, but also to ensuring that private capital is not crowded out in the process of issuing grants, subsidies and loans. Regional funds display this trait strongly.
- c) Adding a new “intermediary” layer could assist USAFs lacking the requisite capacity to make investment decisions and could dissuade them from the temptation to implement projects rather than funding their implementation – a common issue for such funds. To this end, the SCIF in New Zealand is instructive as it has a clear developmental component, namely to build local industry, ensure the economy is resilient to global disruptions like COVID-19 and create decent jobs.
- d) Under the fund-of-funds approach, the fund makes indirect investments as it leaves financial investment decisions to fund managers that have commercial experience, skills and proven track records. However, since they use government money, they are forced to develop portfolios with a developmental impact linked to national goals. This addresses some of the challenges historically experienced by USAFs in terms of lack of capacity, experience, transparency and accountability. However, it also moves the fund one step away from the projects and may compromise the fund’s ability to be outcome based.
- e) Importantly, as the fund model evolves, additionality must be demonstrated to ensure an increased funding pool and adherence to development objectives.
- f) Funds need a focus – while funding gaps may be identified on both the supply and demand sides, the funds in this section are able to focus on a specific market segment and pool resources to address it in a targeted manner. One single USAF model may not be perfect for a given country – a country may implement a traditional USAF model for infrastructure and connectivity projects, and other co-investment or fund-of-funds models for SME growth, R&D and development.

9 USAF 2.0: Evolving the USAF for effectiveness and relevance

9.1 Introduction to USAFs

Traditional universal service and access funds (USAFs) need to evolve, not just as a response to some funds’ chequered history, given the well-documented case studies on non-performance, but also, importantly, in response to the evolution of the digital and financial-service sectors. It is difficult to conceive that funds established in the early 2000s, nearly 20 years ago, to close circuit-switched voice gaps and extend mainly public switched telephone network (PSTN) infrastructure are suitable for the current digital environment. It is equally hard to believe that the financial instruments that were valid two decades ago have not been complemented by new funding approaches, such as crowdsourcing and digital bonds. Even successful funds would need to be reviewed and reformed where necessary to remain relevant and effective.

What is needed is a USAF 2.0 that is aligned with the broader digital transformation process and a given country's ICT and economic policy, strategy and legal framework and recognizes the magnitude of the universal-access challenge and its impact on socio-economic development. USAF 2.0 should also appreciate that there are several actors, e.g. the private sector and development organizations, which have access to different financial and non-financial resources, varying risk appetites and roles to play in bridging the digital divide. Therefore, USAF 2.0 should appreciate the need for collaboration and the importance of adopting blended-finance principles and using the money that has been collected to leverage other funding. Furthermore, it should be outcome based and shift from being transfer/absorption oriented to growth enhancing.

History has shown that USAF 2.0 needs to be properly resourced and with sufficient capacity, especially from a human resource and institutional perspective. Funds that have been able to use monies effectively and efficiently have been those with good governance and the requisite administrative capacity to build and assess opportunities and project pipelines, organize competitive bidding, least-cost subsidy or reverse auction tender processes and run effective internal controls. This section discusses USAF 2.0 and how to achieve it, particularly in countries where funds are already operational and need to be reformed and modernized.

9.2 Context of fund review

USAFs have had an uneven track record. There have been numerous successful funds, but others have been weak or stagnant. The main challenges that have been identified include some that have been discussed earlier in this report, namely:

- a) Funds that have over collected or collected but not spent for sector development;
- b) Funds that have provided subsidies for unsuccessful projects or for inefficient use in projects;
- c) Funds with questionable governance that have been accused of mismanagement and corruption;
- d) Funds that have not been able to coordinate among different levels of government and different affected government departments (e.g., education, infrastructure and health); and
- e) Non-transparent and unaccountable funds.

These and other challenges have led to calls, primarily by operators, for a reduction in USAF levies or a justification for them. Owing to poor fund performance in some countries, there is a sense of apathy around USAFs and a lack of industry interest in participating in fund projects - funds are failing in some countries to give out subsidies to mobilize private capital and in other countries there have been least-cost bids, but operators have not even expressed an interest to participate. The coordination in some markets between fund and operators stops at the collection of USAF contributions, reducing fund contributions to an additional sector tax. If funds are not properly managed, then fund levies lead to increased communication costs and burden on consumers.

Conversely, there have been examples of successful funds in Singapore, the United States, Canada and Pakistan, where USAFs are able to collect and disburse monies for relevant projects, are transparent and have successful track records and good governance frameworks.

The question then arises: is there still a role for funds in the current digital environment? Put another way: are there still funding gaps that prevent people from adopting and using the Internet and being included in the digital economy? The answer, as demonstrated in [section 4](#), is yes, with gaps on both the supply and demand sides.

The next question is: are funds the best way to close these gaps? The answer will differ depending on the country context and each fund's historical performance, which is informed by the legal and institutional framework and administrative and operational capacity. Evidence does confirm, however, that funds are not the only way to address these goals, and it is becoming patently clear that they cannot do so in isolation: collaboration and partnerships are critical.

9.3 Steps to review funds

By the end of 2020, 100 countries had reported having operational USAFs. In these countries, laws have been passed establishing the fund and setting out its specific mandate, the scope of its funding, eligible beneficiaries and the governance frameworks for fund operations. Importantly, they also set out the key parameters for fund collection; in all cases the main funding mechanism is a "pay" obligation – a levy imposed on industry players. While the legal framework serves to enable the USAF, it can also inhibit it as time passes and available technology, services and applications change. After following the key steps to review fund strategy, policy and institutional frameworks, it is critical that countries enshrine these changes in an appropriate legal instrument.

Figure 10: Steps to review funds



In reviewing funds, countries should:

- a) **Conduct an audit of the fund and its performance**, looking at: issues such as the level of collections, disbursements, transparency and accountability; and project performance and impact on meeting universal-access goals and targets. A consideration of the former is important to understand how the fund functions and the level of trust it has engendered since its establishment.

The performance assessment should be objective and not political. The fund should be active; where a fund has been inactive or has disbursed less than 60 per cent of its fund over a defined period, a review of the fund should be instituted. It would be reasonable to propose a two-year period given that contributions are made annually. If the fund is to play a role in bringing about a digital economy, especially in collaboration with

other stakeholders, it has to be properly resourced, managed and trusted in order for its evolution to be accepted. Public consultation on fund performance and any proposals for its evolution or modernization is critical. In addition, all findings should be made public.

- b) **Map current policies, goals and priorities**, considering broadband plans, digital agendas and inclusion strategies and other policy instruments that define the national vision and set targets against which universal access gaps will be measured and for which project types will be identified. This step is important in determining fund focus and ensuring programme and project relevance. It is noted that there may be competing goals and priorities; the fund should, however, establish key themes that assist in prioritization. The themes should be linked to where cost impact can be derived, e.g. connectivity, SME support and affordability initiatives could be priority areas identified in a USAF strategy.
- c) **Conduct a funding analysis and map the current financing and funding environment** – this includes both assessing the cost of financing the identified gaps and digital inclusion and identifying the key players that can contribute in cash and in kind to funding universal access through understanding the funding landscape. Consider what the fund’s role can be in coordinating funding or contributing to a larger pool of required funds needed to finance universal service and access.
- d) **Map the institutional framework**, considering the current allocation of roles and responsibilities in the national landscape for policy development, ICT and digital regulation, financing of infrastructure and demand-side strategies, ICT project implementation, digitalization and e-government, amongst others. An understanding of where the fund fits in the light of some of the new organizations that provide non-financial support, such as ICT commissions and agencies responsible for policy implementation, and complementary and competing vertical funding bodies such as digital SME funds, funds providing loans and grants for connecting schools, agriculture projects and health facilities, as well as COVID-19 relief funds amongst others.
- e) **Map current regulations that facilitate or inhibit universal access** to identify strengths and weaknesses in the regulatory framework and make recommendations on non-financial mechanisms that can be explored to lower costs and risks and on regulatory incentives that can be put in place to facilitate universal access and promote private-sector investment to complement the fund’s work.
- f) **Conduct a market gap analysis** to identify current market gaps based on an understanding of current and anticipated market players, network coverage and roll-out, sector revenue, ARPUs and pricing. On the demand side, consider e-government, school and hospital connectivity and entrepreneurship gaps, as well as digital-literacy challenges.
- g) **Determine the status of digital inclusion** for women, children, persons with disabilities, the elderly and other identified marginalized and vulnerable groups.

These steps will answer questions about the role, relevance and positioning of the funds and underpin their evaluation. This assessment will broadly show that there are two types of funds: those which have functioned effectively, such as in Colombia, the United States and Uganda; and those which are considered ineffective. Following the above steps will show the best approach for operational funds to evolve into USAF 2.0, or, in the case of low-disbursing or non-functioning funds, reveal that the fund has outlived its relevance.

9.4 Low-utilization funds

Without disbursing money effectively or, in some cases, at all, many funds fail to achieve the very goals that they were established to meet in order to finance projects that will address the challenges of affordability, accessibility and network availability. According to ITU data from 2020, of the 43 operational funds that had provided information, 20 had disbursed 50 per cent or less of the amounts that had been collected, including eight that had disbursed less than 25 per cent, while three of the funds had not disbursed any money at all. Given the prevalence of this challenge globally, it is possible that low disbursement is a function of the fund's framework. The gap between the high-disbursing and low-disbursing funds is significant. Of the funds that reported that they had disbursed, 21 per cent, including funds in Australia, Iceland, Japan, Niger, Papua New Guinea, St Vincent, Grenada and Hong Kong, China.⁴⁸

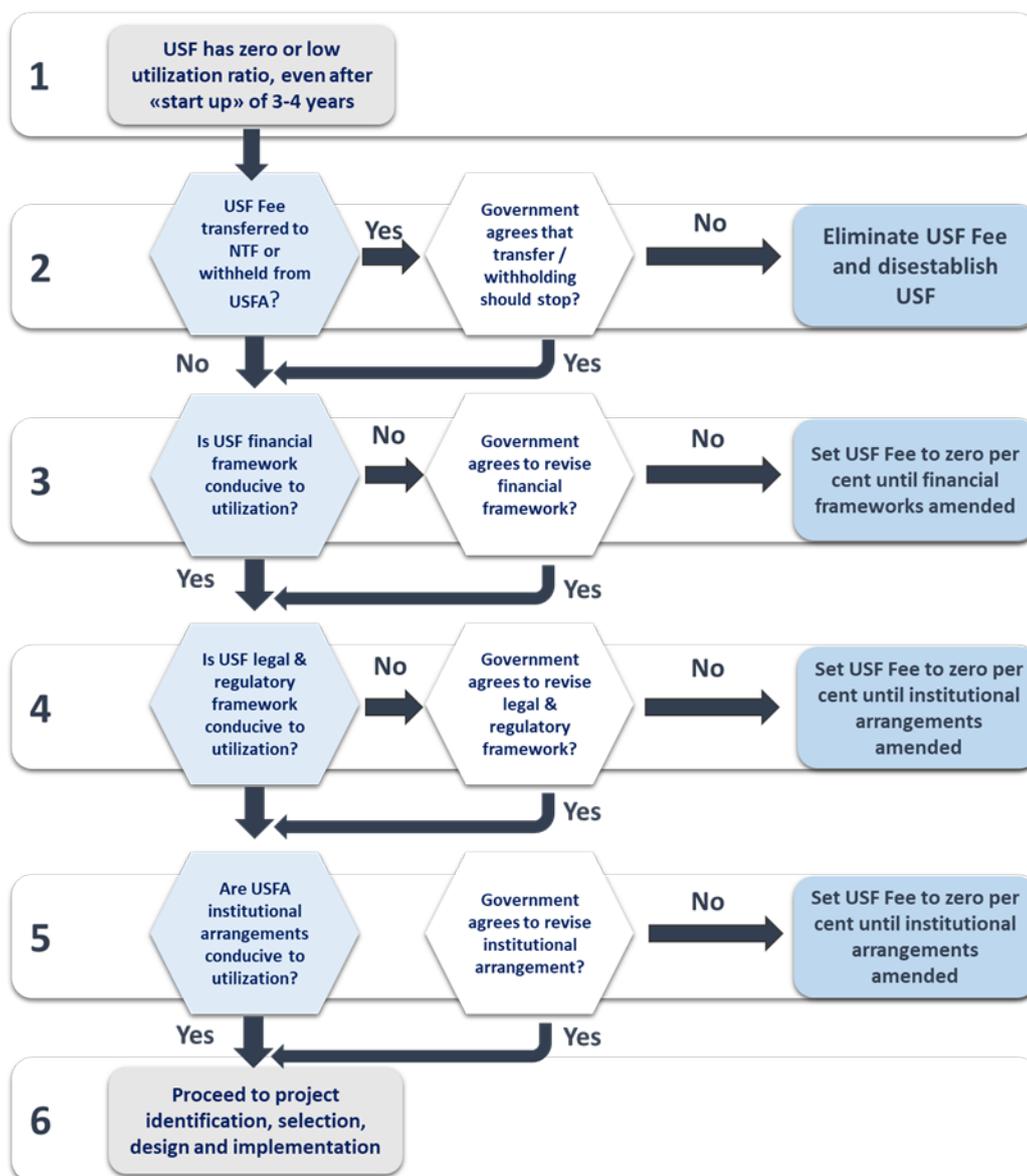
Funds that have failed to disburse the monies that they have collected require a different approach; rather than reform, they should question their very existence. It might be necessary either to dissolve the fund and make a decision on how to use money already collected or to pause the fund, put it in "fund rescue" and place a temporary moratorium on the collection of further funds until the appropriate institutional arrangements can be made to ensure its effectiveness. The key questions that should be asked of the fund in evaluating its relevance and the next steps are:

- a) Is its collection framework appropriate (i.e. does money collected go into a separate, ring-fenced fund or the general government budget)?
- b) Does the legal and regulatory framework enable the fund to disburse effectively? This can be assessed by reviewing definitions of universal access and targets, definitions of eligible beneficiaries, scope of programmes, demand and innovation, as well as supply.
- c) Are the institutional arrangements strong enough to allow the fund to be effective? Are there measures for reporting and accountability, separate boards, separate bank accounts, etc.?

If any of these are not in place, it could warrant a freeze on collections until they are addressed. The remainder of this section discusses how these factors can be addressed in order to reform funds. If several of these factors are not in place, depending on the reasons why, the fund might need to be closed. The figure below outlines the decision-making process in this regard.

⁴⁸ ITU Eye, 2019

Figure 11: USAF 2.0 decision tree



9.5 Scope of funds

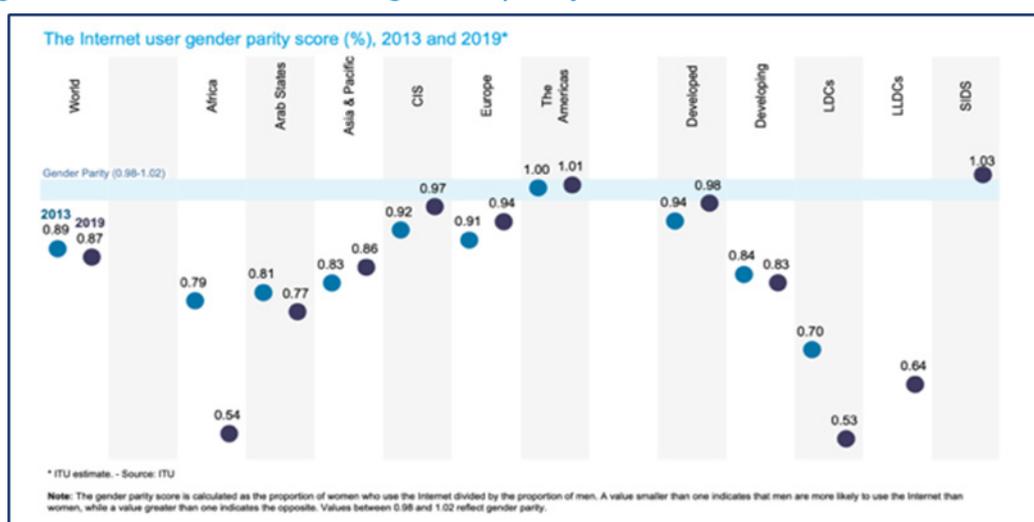
Funds that have not disbursed a significant portion of the money collected might find themselves in a dilemma: reform, i.e. changing the rules of the game while there is unspent money in the bank, will require significant stakeholder buy-in, especially from the operators who contributed to the fund, because when the money was collected, it was designated by law for specific uses, often primarily linked to the closing of voice gaps and extension of fixed-line access (93 per cent of operational funds).

Since the establishment of first-generation funds, wireless services have become prevalent; this notwithstanding, given the gap between the pace of technological change and that of legislative change, in Africa and the Americas 27 per cent and 50 per cent of operational funds,

respectively, do not include individual mobile services in their definition of universal access. Technically, this prevents them from funding such projects. In addition, many fund frameworks:

- a) do not cater for adoption and use and do not include end users as potential beneficiaries;
- b) do not mention digital inclusion and access for marginalized and vulnerable communities. In fact, in 2020, only 17 funds included women and girls in their definitions and 65 countries included service for the elderly in their definitions of universal access; and
- c) make specific provision for the support of projects that connect schools and health centres, but not other strategic public institutions that are central to a given community, such as police stations or financial centres.

Figure 12: The Internet user gender parity score, 2013 and 2019



9.6 New mandates and roles for USAFs

While infrastructure deployment remains key, increasingly digitally focused funds will need to be considered in markets that are reforming their funds. As discussed in the section on prioritization (Part A, [section 3](#)), funds will need to continue facilitating the bridging of the digital divide but will additionally need to facilitate the digitalization of the economy by prioritizing the funding of:

- a) **Connectivity, digital networks and access** – this includes the extension of networks to rural and underserved areas, but additionally ensuring a step change and supporting projects that have an impact through new investments or additional functionality.
- b) **Digital adoption through facilitation of demand-side investment** – this requires that the founding legislation allows funds to spend money on digital inclusion and demand-stimulation projects – currently about 70 per cent of operational funds’ legislation does not provide for this according to ITU.⁴⁹ USAF 2.0 should be mandated to finance:
 - i) **Providing individual and strategic public institution support** – with a focus on investing in digital literacy, promoting uptake and use.
 - ii) **Digitizing and supporting industry and, in particular, local SMEs** – to ensure that businesses, SMEs and digital and non-tech industries can benefit from digital innovations to create a higher value chain and scale up.

⁴⁹ ITU Eye, 2019

- iii) **Supporting digital literacy**, including skill development and local and relevant content development to promote adoption and usage, which in turn will spur investment in infrastructure.
- c) **R&D and innovation** to facilitate the development of innovative (and local) digital applications and technologies which have a developmental impact and are aligned with the SDGs.
- d) **Mainstreaming of digital inclusion** by making the addressing of the needs of marginalized and vulnerable communities a condition of funding.
- e) **Development of tools that will facilitate investment** – this includes key tools, such as research, baseline data and infrastructure maps (to identify ducts, fibre, etc. that can be shared – the ITU broadband and Giga real-time maps that are central to achieving school connectivity are good examples).

With the multitude of institutions involved in the financing of the digital space, the USAF as we know it will have to differentiate itself to remain relevant. Given its unique positioning among ICT-sector funders, it can do so by adding an advisory or facilitating role to its funding, which could entail:

- a) Convening various funders and financiers interested in digital infrastructure, innovation and adoption, as well as digital inclusion;
- b) Filling knowledge gaps between financiers with no specific knowledge or understanding of the ICT and digital sectors and a USAF 2.0 which is able to design and develop concepts and terms of reference for successful broadband and digital transformation projects that consider connectivity, access and use across the economy;
- c) Coordinating the pooling of government resources in line with a whole-of-government approach. The Republic of Korea's fund of funds shows that governments can pool money from different departments and agencies dealing with one theme, e.g. SMEs, and use it to increase the size of the fund. If this approach is taken, it can coordinate government-funded initiatives and complement or replace the mandatory levies, depending on the funding gap in a given country; and
- d) Using USAF projects as a model for national-scale projects so that it can collaborate and align with the regulatory regime (e.g. sandboxes) and private initiatives (e.g. accelerators) to make a meaningful impact. It should evolve its thinking about "pilots" and invest in scalable pilots.

Adopting a catalytic mindset and shifting focus from implementing projects to leveraging investment in projects is important. While the latter has at least theoretically always been the role of USAFs given their aim to fill coverage and affordability gaps through subsidies on a sustainable basis, it has not always been the case in practice. USAF 2.0 should work with other actors in the ICT and digital funding space to achieve the objective of leveraging funds to achieve sustainability.

9.7 Sources of funding

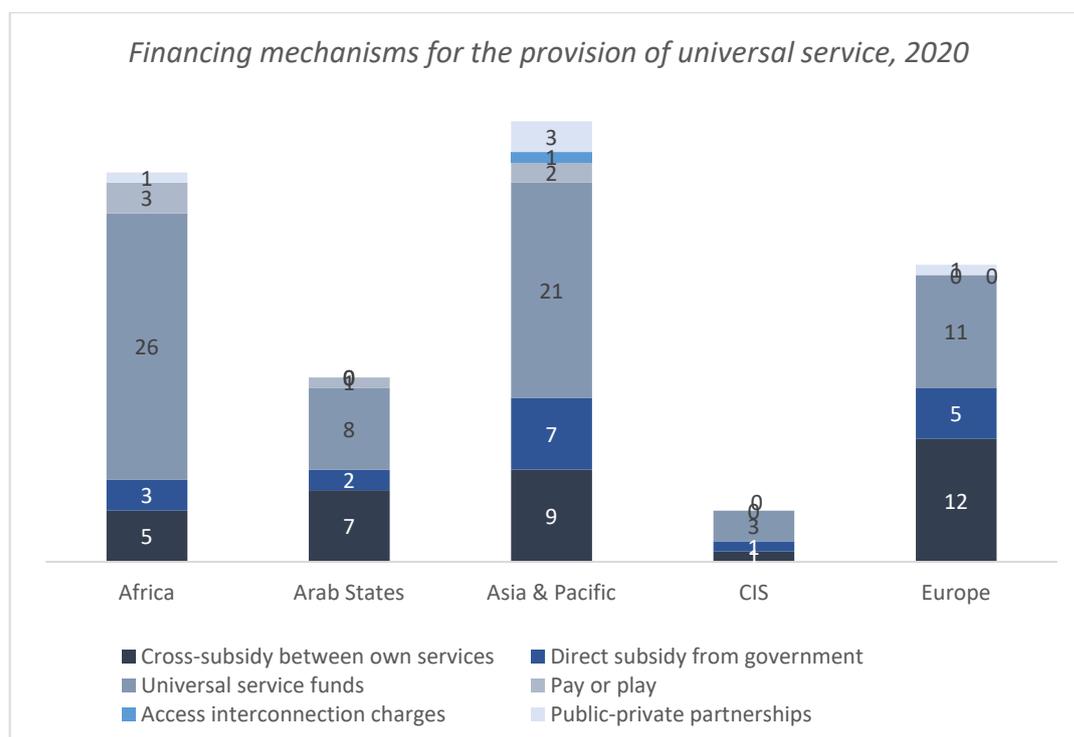
As USAFs are increasingly forced to consider expanding their scope to include supporting the delivery of broadband and digital services, so too must they reconsider funding mechanisms. Currently, most funds get the bulk of their money from mandatory contributions made by licensees in the sector. Some 55 per cent of funds require all operators to contribute to the fund; 20 per cent require fixed-line operators (with or without SMP) and 30 per cent require mobile operators (with or without SMP). Only 7 per cent of funds require ISPs to contribute, and yet ISPs are key beneficiaries of the increase in universal broadband access. Fundamentally, the bulk of the responsibility for financing funds has historically been placed on mobile and fixed operators

delivering the voice services that needed to be extended. In a modern scenario, many funds have not changed who contributes, but they have increased the scope of who may benefit, including potentially unlicensed entities in the digital value chain, such as digital platforms and data centres. To that end, key proposals for sourcing funds include:

- a) Industry contributions should be used as “anchor funds” and mobilize investment in the fund from other parties. Legislation has to enable funds to collect money from other sources, such as donations, donor organizations, institutional investors and NGOs. It also has to allow the funds to pool public-sector resources, such as in the Republic of Korea, or co-invest with parties in some cases, such as in New Zealand. In addition to legislative permission to do this, funds will need to have evidence of performance in order to attract further investment.
- b) In reviewing funding sources, it is imperative that funds reconsider the level of USAF levies which currently range from 0.5 per cent to 6 per cent. In most countries, despite changes in operator revenue and profitability, the introduction of new players and changes in market size, the levies have not changed since inception, creating the impression that the levies bear no relation to sector need. One argument raised to address this is that funds should be funded by a government appropriation and have a budget issued to them by the government. In some countries, the levies collected are sent to the general government budget and then allocated to the USAF on an annual basis. In these countries, the challenge can be seen as over-collection or misallocation: funds intended for ICT-sector development are used to fund other government priorities in different sectors. Consequently, the levies might be considered a form of tax, no different from VAT or excise duty, which is collected and used for the general budget. This position is made more untenable by the fact that this tax gets passed on to consumers and effectively increases the cost of communication.

USAF 2.0 has to ensure that money collected is sent straight to the funds and used for its intended purposes and that there are no unintended policy consequences, such as the pass-through to consumers. This might require the creation of virtual funds, which are effectively an entry in the books for operators to pay, but collection occurs only once the money that has already been collected is disbursed. This approach can be implemented easily, even for funds that have already collected and not disbursed, and will incentivize expenditure while ensuring that excess money is not collected. This would require an amendment to the founding legislation in order to add the condition that collection follows spending.

Figure 13: Financing mechanisms for the provision of universal service, 2020



9.8 Beneficiaries

The beneficiaries of funds distributed by USAFs have primarily been operators and equipment vendors through least-cost subsidies and competitive bidding processes, low-income users and projects that support funds’ mandates, such as telecentre projects. With a broader scope, the pool of eligible beneficiaries may need to be widened. The term “beneficiaries” in this context refers to direct beneficiaries, i.e. recipients of money from the fund, as opposed to the people who broadly benefit from a project.

If funds continue to be limited to monies received from mandatory contributions by a select group of operators, it is difficult to argue for the broadening of the scope of beneficiaries. It might then make sense to prioritize the financing of parties that have contributed to the Fund to the extent that they obtain the funding on a competitively neutral basis. In this case, pooling resources and extending the sources of funds may be the reformed funds’ only way of reaching more beneficiaries.

9.9 Approaches to Funding

9.9.1 Using principles of blended finance

Given that the primary goal of USAF 2.0 should be the promotion of private-sector investment, all spending should be geared towards getting most value for money. Consequently, it should aim to leverage its funds by pooling resources or co-investing with other investors with similar or complementary economic development objectives through the use of financial instruments that will mitigate risks keeping private capital at bay and contribute to ensuring project sustainability. In a blended-financing arrangement, funds can focus on combining the use of grants and/or

financial instruments from the USAF 2.0 budget with private capital, such as via a loan, debt, equity or any other repayable form of support.

Legislation may need to be amended to adapt funds' mandates and enable them to become facilitators of investment in addition to funders.

9.9.2 Imposing developmental conditions on funding

An important tool that USAFs have at their disposal, which differs from other actors in the financing space, is their positioning in the ICT policy, regulatory and institutional framework. Funds can use monies to achieve broader policy and regulatory objectives owing to their position in the ICT institutional framework. USAF 2.0 has to be strategic in fund allocation and use financial support to:

- a) fund projects and initiatives that will promote universal access;
- b) achieve non-financial goals that will ultimately reduce the cost of roll-out for private investors; and
- c) demonstrate additionality, i.e. to attract private capital, while supporting development.

Simply put, USAFs should attach conditions to their funding that align with the regulatory conditions being promoted, e.g. funded infrastructure should be made available on an open-access basis and rolled out using "dig once" or "dig smart" approaches, and infrastructure sharing should be mandatory for all publicly funded infrastructure projects (see [Part C, section 10](#)). Demand-side and innovation projects financed by USAF 2.0 should demonstrate alignment with SDGs, e.g. if funds finance innovation via SMEs or accelerators, they should focus on technology and digital projects that specifically respond to an identified developmental or community challenge, close an identified digital gap or address digital development in general. Additionally, in the same way as ExACs are framed in the European Union, funds should ensure that all funded projects align with the broader policy and regulatory framework and advance the national vision.

This concept is not novel: some first-generation funds have made funding conditional on the sharing or open access of infrastructure, such as in Pakistan; this has not, however, been an intrinsic part of funds' management and administration framework in many developing countries worldwide. Another set of conditions that should be linked to all USAF 2.0 funding are those relating to digital inclusion.

At all times, projects should address the needs of women, persons with disabilities, the youth and the elderly as part and parcel of the funding decision.

9.10 Fund administration

Globally, USAFs are managed and administered either through the ministry (Colombia), a division of the regulator (Uganda, Eswatini, Lesotho and Mauritius), a separate agency (Nigeria, Peru and Tanzania) or an independently run third party (United States). Any of these models is acceptable if the right governance and institutional framework is in place, including:

- a) a qualified fund manager and management team that includes technical, project management, legal and financial expertise;

- b) an objective board – the USAFs in Ghana and Pakistan are two of the 26 funds globally where the Board includes operators;⁵⁰ while in Eswatini it includes representatives of ministries other than the ministry responsible of ICT, promoting a whole-of-government approach to the financing of projects and initiatives;
- c) a separate bank account and audited financials;
- d) published application procedures, often captured in a fund manual; and
- e) requirements for periodic reporting, also audited.

Many funds have, however, been plagued by a failure to follow their established rules. Given the amount of money collected, the sources of funding and the funds' objectives, it is critical that there is transparency on the spending of money. It is furthermore important that funds, wherever housed, are accountable for all collections and expenditure.

Tools to improve transparency and accountability

USAFs today suffer from a lack of trust arising from poor transparency and accountability with respect to many funds' use of monies received. To counter this, funds should:

- a) Adopt a clear time-bound strategy and associated budget which informs the public of the direction that the fund intends to take with respect to spending;
- b) Use technology to promote transparency and to make initiatives more effective;
- c) Make use of open-data policies and platforms to allow stakeholders, including fund contributors, to track progress on disbursement; and
- d) Use open data to coordinate projects and collaborate across funders and beneficiaries.

9.11 Programmes that do good and facilitate investment

USAF 2.0 programmes should be defined broadly, without project types prescribed in too much detail in legislation, given the fast pace of change and innovation in the sector. The programmes should match a country's policy priorities and reflect the broadband and digital ecosystems. The fund should be able to disburse for supply-side and demand-side projects and should be broadly defined so as not to restrict implementation.

9.11.1 Infrastructure: improve connectivity, digital networks and access (supply side)

Any financing of USAF 2.0 infrastructure projects, and public infrastructure projects in the ICT sector in general, should be based on the following key principles:

- a) **Complementary and competitively neutral** – it should only be used to optimize the total available funding and, in so doing, complement market-reform measures. Public funding should not compete directly with or replace current or planned investments of market players. Any public intervention should try to limit the risk of crowding out private investments, altering commercial investment incentives and ultimately distorting competition.⁵¹

⁵⁰ ITU Eye, 2019

⁵¹ State Aid Rules, 2013

- b) **Technologically neutral** – governments should allow the use of all technologies and leave technology decisions to operators and equipment partners, as long as they have the appropriate physical attributes to meet clearly defined broadband and universal-access goals and targets.
- c) **Wholesale open access** – third parties should be allowed to use the subsidized network to provide their own services, thus ensuring that maximum utility is derived from the network and that costly duplication is avoided. Access must be effective, transparent and non-discriminatory.
- d) **Targeted and impactful** – publicly funded broadband interventions must make a tangible difference, either extending the network where there is none or having a significant impact or substantial improvement on existing networks. Under the EU State-aid guidelines, the latter is described as a “step change.”
- e) **Scalable** – interventions should be locally relevant and at the same time applicable in other, similar markets. This requires good documentation of processes and outcomes, standardization and harmonization.
- f) **Spur local development** – funding should be locally oriented and meet community needs in terms of creating decent jobs and other opportunities.
- g) **Encourage digital inclusion** – all publicly funded projects must meet minimum digital inclusion criteria in relation to the number of jobs they create for marginalized communities, the amount of procurement they outsource to them, the levels of training provided and the participation of persons with disabilities, women and the elderly, as appropriate, in the projects.

Step change - Impactful interventions

The EU rules on State aid provide two criteria for “step change:”

- (1) New investment – public infrastructure projects should make significant new investments in the broadband network. The mere upgrade of the active components of existing network infrastructure would not constitute a step change.
- (2) New capabilities – the subsidized infrastructure brings significant new capabilities to the market in terms of broadband service availability and capacity, speeds and competition. An upgrade from a basic network (e.g. ADSL) to an NGN with speeds of 100 Mbps would be considered a step change.

<https://ec.europa.eu/digital-single-market/en/state-aid>

Checklist for USAF 2.0 Funding: Mobilizing and crowding in funding

To avoid crowding out funding, recipients of USAF 2.0 support should be required to confirm the following:

- a) Has the project's objective been clearly defined? Is it linked to national targets and the SDGs?
- b) Would USAF 2.0 funding serve to mobilize additional investment by the private sector and other funding actors?
- c) Would the project undertaken with USAF 2.0 have been executed under the beneficiary's existing business plans?
- d) Has a collaborative approach been taken? Has USAF 2.0 funding been pooled with other funders and financiers where the projects support the use of ICTs in that sector?
- e) Has the funding been allocated transparently and objectively, e.g. through competitive tendering or least-cost subsidies?
- f) Has a monitoring and evaluation framework been set up with clear responsibility given to an independent party to monitor the implementation of project objectives?

9.11.2 Uptake and use: support adoption (demand side)

Some key principles that ensure the success of USAF2.0-funded demand-side projects and programmes include:

- a) **Alignment with SDGs and national policy** – they should be linked to broader national and international policy goals.
- b) **Digital inclusion** – all publicly funded projects must meet minimum digital inclusion criteria (See section 9.11.3).
- c) **Demand aggregation** – the projects should address demand risk for ICT infrastructure.
- d) **Stimulate revenue growth for operators** – in order to ensure the sustainability of projects and a win-win scenario for industry and consumers, all initiatives must allow operators to make a sufficient return on investment to guarantee project viability, attract further investment in network infrastructure and foster adoption.
- e) **Sustainability** – projects should be able to stand on their own after a specified amount of time which should be agreed in advance. They should also achieve sustainability by ensuring that, before projects start, the proper groundwork is done, including checks of key readiness factors, e.g. research and feasibility studies, availability of electricity and demand analysis.
- f) **Innovative partnerships** – the different cost components of expanding access and adoption should be borne by various stakeholders, e.g. public and private sectors, donors, civil society and even consumers. Partnerships that allow these investments to be coordinated and that bridge the gaps between available funds and the investment required can shift the burden to the different stakeholders, as appropriate.⁵²
- g) **Collaborative approaches** – no single skill set is required to deliver any of the solutions to demand adoption, and all solutions are complementary. As such, cross-stakeholder collaboration and the formation of coalitions are key to delivering the access and training that will encourage communities and individuals to use available content, services and applications and to develop their own.

⁵² Internet for All

- h) **Targeted and impactful** – projects must make a tangible difference in terms of job creation, innovation, digital literacy and local content development. They should always have clearly specified digital-inclusion targets linked to them.
- i) **Scalable** – the interventions should be locally relevant and at the same time applicable in other, similar markets, which requires good documentation of processes and outcomes, standardization and harmonization.
- j) **Spur local development** – funding should be locally oriented and meet community needs in terms of creating decent jobs and other opportunities.

9.11.3 Digital inclusion

Digital inclusion requires the implementation of deliberate and targeted strategies and investments that will reduce and eventually eliminate institutional and structural barriers to access to and use of technology. It is, therefore, not a “nice to have” and must be a central consideration of the funding decision. Consequently, all supply and demand-side projects and initiatives that are publicly funded, whether infrastructure or adoption focused, must meet minimum digital inclusion criteria in relation to:

- a) The number of jobs they create for marginalized communities, entrepreneurs and SMEs;
- b) The amount of procurement they outsource to marginalized communities and SMEs; and
- c) The value and amount of training and skill development provided for the participation of persons with disabilities, women and the elderly, as appropriate, in the projects.

Programmes and projects are discussed in [Part E](#).

Part C - Non-finance mechanisms: Regulatory incentives to reduce risk and costs

10 Background

Regulators have long realized that market development regulations are central to creating an investor- and investment-friendly environment for broadband and digital transformation. Regulations on licensing, spectrum management and universal access and service, various aspects of technical regulation, competition and consumer protection, which underpinned second and third-generation regulation, are still the building blocks of good regulation. However, in order to lead the next level of change and use more collaborative (fourth and fifth-generation) regulation,⁵³ universal access investment requires the following:

- a) **The right mindset has to be adapted by the regulator** - fourth-generation regulation represents a shift in the approach taken by regulators to implement the frameworks that they created over the preceding two decades as they move towards a more principle and outcome-based approach which facilitates investment and innovation; and
- b) **In some cases, the content of regulation has to change or be updated** - for example, to include previously overlooked areas of regulation that create an enabling regulatory environment and have become important for digitalization and supporting digital investment.

Part C addresses non-financial incentives and considers the way in which regulators can use the regulatory environment to create stability, reduce risk and lower implementation costs for both supply-side projects related to infrastructure roll-out and demand-side programmes to spur adoption and use. In some cases, appropriate implementation of these measures will be sufficient to reduce risk and costs to spur investment; in other cases, they can be used to complement the application of financial incentives, achievable by imposing obligations or adding them as conditions for financing. As an example, infrastructure-sharing obligations can be included when tower projects are funded by USAF 2.0.

11 Connectivity, network and access incentives

This section focuses on regulatory measures that can attract investment and improve the returns of digital-infrastructure financiers by helping to reduce or mitigate some political and

⁵³ The concept of "generations of regulation" is an important framework which assists in analysing the maturity of modern regulatory regimes. It is based on a view of collaboration, high-level principles and focus, as illustrated by indicators set out in ITU's G5 regulatory toolbox. In summary, according to ITU: (1) collaboration is the dominant element - the very watermark of G5 regulation. It measures the breadth and depth of cross-sector collaboration between the ICT regulator and her/his peers; (2) As regulation shifts from rules to principles, the design of frameworks and what keeps them together have acquired particular importance. While rules will not disappear soon, principles are better suited for finding balanced, sound solutions, especially in complex areas; (3) New consumer needs, business models and market dynamics call for retooling the regulatory inventory and the development of coherent, outcome-oriented policy instruments, as set out in the G5 regulatory toolbox.

regulatory risks, as discussed earlier in [section 2](#). The key incentives that form part of effective next-generation regulatory regimes include:

- a) **Waiving taxes, fees, costs and other payments** which would otherwise have to be paid by an infrastructure provider to government departments, agencies and regulators. The ICT sector in many countries is taxed on multiple fronts, including value-added tax, corporate tax and customs and excise duties. Measures to lower costs and increase investment could include tax holidays or license-fee exemptions for spectrum licenses and airtime taxes, which directly increase consumer prices and reduce affordability, import taxes and customs and duties on network equipment, hardware and devices, especially handsets, which many use to access the Internet. Lowering taxes can play a role in reducing the device access and affordability gap.

Tax incentives include ones applicable to software development services, ICT-related services and call-centre services, such as those implemented in Belize, Djibouti, India and the Philippines.⁵⁴ Additionally, tax exemption regimes can be used to attract investment, including through special economic zones (SEZs) and science parks that provide tax incentives and other incentives, such as access to land and high-quality infrastructure, and streamline processes for new ICT businesses and real estate investment trusts (REITs) that incentivize investment in infrastructure, such as towers and data centres.

Special economic zone frameworks

Rwanda	Rwanda's SEZ programme is designed to address domestic private-sector constraints, such as availability of industrial and commercial land, availability and the cost of energy, limited transport links, market access and reduced bureaucracy and availability of skills. Designated, serviced land is provided for small and large-scale industrial development, in addition to reliable, high-quality infrastructure, competitive fiscal and non-fiscal regulations and streamlined administration procedures. ⁵⁵
China	Businesses operating in economic development zones (EDZs) can expect, among other incentives, a higher level of autonomy over their operations, a variety of tax exemptions, land and construction subsidies and preferential employment policies. China had established 156 high-tech development zones (HTDZs) by the end of 2017, which contributed USD 1.42 trillion to China's GDP, or 11.5 per cent of the economy, in 2017. In HTDZs, R&D spending equates to 6.5 per cent of total production value, which is three times the average for the national economy. Patents granted to enterprises in HTDZs account for 46 per cent of all business patents granted nationwide. ⁵⁶
Turkey	Technology development zones (TDZs) are areas designed to support R&D activities and attract investment in high-technology fields. There are 84 TDZs, of which 63 are operational and 21 have been approved and are currently under construction. Until December 2023: profits derived from software development, R&D and design activities are exempt from income and corporate taxes; sales of application software produced exclusively in TDZs are exempt from VAT; and 50 per cent of the employer's share of the social security premium will be paid by the government. ⁵⁷

- b) **Streamlining processes, procedures and approval processes**, including those for environmental impact assessments (EIAs), permits to access rights of way for national, municipal and local sites and permissions for towers with an antenna to be deemed compliant with EIA requirements for additional collocations.

⁵⁴ https://www.wto.org/english/res_e/booksp_e/wtr20_e/wtr20-2_e.pdf

⁵⁵ https://unctad.org/system/files/official-document/WIR2019_CH4.pdf

⁵⁶ <https://www.china-briefing.com/news/wp-content/uploads/2019/03/Types-of-Economic-Development-Zones-in-China-UPDATED.jpg>, and https://unctad.org/system/files/official-document/WIR2019_CH4.pdf

⁵⁷ <https://www.invest.gov.tr/en/investmentguide/pages/investment-zones.aspx>

- c) **Promoting open access and infrastructure sharing** at national and local levels, as well as across sectors. A key principle should be the reduction of duplication, which will in turn reduce costs. This can be achieved through non-discriminatory open-access regimes that recognize that the initial investment in networks can significantly reduce investment costs or through the sharing of passive infrastructure, such as ducts, masts and towers. Sharing should not be limited to the telecommunications sector as cases such as the Balkans Digital Highway Initiative show that cross sector infrastructure sharing also presents opportunities.⁵⁸ That initiative focusses on regional interconnectivity in the Western Balkans and seeks to increase Internet access by establishing a regional broadband Internet infrastructure over the transmission grids of State-owned energy companies. Alternatively, on national and regional levels, ISPs can benefit from infrastructure-sharing activities through access to more optical fibre capacity, and electricity companies which do not use all, and often less than half, of their capacity can add new revenue streams while lowering costs for the ICT sector.⁵⁹
- d) **Rights of way and “dig once” and “dig smart” open trench notification policies and processes** – “dig once” policies apply to network providers, transport and construction companies and municipalities which play a role in network expansion. They can lead to lower roll-out costs through the requirement to notify other potentially interested parties of trenching and conduit installation. “Dig once” and “dig smart” policies should apply to municipalities and local governments who can be encouraged to install relatively low-cost conduits – narrow pipes not housing any actual optical fibre – during local construction projects involving the upgrading, maintenance or repair of pipes, roads and other relevant infrastructure.
- Under “dig smart” policies, conduit installation is mandatory for anyone installing infrastructure in a public right of way, and the government must pay for the incremental costs of laying the conduit, while retaining ownership of the installed conduit. In the longer term, these conduits can be leased out and serve as a revenue stream for the municipality or local government. These policies go hand-in-hand with other policies aimed at encouraging GIS mapping and improving access to information so that other providers *know* where conduits are available and can install fibre at a lower cost.
- e) **Assignment of radio spectrum for next-generation networks under investment-friendly conditions**, such as those set out in the ITU GSR-20 Best Practice Guidelines, amongst others. The guidelines provide that spectrum should be made available for wireless applications in a timely manner and as easily as possible, giving spectrum users and innovators at national and, where possible, community levels the flexibility to provide services that will deliver the greatest long-term benefits to society. Governments should weigh up the long-term value that can be achieved from spectrum assignments against the potential short-term revenues receivable from spectrum fees or spectrum auction proceeds. According to the GSR 20 Best Practice Guidelines, “[a]n agile and flexible authorization framework, using technology- and service-neutral approaches may enable spectrum users to deploy equipment quickly and smoothly and evolve their networks.” Such an approach will drive innovation and investment in a range of technologies that can complement and support networks and expand broadband access at low costs at national and community levels, where appropriate.⁶⁰
- f) **Consumer education and awareness campaigns** to address the public’s concerns about the environmental and health-related impacts of infrastructure deployment as the link between mobile infrastructure and health has been questioned for years. It is important to disseminate information about relevant standards, such as those of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), particularly as investment models become more localized and community based and the focus on adoption increases.

⁵⁸ <https://www.worldbank.org/en/country/kosovo/brief/balkans-digital-highway-initiative>

⁵⁹ <https://ppiaf.org/documents/4709/download>

⁶⁰ https://www.itu.int/en/ITU-D/Conferences/GSR/2020/Documents/GSR-20_Best-Practice-Guidelines_E.pdf

g) **Introduction of industrial policy and regulatory measures**, like Singapore’s Smart Nation Plan, Mexico’s Industry 4.0 Roadmap, the Philippines’ Inclusive Innovation Industrial Strategy (i³S) and Rwanda’s Made in Rwanda policy, to promote R&D, local innovation and manufacturing to support business models, such as those offering low-cost devices on the market.⁶¹ Despite an increasingly interconnected world, consideration of domestic ICT industrial policy and its impact on productivity, jobs and growth will enable countries to:

- i) better grow local manufacturing sectors and compete on the global market; and
- ii) invest to turn R&D into a commercial success with a developmental impact.

This understanding will influence the types of project to which finance is channelled and the core underlying business models that will stimulate local R&D and innovation. Low-cost devices, accelerators and local incubation hubs and local intellectual property and patents will be encouraged.⁶²

h) **Infrastructure mapping and improved access to information** – 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. The provision of such data is important to encouraging investment and facilitating infrastructure sharing, open access, dig once and other policies and is a key aspect of such policies. Timely information about the location of fibre and right-of-way access facilities and the procedures to facilitate sharing can prompt actions that will significantly reduce costs. This type of mapping is a core part of the Giga initiative, which provides a visual representation of school connectivity,⁶³ mapping the location of learning institutions and the level of Internet connectivity available to better identify and finance priority areas.

i) **Improvement of cross-sector collaboration and cooperation among regulators** to accelerate the deployment of ICT-driven and digital solutions, including in terms of regulations that will lower taxes, which could be applied in the finance, energy, transport, health and education sectors, for example.

j) **Demand aggregation to guarantee traffic for operators** – this is not often the case for USAF end-user subsidies, but can be achieved by subsidizing the costs associated with low-income, marginalized and vulnerable users, aggregating demand and facilitating “smart” government procurement, thereby making government a public anchor institution (See [section 12](#) on Adoption and inclusion incentives)

⁶¹ https://www.wto.org/english/res_e/booksp_e/wtr20_e/wtr20-2_e.pdf

⁶² <https://www.enisa.europa.eu/publications/enisa-position-papers-and-opinions/eu-ict-industry-consultation-paper>

⁶³ <https://gigaconnect.org/category/map/>

Case study: California municipality

In Santa Cruz, California, the county's initiatives were crafted into a comprehensive set of policies which provide for:

- a) A dig-once process that requires the county to notify broadband companies and provide opportunities to lay fibre whenever a street is open;
- c) Development of master lease agreements to simplify access to county facilities; and
- d) Inclusion of conduit as part of public works projects, new developments and land divisions.

Source : <http://www.bbpmag.com/MuniPortal/EditorsChoice/0516editorschoice.php>

12 Adoption and inclusion incentives

12.1 Consumer protection, privacy and data protection policies, laws and regulations

These laws and regulations build consumer and business trust and confidence in the use of the Internet for personal and potentially sensitive matters, such as digital payments, government applications and any other e-services that require the sharing of personal information. Policies can reduce investor risk by influencing user uptake and use and thereby expand the market for potential investors, while also protecting businesses and consumers. Some key legal and policy instruments include:

- a) **Privacy regulation instruments**, such as the EU's General Data Protection Regulation (GDPR)⁶⁴ – passed in 2016 and effective from mid-2018, South Africa's Protection of Personal Information Act (PoPIA),⁶⁵ Brazil's General Data Protection Law (LGPD) and Thailand's Personal Data Protection Act (PDPA),⁶⁶ all of which came into effect in 2020 and 2021.
- b) **Electronic transaction, cybersecurity and consumer protection frameworks** – a prerequisite for online transactions and to support investment in e-commerce. Electronic transaction laws have been adopted by 158 countries (81 per cent), of which 68 are developing or transition economies and 30 are LDCs.⁶⁷ It is further noted that, according to UNCTAD, 154 countries (79 per cent) have enacted cybercrime legislation, though the adoption level varies by region: Europe has the highest adoption rate (93 per cent) and Asia and the Pacific the lowest (55 per cent).⁶⁸
- c) **Intellectual property and copyright protection rules**, which will affect investors' decision to put money into content and platform services.

⁶⁴ <https://gdpr.eu>

⁶⁵ <https://popia.co.za>

⁶⁶ <https://thainetizen.org/wp-content/uploads/2019/11/thailand-personal-data-protection-act-2019-en.pdf>

⁶⁷ <https://unctad.org/page/e-transactions-legislation-worldwide>

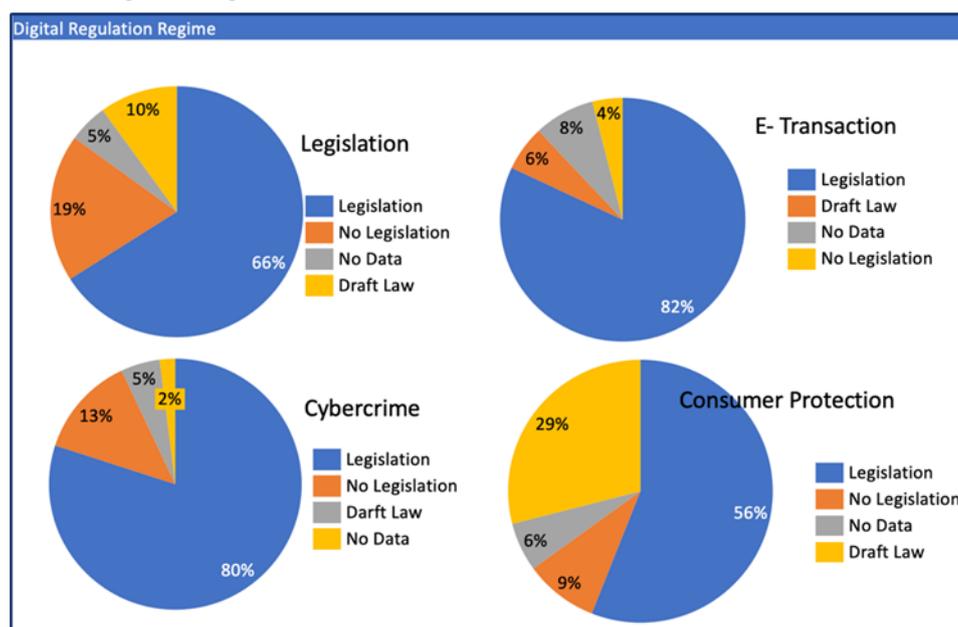
⁶⁸ <https://unctad.org/page/e-transactions-legislation-worldwide>

12.2 Investment enabling regulation

In addition to legislation and policies that protect consumers and promote Internet use, there is a need for legislation that protects digital-service providers, including recognition of ISP association take-down notices and other forms of legislation, such as:

- Section 230 of the United States' Communications Decency Act, which protects ISPs, website owners, social media networks and other sites and online services and provides that "[n]o provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider." This promotes user-generated content – an important form of local content – and protects service providers and intermediaries from lawsuits for the posting of illegal content, though there are, however, exceptions for copyright violations, sex work-related material and violations of federal criminal law.⁶⁹
- The updated EU Directive on Copyright in the Digital Single Market (Directive 2019/790), in particular Article 17, which deals with the **use of protected content by online content-sharing service providers** and makes providers liable if they fail to take "effective and proportionate measures" to prevent users from uploading certain copyright violations and do not respond immediately to take-down requests.⁷⁰

Figure 14: Digital regimes, UNCTAD



13 Sandboxes: Spurring innovation and development incentives

A regulatory sandbox is essential as an innovation safe space or "test-and-learn" environment that enables both start-ups and established businesses to develop new concepts and products in a controlled environment. The regulatory requirements in a sandbox are relaxed to facilitate innovation with significantly reduced regulatory risk. Initially, most sandboxes were intended to develop financial technology (FinTech) concepts, such as the recently launched "Controlled

⁶⁹ <https://www.eff.org/issues/cda230>

⁷⁰ <https://eur-lex.europa.eu/legal-content/en/TXT/HTML/?uri=CELEX:32019L0790>

Testing Environment for Financial and Payment Innovations” in Brazil and the regulatory sandboxes established by the Canadian Securities Administrators (CSA) and in Colombia and Thailand.

- a) In Canada, if a FinTech firm is seeking to operate in multiple Canadian jurisdictions, it can register under the “passport regime” as part of the CSA Regulatory Sandbox and thereby gain access to multiple capital markets.⁷¹
- b) In May 2020, Colombia’s Regulation Communications Commission (CRC) adopted a resolution introducing a regulatory sandbox as an alternative regulatory mechanism allowing the testing of new products, services and solutions in any aspect of the ICT sector. The maximum 12-month license period allows for tests to be conducted within specified geographic areas under a flexible regulatory regime or with regulatory exemptions. Telecommunication network and service providers, whether multinational or community-based entities, may participate.⁷²
- c) In Thailand, the National Broadcasting and Telecommunication Commission established a sandbox to facilitate technological testing for businesses, including in preparation for the adoption of 5G technologies. The notification on the criteria for permitting frequency use for innovation development and testing in a sandbox area allows sandbox participants to use certain frequencies and conduct frequency testing, within a limited sandbox area subject to obtaining a sandbox license.⁷³

Regulatory sandboxes are important for encouraging innovation and the local development of solutions. Similar to entrepreneurs and start-ups, however, products, technologies and solutions developed and tested in sandboxes often find it difficult to obtain sufficient funding to scale up. In Rwanda, the companies that have benefited from regulatory sandboxes have been international firms with sufficient funding but no market in which to conduct trials. While sandboxes solve this challenge, they do not address the funding challenge experienced by small firms and local companies wishing to scale up projects. Funding for this purpose is most likely available through accelerators, hubs and venture capitalists.

Using regulatory protection provided by sandboxes and financing from other funds will increase R&D, innovation, job creation and local content development through supporting incubators and accelerators, while also providing a practical way to test the efficacy of regulatory measures. High-altitude platform systems (HAPS)⁷⁴ and other emerging technologies are currently being deployed without proven business models and benefit greatly from participation in regulatory sandboxes for broadband access in rural areas.

⁷¹ https://www.securities-administrators.ca/industry_resources.aspx?id=1588

⁷² Case Study: Regulatory Sandbox Framework in Colombia | Digital Regulation Platform: <https://digitalregulation.org/case-study-regulatory-sandbox-framework-in-colombia/>

⁷³ <https://www.bakermckenzie.com/en/insight/publications/2019/09/thailands-nbtc-introduces-regulatory-sandbox>

⁷⁴ <https://www.itu.int/en/mediacentre/backgrounders/Pages/High-altitude-platform-systems.aspx>

14 Tools to implement incentives

Importantly, these measures are not stand-alone issues to be crafted into command-and-control regulations. In a holistic and outcome-based approach to collaborative regulation, such measures may be implemented via:

- a) **Public-funding conditions** – for example, dig once and dig smart policies and processes for publicly-funded municipal networks;⁷⁵
- b) **Guidelines and memoranda of understanding** – or vertical regulation for cross-cutting issues like EIA applications and rapid-deployment rules;
- c) **Universal-service obligations** – for example, open-access requirements for broadband spectrum licensees, where applicable; and
- d) **Informal practices** – such as municipalities and communities allowing broadband providers access to lines of sight, e.g. roofs of government buildings, water towers and other tall structures, for the installation of transmitters, antennas and other networking equipment, thereby reducing the cost of broadband deployment and promoting expansion.⁷⁶

15 Regulatory forbearance

In addition to crafting effective regulations to create an enabling environment, regulators should avoid onerous or counterproductive regulation that fails to maximize market and consumer outcomes. Regulators and governments should be careful to ensure that frameworks put in place to cater for local needs and protect local markets are carefully balanced against their potentially negative impact on the investment climate. For example:

- a) **Data centre/data localization requirements** used by governments to oblige companies to store and process local data within a country may have the unintended consequence of increasing operational costs (e.g. cloud computing costs), especially in smaller markets where the traffic is insufficient to justify the building of a data centre.
- b) **Online content rules** may inadvertently end up restricting content for subjective reasons related to, for example, politics or religion, and rules which place restrictions on freedom of expression, however defined in a given country, may inhibit investment in local content. Such rules may also inhibit uptake and use of the Internet. Furthermore, once created, the laws have to be enforced, often involving requests to operators to take down content, switch off certain services or limit Internet access for consumers, all of which have a negative impact on the investment climate.

It is more important today than ever before that regulators look beyond their core mandates to understand the impact of regulation on investment. While the importance of considering the impact of regulation in sectors that intersect with the ICT sector is clearly understood, it is also important for regulators to consider the broader national, regional and international regulatory frameworks. Often, newly adjacent or vertical sectors, such as transport and financial services, may have rules on issues such as e-hailing or FinTech, respectively, that deter investment in these sectors and affect digital investment broadly.

⁷⁵ Appendix A: FTTH Council America's DIG SMART: Best Practices for Cities and States Adopting Dig Once Policies <https://www.ncbroadband.gov/media/50/download?attachment>

⁷⁶ <https://www.ncbroadband.gov/technical-assistance/playbook/policy-broadband/building-structure>

16 Play policies: In-kind contributions

16.1 Measured “play” strategies

Initial universal access and service strategies were based on first and second generation command-and-control approaches to regulation. For example, it was not uncommon to have license obligations to connect a targeted number of schools or hospitals by a certain deadline, without reference to a particular operator’s size, coverage or budget – often the only difference would be technology based, with one set of obligations for fixed-line operators, another for mobile operators and yet another for ISPs. As licensing frameworks have converged and become more unified over time, the imposition of license obligations on certain licensees, most often incumbent and mobile operators, without due consideration for national needs or the operator’s ability to perform, is problematic in that it increases investment costs and affects the value of licenses, whether issued via “beauty contest” or auction, as is increasingly the case for spectrum assignments. It also lays the ground for an adversarial relationship between operator and regulator, particularly as the regulator tries to enforce the obligations.

Exhibit: Mobile network coverage requirements in select OECS countries⁷⁷

Economy	Coverage requirements attached to MNO licences
Anguilla	Not applicable
British Virgin Islands	95 per cent coverage of the population
Dominica	Island-wide coverage
Grenada	92 per cent coverage within three years of establishment
Montserrat	None
Saint Kitts and Nevis	Typically, 92 per cent island-wide and 95 per cent at each cell site
Saint Lucia	80 per cent
Saint Vincent and the Grenadines	The licensee shall provide a 70-per-cent geographical coverage in year one; 80 per cent in year two; 85 per cent in year three; and 90 per cent in year four across Saint Vincent and the Grenadines

Converged regulation brought about a move towards standardized license terms and conditions across a category of licensees, as well as light-touch regulation, both of which represent a departure from previous more command-and-control approaches adopted by first and second-generation regulators when they issued licenses with detailed obligations.

In third-generation regulation, additional obligations are aimed at either promoting competition or facilitating universal service and access:

- a) **To facilitate competition**, i.e. on operators that have significant market power (SMP) as determined by a market study – the obligations should apply to the market in which SMP has been assessed, thus open access obligations, non-discrimination, transparency and accounting separation are examples of obligations that may be applied to facilitate competition in relevant markets (e.g. broadband access and interconnection).

⁷⁷ ITU Giga Report, 2021

Spectrum for COVID-19

After COVID-19 was declared a national disaster in South Africa, the regulator prescribed minimum standards that licensees had to adhere to enable the sector to meet increased demand for ICT services during the period. A critical measure introduced by the regulations is the temporary release of high demand IMT spectrum in the 700 MHz, 800 MHz, 2300 MHz, 2600 MHz and 3500 MHz bands for the duration of the national state of disaster in order to ease network congestion, maintain good quality of broadband services and enable licensees to lower the cost of access to consumers.

A spectrum auction had been envisaged in 2020, and the regulator commented that "...the emergency release of this spectrum does not, in any way whatsoever, negate the processes that are currently underway for permanent assignment of spectrum through an auction."

Source: Independent Communications Authority of South Africa

Obligations: Selected play measures			
Country, Year	Target	Key aspects	Provider
Argentina, 2014 ⁸⁰	National coverage, including underserved areas	The auction of 700 MHz, 1700 MHz/2100 MHz spectrum included coverage obligations requiring licensees to roll out 4G services to all localities with more than 500 inhabitants	All successful licensees
United Kingdom, 2020 ⁸¹	Connection that can deliver 1 Mbps download speeds and 1 Mbps upload speeds, along with other defined quality parameters. Ofcom defined an affordable connection as one that costs less than £45 per month.	USO provides a legal right to request a decent broadband connection, up to a cost threshold of GBP 3 400. Universal service providers must provide service across their infrastructure for anyone that asks for it in their coverage area, with reasonable notice. Other operators and interested parties pay into a fund to compensate the incumbents.	BT and Kingston Communications

⁸⁰ GSMA, https://www.gsma.com/spectrum/wp-content/uploads/2016/11/spec_best_practice_ENG.pdf

⁸¹ <https://commonslibrary.parliament.uk/research-briefings/cbp-8146/>

(continued)

Obligations: Selected play measures			
Country, Year	Target	Key aspects	Provider
Switzerland ^{82,83}	<p>Switzerland's Federal Communications Commission (ComCom) requires affordable and available services in all regions.</p> <p>In 2020, the minimum speed requirement for the broadband service tripled to 10/1 Mbps.</p> <p>From 2018 to 2022, existing analogue and legacy digital connections, such as ISDN, need to be replaced by multifunctional connections based on IP standards.</p>	<p>Universal services are only provided by one service provider.</p> <p>Other providers are not subject to the specific regulations in this respect.</p> <p>Swisscom has not asked for compensation for providing universal services.</p>	Swisscom, chosen in a public tender process (next one in 2022)

16.2 Key considerations: play obligations

USOs are not a progressive approach to financing universal access. In general, USOs should only be imposed for operators with access to high-demand scarce resources, such as spectrum. If license obligations are to be imposed as part of a spectrum licensing process, they should be as relevant and manageable as possible and their impact should already be predicted through research and regulatory impact analysis. Good practice and principles include:

- a) Mapping the national priorities as set out in the broadband policy, digital agenda and any relevant vertical digital policies, e.g. if school connectivity is a national priority.
- b) Estimating the costs of complying with the obligation and seeing if they can be offset against any other fees that are charged. This approach recognises that USOs are not a form of tax but are instead being imposed on operators with the technical, project management and spectrum resources to deliver on the goal of universal access.
- c) Imposing obligations only after considering potential market impact – ensuring that they do not distort the market or discourage spectrum applications. See the public infrastructure funding principles in [section 8](#).
- d) Ensuring that progress is measured periodically and that there is certainty surrounding the obligations.
- e) Defining USOs up front at the beginning of a spectrum licensing process to enable proper planning and promote certainty before operators make investments.
- f) Ensuring that any USOs are imposed only after public consultation, including with the beneficiaries of the obligations, e.g. schools and communities, and with licensees on whom the USOs will be imposed to ensure that they are appropriate and achievable.

⁸² <https://www.bakom.admin.ch/bakom/en/homepage/telecommunication/the-universal-service-with-regard-to-telecommunications.html>

⁸³ <https://www.ses.com/case-study/swisscom>

Part D - Programmes, projects and practices

This section discusses the design of publicly funded ICT and digital programmes and projects, which may also include funding from the many actors described in previous sections, including USAF 2.0, local or municipal governments, donors or other sources, in combination with private-sector resources. Projects should be tailored to the requirements of a given country, as determined through an analysis of the policy context, existing and future infrastructure plans, service requirements and demand among the population. The right financial mechanisms should be applied to a project to ensure that it is developed in a sustainable manner which reduces the risks involved with the project and encourages further investment in it. Poorly designed projects and programmes will result in ineffective project implementation and, in some cases, a waste of resources.

	Pros	Cons	Public-funding instrument
Public-private partnership	<p>Can be supported by many financial mechanisms.</p> <p>Can encourage financial markets to lend into projects.</p> <p>Can access a broad range of skills, expertise and resources needed to successfully execute broadband infrastructure projects.</p>	<p>High funding requirement.</p> <p>High transaction/execution costs owing to involvement of multiple parties.</p>	<p>Direct, indirect or contingent support.</p> <p>In-kind support – e.g. provision of land or equipment.</p> <p>Loans.</p> <p>Guarantees.</p>
Design, build, operate (private)	<p>Low levels of risk for public sector.</p> <p>Potential high-value asset for private operator once network is operational.</p> <p>If there is sufficient public funding and risk mitigation, private investment can be mobilized.</p>	<p>High funding requirement – sufficient funding has to be available to attract interest from private operators, as significant investment may be required to make a viable business case, especially in rural areas.</p>	<p>Grants against obligations, e.g. open access, infrastructure sharing, etc.</p>
Design, build, operate (public)	<p>Catalyst effect – public sector retains ownership and control of the network and can facilitate further investment.</p> <p>Using it – wholesale open access network.</p>	<p>High risk for public sector.</p> <p>High funding requirement – network will have to be reliable, high speed and high quality to attract other investment.</p> <p>Often lack of public-sector commercial and technical expertise – requiring an operator/vendor partner throughout.</p> <p>Does not exploit the economies of scale and scope that private-sector operators can bring.</p>	<p>Fiscal funding.</p>

(continued)

	Pros	Cons	Public-funding instrument
Community	Communities/investors play the role of generating and aggregating demand in the area, government and donors can co-finance projects.	<p>Lack of access to financing by communities, particularly those in rural and underserved areas.</p> <p>Lack of technical experience of communities requires higher-cost turnkey solutions.</p> <p>Long-term sustainability is a challenge.</p> <p>No scalability.</p> <p>Project does not benefit from economies of scale and scope.</p>	<p>Government guarantees.</p> <p>Underwriting loans.</p> <p>Grants - though a plan needs to be in place for long-term sustainability.</p>

17 Infrastructure business models

17.1 State ownership: direct investment/equity

In terms of this model, all aspects of network deployment and operation are managed and financed by the public sector. Governments give a capital contribution without receiving any guarantee or repayment and, in so doing, acquire ownership of a project. Government have an equity stake and are directly involved in network deployment. Such an approach helps to respond to the high cost of broadband deployments in rural and underserved areas and seeks to ensure achievement of the goal of leaving no one behind. The infrastructure-funding principles recommended for USAF 2.0 and described in [section 8](#) should inform this model in terms of mitigating the main risks involved in this financing approach, which is that it has a low leverage effect, does not necessarily serve to mobilize other investment - in fact, it risks crowding out investment - and does not explicitly incentivize delivery.

National broadband networks, such as those rolled out in Australia, Tanzania, Malaysia and South Africa, were a common feature of countries' broadband policies and strategies following the global financial crisis of 2008. By mid-2018, over 60 per cent of all Australian premises could access national broadband network (NBN) services, with the project due for implementation in 2020. The Australian NBN project looked into the social and economic impacts of network roll-out and found that NBN access helped to drive an estimated USD 1.2 billion in additional economic activity in 2017 and to create up to 5 400 businesses and 9 700 new jobs. The same research estimates that the benefits to Australia of complete NBN roll-out include up to USD 10.4 billion of additional annual GDP and the creation of up to 80 000 new businesses and 148 000 additional digital jobs by 2021.⁸⁴

⁸⁴ <https://www.industry.gov.au/data-and-publications/australias-tech-future/digital-infrastructure/what-is-the-government-doing-in-digital-infrastructure>

Not all State-owned broadband networks have had the same impact. Many have struggled to compete with other broadband operators in the market, owing to the fact that they do not necessarily address a market gap and do not constitute effective investment.

17.2 Public-private partnerships (PPPs)

The World Bank defines a PPP as “a long-term contract between a private party and a government entity for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance.”⁸⁵ The intention is not to discuss PPPs as there is significant literature on the pros and cons of such structures;⁸⁶ however, it is interesting to note that certain PPP structures and features, namely availability of payments and offtake agreements, can be applied to mitigate risk in funding universal access and service.

The form of governments’ involvement in PPPs may range from financial support and indirect or contingent support, to in-kind support, such as the provision of land or equipment, or broader financial mechanisms that can support a specific PPP roll-out programme or encourage financial markets to lend into projects.⁸⁷ In the broadband sector, there is always some element of public funding in broadband PPPs and the mode of financing among the partners determines the risk-sharing framework and the roles of each PPP partner.

Figure 15: Broadband PPP models

Concessional PPP model	Operator PPP model	Cooperation PPP model
<ul style="list-style-type: none"> • Partners share the funding. • Low-risk projects. • Over a period of time that aligns with the amortization of the private investment. 	<ul style="list-style-type: none"> • 100-per-cent public funding. • High-risk projects. • E.g. national broadband networks. 	<ul style="list-style-type: none"> • Shared funding and 100-per-cent public funding. • E.g. undersea cable projects.

There are three main broadband PPP models: the concessional model; the operator model; and the cooperation model:⁸⁸

- Concessional models are used in lower-risk projects and involve the public and private-sector partners agreeing to share the funding of the PPP project. Concessions for the private partner are usually assigned over a time period, corresponding with the amortization period of the private investment;
- Operator models are applied where there is 100-per-cent public funding and tend to be used for very-high-risk projects where market demand is very low, such as in remote and sparsely populated areas; and
- Cooperation models are applicable for projects involving both shared and 100-per-cent public funding which have a medium to high risk level. Such projects may have low market demand but potential for demand aggregation, e.g. submarine cable projects.

⁸⁵ <https://pppknowledgelab.org/guide/sections/3-what-is-a-ppp-defining-public-private-partnership>

⁸⁶ See: Developing Successful Public-Private (ITU, 2013) <https://www.itu.int/ITU-D/treg/publications/SuccessfulPPPs.pdf>

⁸⁷ <https://ppp.worldbank.org/public-private-partnership/government-support-financing-ppps>

⁸⁸ Financial funding and organisational models in Public Private Partnerships for broadband projects in Europe

These partnerships recognize the need for a broad range of skills, expertise and resources to successfully execute broadband infrastructure projects. In their most basic form, PPPs may include network operators and governments; many successful PPPs, however, also include equipment suppliers, vendors, manufacturers and communities, given that in many underserved areas bottom-up approaches to project development and implementation are key. Increasingly, PPPs are taking on a more holistic approach and also involving digital platforms seeking to ensure increased connectivity for their business models to be successful.

17.3 Privately-owned municipal, local government and regional PPP models

This privately owned and run model involves a private-sector organization receiving some level of public funding, often in the form of a grant but sometimes through USAFs, other structural funds or State aid, to assist in the deployment of a new network offering open wholesale access. Open access, infrastructure sharing and other relevant obligations that promote competition and reduce investment costs for future competitors can be imposed on publicly funded local PPPs in exchange for funds. The public sector can provide funding and a commitment to procure (e.g. offtake agreements) and thereby guarantee a certain level of capacity from the locality from individuals, schools, municipal departments and local businesses. On the back of this, open-access network deployment and competitive provision of services are more attractive for investors.

While some level of funding is provided in this model, it is not strong on risk mitigation. The same risks that a national operator would be faced with will apply to a local operator, albeit on a smaller scale. There is the possibility that local operators are the first to enter an underserved market and then go on to develop the market, before it becomes cannibalized by national or other local operators once demand has been confirmed. An example of such an initiative is South Africa's Under-Serviced Area License (USAL) project, which received USAF financing and provided licenses for underserved regions. It was unsuccessful, however, because the licensees had to enter into commercial agreements to lease infrastructure from and interconnect with mobile operators with whom they competed in the markets for which they were licensed. The infrastructure costs were high since the licensees had to procure high-cost turnkey solutions from vendors, and some elected to roam on mobile networks to provide services, but in the absence of open access regimes this did not enable them to create sustainable businesses. The burden on the fund and government was low, but local entrepreneurs carried the risk.

Case study: Privately owned municipal, local government and regional PPP models

In the United States, the New Hampshire Fibre Network Consortium (NHFNC), a public-private partnership established by the University System of New Hampshire, together with the New Hampshire Community Development Finance Authority and FastRoads New Hampshire – a fibre build-out entity, applied for broadband stimulus grant funding, alongside two or more private-sector providers of fibre network capacity which would provide private matching funding for the federal grant. NHFNC intend to be structured like a “fibre condominium” with each of the public participants allocated a block of fibre strands and an equity stake, the size of which is yet to be determined, along with private participants in NHFNC, which will be assigned a block of fibre to offer to users on a commercial basis.

The new fibre infrastructure will be designed with off-ramps for anchor institutions and nodes for town-by-town last-mile fibre connections that would be made available on a wholesale basis by FastRoads New Hampshire and others to retail service providers in return for payment for use of the local infrastructure.¹

¹ <https://ppp.worldbank.org/public-private-partnership/sector/telecom/telecom-laws/case-studies-telecommunications>

17.4 Publicly owned regional and municipal networks (design, build, operate)

Smaller-scale municipal or local State-owned entities own, operate and maintain a wholesale open access network over which competing service providers can deliver retail services.

The local authority benefits from the fact that the operator or vendor takes the investment risk and makes the investment, in exchange for retaining all revenue. At the end of the contract, the network infrastructure remains with the public authority; a major risk, however, is that, once the agreed contract period is over, they are unlikely to be able to run the network independently and will not have taken any actions to introduce any further competition, making this an unsustainable long-term solution.

Case study: Romania's public design, build, operate model¹

In Romania, RO-NET has been funded under a design, build, operate (DBO) model to develop backhaul and local access networks bringing Internet closer to around 400 000 people in almost 130 000 households, as well as 8 500 business and 2 800 public institutions, primarily in rural areas. This has increased broadband coverage in Romania by 1.9 per cent, which means that, by the end of 2020, broadband Internet was available for 99.2 per cent of the country's population. The network is rolled out mainly in "white" areas with no broadband infrastructure. Romania's Ministry of Communications and Information Society owns the infrastructure, which is built and managed by a number of operators that have been selected via an open call for tender. The operators pay a concession fee and are responsible for managing and operating the network for the entire contractual period, as well as for all costs arising from the operations. They also have the right to keep revenue from the network, although a mechanism is in place to prevent them from making excessive profits.

The network is provided to ISPs and other operators on an open-access basis. RO-NET was rolled out in two phases, the first during 2014-2015 (costing approximately EUR 15 million) and the second in 2015-2016. The budget for the second phase was approximately EUR 66.7 million, with around EUR 45.7 million provided through EU co-financing.

¹ <https://business-review.eu/news/ro-net-internet-broadband-project-completed-in-over-200-white-areas-111478>

17.5 Community ownership

This grassroots, bottom-up model is reminiscent of cooperative models which saw the local community (residents and/or businesses) take control of the delivery of fixed and wireless broadband to their neighbourhoods.⁸⁹ Community anchors, including local governments, agricultural cooperatives, schools and clinics, create a sustainable case where there was previously a universal access gap by aggregating demand and actively taking steps to increase local adoption. In the digital era, the most strategic role that communities can play is to: provide key data to attract investors (See *Good practice: data mapping by communities* below); aggregate demand to increase traffic and mobilize investment; and extend existing networks and promote public shared use, e.g. via Wi-Fi in their localities or by building dynamic wireless community networks.⁹⁰

Community-based models have been found to face challenges relating to:

- a) Lack of technical know-how in communities to lead network deployment and sometimes even to manage the appointed contractors;
- b) Lack of access to financing by communities, particularly in rural and underserved areas. Where there is some level of local finance available, governments and donors can

⁸⁹ The ITU/ISOC Community Networking Manual – How to Build a Network Yourself. https://www.intgovforum.org/multilingual/filedepot_download/4391/2376

⁹⁰ <https://www.itu.int/en/ITU-D/Technology/Pages/LMC/LMC-Home.aspx>

- co-finance the projects through grants, loans and guarantees but a plan needs to be in place for long-term sustainability;
- c) If the project is end-user funded, securing upfront funding for high-cost infrastructure projects, even on a small scale, will be difficult; and
 - d) Projects may be more expensive as they do not benefit from economies of scale and bulk procurement discounts that large operators would get. The public sector and USAFs can provide guarantees and subsidies to support such projects but there must be a long-term view.

Overall, the bottom-up optical fibre model is most appropriate for targeting localized areas in developed markets and for gaining the most benefit from small amounts of funding. It is highly unlikely, however, that end users in unserved or underserved locations in emerging markets would be able to finance any such project without substantial public-sector support, from either central or local government. In such situations, the public DBO model is more appropriate.⁹¹

Emerging markets tend to be better suited to wireless community network models, where some models rely on wireless mesh networks and others on community members sharing unused bandwidth among each other. The latter model can be made sustainable through partnerships between ISPs and the community who can enter into a revenue sharing arrangement with customers who sell their unused bandwidth.

Good practice: data mapping by communities

The community promotor can work directly with community institutions – government and public service agencies, places of worship, libraries, schools and local businesses – to increase both participation and awareness in the community. A data map that shows potential demand and identifies underserved areas within a community provides a powerful tool. With demand and needs accurately mapped, a community gives potential broadband providers:

- a) a ready-made map of potential customers and therefore an indication of demand;
- b) a map that presents opportunities to use existing community, municipal and/or local infrastructure to expand broadband Internet services, especially fixed wireless broadband;
- c) the locations of important anchor tenants (schools, colleges, libraries, non-profits, government offices, healthcare organizations, local business centres, known future development projects and work-ready sites); and
- d) the beginnings of a strategic, phased expansion of broadband Internet service.

⁹¹ The ITU Last Mile Connectivity Solutions Guide. <https://www.itu.int/ITU-D/treg/publications/SuccessfulPPPs.pdf>

Some important information on community infrastructure that can attract broadband investors and investments:

- a) Locations of electricity infrastructure that is key for broadband infrastructure; in some cases the infrastructure may be capable of being shared in order to reduce costs and speed up roll-out – absence of electricity is a key stumbling block for roll-out and significantly increases costs;
- b) Locations of locally/community-owned water towers, silos, telecommunication towers, high sites and tall buildings that can be used by broadband providers through low- or no-cost leases;
- c) Rights of way for easier and less expensive access for the deployment of optical fibre cable;
- d) Capital projects, either current or planned, such as road construction or installation/upgrading of water pipes or other infrastructure, can be used as an opportunity to lay new optical fibre conduits for future activation;
- e) Locations of community-owned infrastructure that can be used at reduced costs or even free of charge by telecommunication companies to expand broadband networks; and
- f) Details of community-owned land that can be leased at reduced costs.

Adapted from <https://www.ncbroadband.gov/technical-assistance/playbook/assets-needs>

18 Financing adoption, use, innovation and inclusion

18.1 Overview

Demand-side projects that promote local content, digital inclusion and digital literacy or support the development of digital entrepreneurs and SMEs tend to be innovative and often first of their kind, making them difficult for traditional funders to evaluate. The lack of previous similar business models, in the case of digital platform services such as Uber, Facebook or Airbnb, for example, can at times make it difficult for banks to assess potential values and risks using existing frameworks and thus to obtain financing. This lack of knowledge and expertise within banks puts digital projects at a disadvantage compared to other kinds of project, necessitating a creative approach for the funding of digital innovation.

The main challenges inhibiting use and uptake are: affordability, or rather lack thereof; a lack of relevant applications and content; and an inability to use the Internet. In response to these challenges, USAFs and other funders and collaborators have considered strategies to make connectivity, including both services and devices, affordable and accessible for individuals from low-income and vulnerable groups and strategic institutional users, such as schools and hospitals. They have also put in place digital literacy strategies, all of which stimulate demand and serve two purposes:

- a) Getting people online where networks exist; and
- b) Promoting network extension where there is low traffic and low affordability.

18.2 Adoption, use, inclusion and innovation models

There are a number of ways in which governments can finance universal access projects to stimulate demand, differing based on project type, locality, region or country and the market. Two key themes for demand-side and adoption strategies are that the most effective ones are local and bottom up and that they embrace collaboration at all levels, from design and funding to execution. This collaboration is between communities, donor agencies, the public sector at regional and municipal levels, the private sector, often as part of corporate social investment (CSI), and USAFs. The involvement of USAFs in demand-side projects has increased over the years and, according to ITU, only about 30 per cent of funds currently have measures in place in their fund structures to stimulate service demand among low-income users or target groups, e.g., youth, students and the elderly, meaning that only a limited number of funds are sufficiently resourced to fund adoption-related projects; they can, however, consider partnerships and in-kind contributions to complement other parties' funding efforts.

This section considers the following types of initiative that stimulate demand within the broad funding priority areas discussed in [section 3](#):

Initiatives	Public connectivity	Affordability	Adoption, use and uptake	Innovation and SME development	Digital inclusion
Public access centres and Wi-Fi	X	X	X		X
Low-cost broadband for individuals		X	X		X
Low-cost connectivity for strategic public institutions	X	X	X		X
SME connectivity	X		X	X	X
Digital literacy programmes			X	X	X
Local content and relevance			X		X
Accelerators and incubators				X	X
SME development	X		X	X	X
Research	X	X	X	X	X
Mapping	X	X	X	X	X

The above-mentioned projects and initiatives are funded in a myriad of ways, from the private sector to USAFs and donor organizations. A key aspect that contributes to successful collaboration, given that community connectivity has so many touchpoints – e.g. schools, ISPs and the UASF, is that stakeholders that may not usually engage or interact do so.

In this section, the types of initiative set out above will be explored and consideration given to how they are conceptualized, funded and executed. In addition, case studies will be provided as appropriate. This section highlights the role of USAFs, where appropriate, in each of these project types to inform recommendations with regard to fund modernization.

18.3 Project and Initiative selection

Broadband adoption programmes differ significantly across countries and communities owing to the various location-specific characteristics, needs, opportunities and challenges. In general, however, before selecting any of the models described in this section, communities and municipalities should perform a needs assessment and consider stakeholder engagement, initiative and programme planning and methods of monitoring and evaluation.

Figure 16: Project and initiative selection process



- (1) **Needs assessment:** as adoption projects are ultimately about people, it is important that financiers have a clear understanding of the country's or region's needs and opportunities and how broadband adoption will address them, including the technical, financial and human resource needs to match broadband adoption;
- (2) **Stakeholder engagement:** it has long been established that no community-based projects should be implemented without community buy-in. It is therefore critical that funds map all relevant stakeholders and engage them on all aspects of the initiative;
- (3) **Initiative definition and programme planning:** it is necessary to align the programme with policy and regulatory objectives and develop a plan that is outcome-based and includes measurable targets through the project-implementation cycle to ensure adequate return on social and financial investment;
- (4) **Monitoring and evaluation:** these are core aspects of project implementation and should involve ongoing assessment, data collection and analysis, information sharing and programme improvements.

Based on the needs assessment, initiatives will be tailored to specific technical, financial and resource needs of the community being addressed, which will ensure that the right type of support is provided for the desired outcomes. Furthermore, the models are not mutually exclusive and it is possible that several initiatives might need to be implemented in parallel or in a complementary manner to achieve the desired objectives.

18.4 Supporting tools: research and mapping

Data is key to closing the digital divide and is used by governments at national, regional and local levels to decide where to target public funds. It is therefore important that attaining data is considered an aspect of universal access and adequately funded, either as a stand-alone project or as part of initial feasibility and pilot phases of all projects, as well as later during the implementation and evaluation stages.

Research includes market gap analysis, as discussed earlier in this report, and looks at, *inter alia*, progress in the attainment of universal access goals and targets, the efficacy of funding models

and project trends and improvements, amongst others. This will ensure that policy and funding frameworks and USAF strategy are evidence based, facilitate the monitoring and evaluation of projects and support the achievement of outcome-based funding.

Mapping is a critical data input for effective universal projects. This is discussed later in the context of the Giga project, which addresses school connectivity. Mapping helps to derive the correct data, which in turn enables countries to prepare appropriate budgets to close the broadband and other gaps.

18.5 Public connectivity

18.5.1 Public Wi-Fi

Public access today can learn from the lessons of yesterday. With respect to Wi-Fi models, these tend to be either: government-led through direct State funding, e.g. Philippines; operator or ISP-led; or development partner-led, depending on the primary source of financing, and then community supported. There are also successful fund-led models sponsored by USAFs, such as in Botswana. The most effective models involve collaboration across actors and throughout the value chain, i.e. with community, public and private (technical) cooperation.

- a) Facebook's Express Wi-Fi is a collaborative model through which it collaborates with other private-sector players, including Cisco, mobile operators and local entrepreneurs in specific countries to finance public access. Express Wi-Fi is a software platform offered free of charge to MNOs and ISPs, allowing them to deploy, operate and monetize Wi-Fi services, according to Analysys Mason. Express Wi-Fi is monetized either as paid data bundles or via advertising. Usually, the sale of Express Wi-Fi data bundles is done via local entrepreneurs offering the Express Wi-Fi hotspot service.⁹²
- b) In the Philippines, the Department of ICT is responsible for the implementation of the Free Public Wi-Fi for All programme, which provide free public Wi-Fi in public places, such as parks, plazas, public universities and colleges, public hospitals and health centres and airports. The Department of ICT procures the services of various providers through bidding processes, which are documented on its website, and lists all areas and live sites that have been covered by the programme. The Free Wi-Fi for All programme recently installed emergency free Wi-Fi services via very small aperture terminal (VSAT) as part of its disaster relief efforts in areas affected by typhoons in November 2020. As of April 2020, over 3 700 sites were operational.⁹³

18.5.2 Public-access centres

Funds also maintain public-access computing facilities that allow residents to access technology in places in which they feel comfortable and supported. These spaces also complement digital literacy classes that are often offered in the same location and can complement Wi-Fi projects. Low-income individuals and families value public-access computing centres because they are often in convenient locations and have helpful staff that provide them with one-on-one support with computers and broadband Internet access.

⁹² It provides low-cost access, as long as users have a device that can connect to the network; boosts service use by capturing new users within already-covered areas and increasing their data consumption thanks to improved service quality and affordability; and allows operators to offload their mobile traffic, in urban and semi-urban areas, onto the Wi-Fi network.

⁹³ <https://freepublicwifi.gov.ph> and <https://www.itu.int/en/myitu/Publications/2020/08/31/09/09/Digital-Regulation-Handbook>

The most successful public-access centres are bottom-up community-based models that are financed in partnership with the private sector. USAFs have significant experience delivering this model, including early telecentre models in Latin America, which quickly spread throughout developing countries. Many lessons were learned from the telecentre and multi-purpose community-centre models, including that: bottom-up models with community ownership and buy-in work best; the whole ecosystem needs to be considered – device, service and training; and sustainability is critical. Many telecentres failed because they were not able to develop sustainable business models.

18.6 Adoption: uptake and use

18.6.1 Low-cost connectivity for individuals

As discussed earlier, meaningful connectivity can only be achieved if there is Internet connectivity with an appropriate device, increasingly a smart device, that enables the use of apps. Appropriate in this regard also means that devices must be designed in line with universal design or design-for-all principles. Nearly 2.5 billion people live in countries where the cost of the cheapest available smartphone is at least a quarter of the average monthly income.⁹⁴ Subsidized low-cost or free smartphones, tablets and computers are therefore central to enabling active participation on the Internet. Some funds and community-based projects also provide ongoing technical support to residents who need social and technical assistance to keep their computers operational and online over time. In addition, funding for the development of low-cost devices to address the device affordability barrier can be considered in line with broader industrial policy incentives discussed later in this section.

*Case study: Italy's voucher scheme for low-income families*¹

In Italy, a EUR 200 million voucher scheme has been developed to support low-income families by providing vouchers to purchase broadband services with download speeds of at least 30 Mbps, with a preference for the highest speed available, so that several suitable infrastructures are present in the given area. The vouchers will also cover the provision of the necessary equipment, such as a tablet or personal computer.

The initiative aims to enable eligible families to telework and access educational and other services provided online by schools, universities, public service providers and businesses. Families can select their providers and equipment from the eligible providers, thereby ensuring competitiveness and technology neutrality in the programme.

¹ https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1445

⁹⁴ <https://webfoundation.org/2020/08/mobile-devices-are-too-expensive-for-billions-of-people-and-its-keeping-them-offline/>

18.6.2 Low-cost connectivity for strategic public institutions

Most broadband plans and digital agendas recognise the importance of connecting critical public institutions, such as schools, hospitals and police stations, as a means of increasing use and uptake, as well as promoting efficient service delivery in line with e-governance strategies. The challenge lies in the fact that, in many cases, municipal or national budgets do not cater sufficiently for them or their users in terms of Internet access.

An “e-rate” is a funding mechanism for school connectivity. Similar schemes can be applied to other strategic public institutions, such as universities, clinics, hospitals and police stations. The institutions are given discounts on ICT services, such as voice and broadband, and the service provider can either pay the difference as part of an e-rate obligation, as in South Africa, or be reimbursed to the level of the discount from a universal service fund, as in the United States. Schools typically still have to pay the remaining part of the fee. Experience has shown that, in many countries, funds are not sufficiently resourced to manage end-user subsidies. Based on the frameworks of the USAFs in five of the nine Member States of the Organisation of Eastern Caribbean States (OECS), the support available is primarily aimed at network- or infrastructure-related capital projects, such as the expansion of networks into underserved areas. Additionally, the fund frameworks do not appear to readily anticipate their use in subsidy arrangements.⁹⁵

Another model used in many developing countries is the national research and education network (NREN) model. An NREN is a specialized ICT-service provider that exists in a country to provide Internet and advanced ICT-services to research and education institutions on a non-profit basis. In Zambia and Morocco, ZAMREN and MARWAN4 have expanded over the years and now offer Eduroam, a service that allows users from participating institutions to gain secure access to wireless networks using their standard username (e-mail format) and password credentials, just as they do at their home institution for wireless access. It is based on a federated authentication model where usernames and passwords are validated at their home institution and enables access to authorized network services that are controlled by the visited institution.⁹⁶

⁹⁵ Giga School Connectivity Report

⁹⁶ <https://ubuntunet.net/2015/04/zamren-growing-eduroam-service/>

ZAMREN (Zambian NREN)	Marwan 4 (Moroccan NREN)
<p>In addition to donor funding, ZAMREN members provide ZAMREN with income to pay for its operational expenditures, there is no direct government financing. The government does, however, support ZAMREN indirectly:</p> <ul style="list-style-type: none"> a) The national electricity provider (ZESCO) provides a national Gigabit backbone free of cost during the start-up phase and has announced that ZAMREN will have a special tariff for the national backbone in the future. b) The Zambian regulator provides additional funds to ZAMREN to connect members to the nearest ZAMREN PoP. There are, however, budget limitations for the number of members that can be connected per year. 	<p>MARWAN 4 is funded by Morocco's Ministry of Higher Education and Scientific Research. The Ministry pays for the Internet link, while each institute pays for its link to the MARWAN 4 network, which boasts:</p> <ul style="list-style-type: none"> a) More than 200 connected institutions over 80 links covering cities. b) Offered bandwidth ranges from 100 Mbit/s to 5G Gbit/s. c) Total bandwidth currently 35 Gbit/s connected to the Internet via two links of 10 Gbit/s each in Rabat and Casablanca. d) IPv6 is deployed natively in dual stack. e) IP multicast support. f) Multiple classes of services offered to ensure quality of service for critical applications for the Ministry and universities.
Source: ZAMREN	Source: MARWAN 4

18.6.3 SME connectivity

In addition to productivity gains, small businesses and entrepreneurs that invest in and adopt ICT and digital products/services can gain access to new markets. They can therefore exploit efficiency gains in conjunction with promoting job creation. In addition to generating additional revenues for operators, connecting SMEs will facilitate adoption by a new segment of users by making new applications and use cases available.⁹⁷

The connecting of SMEs affords funds and other financiers in blended arrangements the opportunity to focus on digital inclusion targets in relation to women and persons with disabilities, e.g. in relation to the requirement for participating SMEs to employ and/or train a certain number of people from marginalized communities. Innovative approaches to SME connectivity include a digital adoption fund in Singapore called "SMEs Go Digital," overseen by the Infocomm Media Development Agency. The fund offers grants covering over two-thirds of what small businesses from all sectors spend on digital technology.

The rationale for the grants issued is that, if the costs of adopting technology can be funded, the application of these technologies will make them more productive. Given that SMEs employ two-thirds of Singapore's workforce and contribute nearly half of Singapore's GDP, this is an important and targeted intervention to grow the economy. With digital technology transforming every sector of the national economy, the government is seeking to ensure that SMEs make the most of digital technologies to improve operations and generate new revenue.⁹⁸

⁹⁷ <https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people>

⁹⁸ https://www.imda.gov.sg/-/media/Imda/Files/Programme/SMEs-Go-Digital/Media-Factsheet_SMEs-Go-Digital_1-Apr-2021.pdf?la=en

A new kind of fund: Singapore, focusing on innovation and SME demand

SMEs Go Digital

Launched in April 2017, the SMEs Go Digital programme hosted by the Infocomm Media Development Authority (IMDA) aims to simplify going digital for SMEs. More than 63 000 SMEs have adopted digital solutions from the programme. To make it easy for SMEs to adopt digital solutions recommended in industry digital plans, IMDA provides a list of pre-approved solutions assessed as market-proven, cost-effective and supported by reliable vendors. SMEs interested in adopting these solutions can start by visiting the Go Business Gov Assist portal and applying for the productivity solutions grant (PSG) through the business grants portal. PSG can help to offset up to 80 per cent of the costs of adopting these solutions.

Start Digital

Together with Enterprise Singapore (ESG), IMDA launched the Start Digital initiative in January 2019. Start Digital helps newly incorporated SMEs and those that have yet to digitalize to get started with foundational digital solutions through their natural touchpoints, namely banks and telecommunication companies.

5G innovation programme

To strengthen Singapore's competitiveness, enabled by a robust and advanced connectivity backbone, IMDA's 5G innovation programme will be supporting and encouraging enterprises and industries to adopt and implement new 5G applications in a live operating environment. The programme will also be supporting solution providers and technology developers in commercializing 5G solutions by making the benefits of 5G more accessible to companies and focusing on:

- a) Domain areas (i.e. Robotics and IoT, AI and Data, AR/VR); and
- b) Commercialization and deployment of 5G solutions.

18.6.4 School connectivity

The lack of connectivity among the most marginalized populations – children and young people from poor households and rural areas – places them at an extreme disadvantage and reduces their prospects of participating effectively in the modern economy. This situation was exacerbated by the COVID-19 pandemic, which led to 190 countries closing their schools for a period of time, forcing learners to learn remotely. It has shed light on the goal of universal Internet service to the household, while in many countries universal access in schools has not even been achieved. The challenge, in many developing countries, is that even when schools have a school connectivity plan, that plan has not necessarily been mapped in order to achieve efficiencies derived from a holistic view – mapping is the first pillar of the ITU/UNICEF Giga project.⁹⁹ The school connectivity challenge is compounded by a lack of basic services and infrastructure, e.g. electricity supply. Furthermore, teachers are not digitally literate and digital literacy is not part of the curriculum – thus preventing schools from being able to connect. In

⁹⁹ <https://gigaconnect.org>

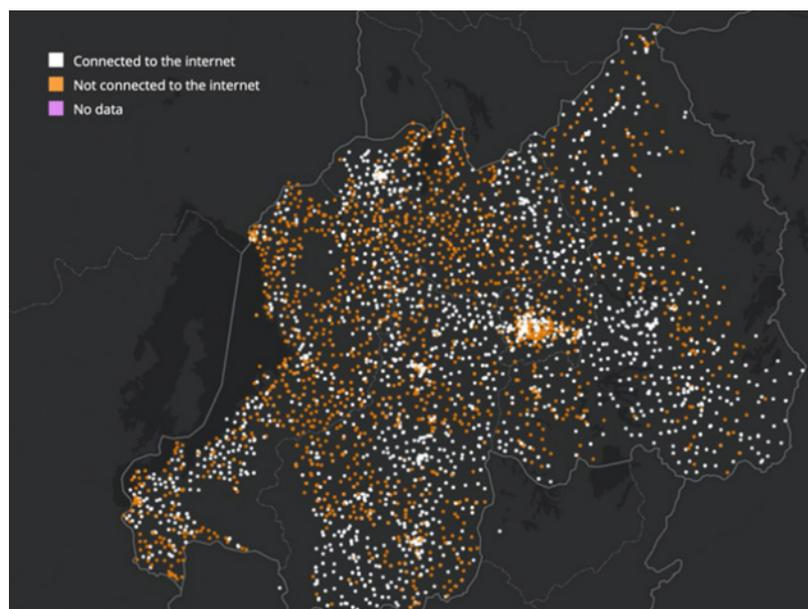
order to advance the connecting of schools, it is important to consider the issue from all angles and to:

- a) collaborate with other authorities, e.g. local government authorities, energy companies, education authorities, etc., to ensure that schools are primed for digitalization; and
- b) prioritize schools that are ready, so that no time is lost.

Thereafter, finance can be sought from, *inter alia*, communities, local governments, USAFs and multilateral and bilateral agencies.

In Rwanda, Giga has found that USD 11 million of CAPEX funding and USD 5 million of annual OPEX funding will enable Rwanda to connect 1 796 schools. This investment will bring 1.3 million students and teachers online and connect 2 million community members who live locally, potentially enabling up to USD 400 million in GDP growth. These figures were arrived at after thorough analysis of the school connectivity gap, which is premised on mapping. Mapping is instrumental to understanding true gaps, and Giga mapping shows that nearly all Rwandan schools are within 30 km of the optical fibre network and covered by mobile broadband, but 1 796 schools (43 per cent) remain without Internet. Electrification and ICT resources are major barriers.¹⁰⁰

Figure 17: Rwanda, Giga mapping¹⁰¹



¹⁰⁰ <https://gigaconnect.org/wp-content/uploads/2021/03/Rwanda-Opportunity-Brief.pdf>

¹⁰¹ <https://gigaconnect.org/wp-content/uploads/2021/03/Rwanda-Opportunity-Brief.pdf>

Cross-sector partnerships and funders

Launched by UNICEF and ITU in 2019, Giga sets the goal of connecting every school to the Internet and every young person to information, opportunity and choice. Giga serves as a platform to create the infrastructure necessary to provide digital connectivity to an entire country, including every community and individual. It is about using schools to identify demand for connectivity and as an analogy for learning and connecting where the community can come together and support its next generation in a world where we are all increasingly digital and where the skills required are not necessarily formal ones and learning happens continuously.

The Giga initiative is built on four pillars:

- a) Map the connectivity of every school and use it to show where demand is, and use new technologies, such as AI, to create a real-time map of school locations and connectivity levels.
- b) Work with governments and advise them on building affordable and sustainable country-specific models for finance and delivery, subsidizing market creation costs and incentivizing private sector investment.
- c) Connect every school to the Internet and create a monitoring system to oversee the level and quality of connectivity, including identification of the best possible solutions for last-mile connectivity.
- d) Empower young people with skills by investing in, and scaling, open-source solutions that - with connectivity - will be available to children, teachers and administrators.

Source: <https://gigaconnect.org/>

Table 2: School prioritization scorecard

School Prioritisation Criteria	
Level	10
Secondary	10
Primary	5
Type	7
Private	3
Public	7
Learner/Teacher Ratio	5
Learner: Teacher Ratio > 30:1	3
Learner: Teacher Ratio <30:1	5
Location	6
Rural	6
Peri-Urban	5
Urban	3
Infrastructure	2
On National Grid	2
Off National Grid	1
On Fibre Route	2
Off Fibre Route	1
Training	4
2 – 5 teachers trained in ICT/ 50 students	2
>5 teachers trained in ICT/50 students	4
Curriculum	4
ICT in curriculum for > 50 percent of students/year	4
ICT in curriculum for 10 percent - 49 percent of students/year	2
Additional Points	
Willingness to Partner with Primary School	6
Willingness to be Community Centre	6
School for Persons With Disabilities	8

- **Prioritise**
 - Government Secondary (based on country strategy)
 - On Grid / On Fibre
 - Learner/Teacher Ratio
 - ICT Trained teachers at school
 - ICT in curriculum
- **Extra Points**
 - Partnering with Primary
 - Community Access
 - PWD

Source: Author

Successful school connectivity projects have been undertaken globally. The most successful models are those that consider the school as a central element to understanding community demand. The school can be seen as both an entry point into connecting a community and as the centre of it; however, all equipment and devices need to be properly secured and students' safety should not be put at risk from the vandalism and security threats sometimes associated with the presence of new technology on a premises.

Rwanda is considered a flagship school connectivity programme. Some successful school connectivity projects include:

- a) The Communications Authority of Kenya implemented a project to connect over 890 public secondary schools to the Internet. Following a tendering process, it appointed two service providers in 2016 and, according to reports, approximately 94 per cent of the schools identified for connection are now online. The project cost approximately USD 8.3 million and received financing from the universal service fund, which receives 0.5 per cent of annual revenue from operators. In July 2020, the authority collected USD 52.3million for the fund, with USD 20.7 million distributed to projects by the end of the year.¹⁰²
- b) In Jamaica, the USAF fully finances the Tablets in Schools (TIS) project, through which devices are distributed to students at the pre-primary, primary and secondary levels, as well as at select teachers' colleges and special education institutions. Students at the University of the West Indies, the University of Technology and the Edna Manley College for the Visual and Performing Arts enjoy free campus-wide Wi-Fi courtesy of the USAF. It has also upgraded ICT infrastructure at the College of Agriculture, Science and Education, the Mico University College and the Caribbean Maritime University. In 2018/19, the USAF spent 60 per cent of what had been budgeted, while e-Learning Jamaica, an NGO, received the full amount that had been budgeted for the financial year 2018/2019 towards the TIS project. The expansion of the island-wide broadband network accounted for 28 per cent of the fund's total project expenditure.¹⁰³

18.6.5 Digital literacy

Digital literacy is a cross-cutting issue in that literacy is required for participation in the working world and across all aspects of society. Thus, digital literacy funding tends to be housed in a number of places and supported by a number of actors - it concerns the whole public sector. In addition, there is a broad range of funders in the form of private sector, philanthropists, foundations and donor organizations. Consequently, in one country there may be multiple digital literacy funds or programmes outside of the ministry responsible for education or ICT, and these programmes may be national or local.

The diverse approaches demonstrate the number of touchpoints that digital literacy has, and ultimately makes the case for collaboration. Several funds with similar objectives in a single country can pool resources to leverage private-sector finance. They can also work together to ensure coordination in approaches and outcomes. USAF 2.0 can play a key role in coordinating initiatives to ensure consistency, create a minimum standard for digital literacy and ensure adequate and efficient investment.

¹⁰² <https://www.businesschief.eu/technology/communications-authority-connect-896-schools-internet>

¹⁰³ https://usf.gov.jm/wp-content/uploads/2020/08/USF_Annual_Report_2018_2019.pdf

Cross-sector funds that can collaborate with ICT funds to leverage school connectivity financing	
Country and type	Description
Australia: National Innovation and Science Agenda (Education sector)	<p>In Australia, the National Innovation and Science Agenda earmarked USD 50.6 million for investment over four years (1 July 2016 – 30 June 2020) to support all Australian teachers and students in embracing the digital age and implementing the Australian Curriculum: Digital Technologies. This funding provides support for:</p> <ul style="list-style-type: none"> a) Grants to school principals and ICT leaders for projects to implement the Australian Curriculum: Digital Technologies through a whole-of-school approach; b) Online professional development courses for teachers; c) Online computing challenges for all Year 5 and Year 7 students; d) ICT summer schools to engage Year 9 and 10 students, with a focus on those from disadvantaged backgrounds, to increase their participation in digital technologies and STEM studies in school, post-secondary school and the workforce; e) Cracking the Code – a series of fun and engaging computing and coding challenges and activities for school students, to be held in National Literacy and Numeracy Week; f) Teacher support for digital technologies to provide in-class support and/or telepresence support and follow-up to schools in the early stages of implementing the Australian Curriculum: Digital Technologies; and g) Developing effective partnerships between STEM professionals and schools to build teachers' and students' understanding of STEM applied in the real world. <p>The focus is on tackling the digital divide to ensure that students most at risk of falling behind in the digital age are given opportunities to participate and engage in digital literacy and STEM in both primary and secondary schools.</p> <p>www.education.gov.au/inspiring-all-australians-digital-literacy-and-stem.</p>

(continued)

Cross-sector funds that can collaborate with ICT funds to leverage school connectivity financing	
Country and type	Description
Canada: Digital Strategy Fund (Council for the Arts) (Vertical sector: arts and culture)	<p>The Digital Literacy and Intelligence component of the Digital Strategy Fund, under the Canada Council for the Arts, supports the arts sector in building digital knowledge, skills and capacity. It supports Canadian artists, groups and arts organizations in their efforts to: respond more effectively to the challenges, issues and opportunities of the digital era; develop and broaden their strategic digital thinking; and strengthen their ability to translate that thinking into sustainable, concrete actions.</p> <p>Applicants may request a grant for a single-phase initiative for which the objectives, timelines and expected results are clearly set out. Eligible activities include, but are not limited to, initiatives that:</p> <ol style="list-style-type: none"> Build strategic digital knowledge and capacity in identifying and understanding the challenges, issues and opportunities of the digital environment, e.g. group learning on strategic issues, workshops, webinars, hackathons, collaborative digital needs/maturity assessments and digital strategic plans that are not for single organizations, etc.; Reach and connect with people within or beyond the arts sector to explore digital challenges, issues and opportunities, and foster collaboration and digital-knowledge sharing, e.g. organizing of symposia, forums, conferences and communities of practice, etc.; Research and experiment with collaborative approaches to problem solving, and build strategic digital knowledge and capacity, e.g. design thinking activities, coaching approaches, conducting studies and strategic foresight, etc. <p>Activities addressing digital challenges, issues and opportunities related to artistic practice are eligible if the focus is not on the creation and production of artistic work.</p> <p>https://canadacouncil.ca/funding/strategic-funds/digital-strategy-fund</p>
Nigeria (Local) (Multistakeholder)	<p>As part of efforts to empower vulnerable groups in rural clusters in Northern Nigeria with the digital skill set required for the future of work and advanced learnings for the 21st century in Nigeria, the Technology for Social Change and Development initiative (Tech4Dev) and the Foreign Commonwealth and Development Office (FCDO) have signed a resilience training agreement to carry out the Basic Digital Literacy for Rural Clusters in Northern Nigeria programme, which takes an inclusive approach and targets 50 per cent vulnerable women and girls (aged 8-18; 45-65), 30 per cent persons with disabilities and 20 per cent individuals of other vulnerable groups.</p> <p>Investing in digital literacy for vulnerable people living in rural clusters in Northern Nigeria allows for reduction in the poverty index by increasing the employability of beneficiaries and closing the digital-skill gap needed in the digital economy.</p> <p>The initiative is designed to directly impact 1 000 beneficiaries in ten rural clusters across ten states in Northern Nigeria; Zamfara, Kaduna, Kwara, Kogi, Benue, Sokoto, Jigawa, Nasarawa, Niger and Plateau.¹⁰⁴</p>

¹⁰⁴ <https://tech4dev.com/blog/blogCategories/pressRelease.html>

18.7 Innovation and SME development

18.7.1 Incubators and accelerators

A decade ago, ICT-sector tech hubs, incubators and accelerators, designed to support start-up businesses and technology-oriented entrepreneurs, were still in their infancy. In their support for innovation, many of these hubs and accelerators have gone on to produce globally and locally relevant and scalable solutions.

Hubs and incubators mainly focus on the provision of collaborative working space and infrastructure for entrepreneurs and start-ups and are led by academia, civil society, the government or a hybrid arrangement. The operating type informs a hub's funding.

Accelerators tend to be private sector or government led and are slightly more sophisticated than incubators in that, in addition to shared space and opportunities for co-creation, investors receive expert mentoring, exposure to investors and cash investment. In exchange, entrepreneurs give a portion of their companies' equity to programme partners, which is why it is often called a "seed" or "venture" accelerator. Private-sector and NGO-led accelerators face funding challenges, such as *ActivSpaces* in Cameroon, which has been active for 10 years and yet struggles for sustainability as it continues to search for a revenue model that will sustain it and ensure its smooth running. *Start-Up Chile*, on the other hand, is a government-backed accelerator launched in 2010 and aligned with broader national policy - start-up entrepreneurship in Chile is a central part of government strategy. *Corporación de Fomento de la Producción de Chile (CORFO)*, which is tasked with promoting economic growth in the country, including small-business development in rural areas, conceptualized the accelerator funding model. The accelerator's twin mandate is to elevate Chile's international profile and to build a local culture of entrepreneurship (see *Chilecon Valley - accelerating women's participation* case study below).

Funds could use accelerator models such as the ones used in *Start-Up Chile*, *GovTech Poland* or the *European Digital Innovation Hubs* (See *GovTech Poland* case study below) and collaborate with partners to support accelerators that are focused on innovation and the design of local solutions. There is also a potential partnership opportunity with regulators that are creating sandboxes to finance the innovations developed. One of the challenges that has been noted for regulatory sandboxes is that, while they confirm the regulatory and technical feasibility of their innovations, they are not able to take them to scale owing to financial constraints.

This is a potential area for funds, regulators, donors and investors to explore collaboratively - perhaps through fund-of-funds models, which use the technical skills of financial intermediaries. It is critical that USAF 2.0 does not compete with venture capital funds. If they choose to finance innovation through accelerators, they should narrow the types of innovation that they are willing to finance to development-oriented projects that are able to provide solutions to local challenges, or to close any of the identified digital gaps.

Case study: Chilecon Valley - accelerating women's participation (Start-Up Chile)

The Corporación de Fomento de la Producción de Chile (CORFO) is tasked with promoting economic growth in the country, and the promotion of innovation and small-business development in some of Chile's rural areas has been a priority. It established Start-Up Chile as a public start-up accelerator. Since 2010, it has supported 1 960 start-ups, of which 54 per cent are still active. It has a valuation of USD 2.1 billion and its programmes include:

- a) S Factory - pre-acceleration programme for female-led start-ups in early concept stage. Successful applicants will receive CLP 10 million (GBP 12 000).
- b) Seed - acceleration programme for companies with a functional product and early validation. Successful applicants will receive CLP 20 million (GBP 24 000).
- c) Scale - programme for top performing companies incorporated in Chile and looking to scale up in Latin America and globally. Successful applicants will receive CLP 60 million (GBP 72 000).

Chile has also developed new programmes to integrate women into the start-up ecosystem. Currently, 42 per cent of women comprise the entrepreneurial activity in initial stages, and women lead 44 per cent of established businesses in Chile.

Organizations such as Girls in Tech Chile are creating awareness and encouraging women to start a career or boost their current one, while there are also start-up programmes specifically targeting female entrepreneurs.

Access to the Start-Up Chile community includes up to USD 100 000 in perks, such as Microsoft BizSpark, Facebook Start, Amazon Web Services and many more.

Source: <https://www.startupchile.org> and <https://contxto.com/en/chile/startup-hub-chilecon-valley/>

Case study: GovTech Poland (hub model)

Poland's Office of Electronic Communication (UKE) is supporting Polish innovative solutions and enterprises on the telecommunication service market. In 2019, UKE joined the GovTech Poland-Activate Ideas! programme, implemented under the auspices of the Prime Minister and bringing together public bodies, undertakings, start-ups, academic communities and citizens. By harnessing the competition formula, the programme invites stakeholders who want to use modern IT and technological solutions to come together and solve important challenges facing society and improve living conditions of citizens and the effectiveness of the public sphere.

As part of the programme, UKE reported a challenge related to creating a publicly available platform showcasing investment attractiveness, especially in areas without standard next-generation access (NGA) infrastructure. UKE aims to ensure that in 2020 high-speed Internet will be available across Poland, and the measures it has undertaken are intended to promote and stimulate investment in the expansion of NGA networks.

Source: Report_on_uke_activities_for__2019.pdf

Part E - Using funding to mainstream the inclusion of women and girls

The digital gender gap is a major challenge: more men (58 per cent) use the Internet than women (42 per cent). In developing countries, the mobile Internet gap is starker - 37 per cent in sub-Saharan Africa.¹⁰⁵ In low and middle-income countries, the GSMA has found that women are 8 per cent less likely than men to own a mobile phone and 20 per cent less likely to use the Internet on a mobile device. Furthermore, a key barrier is smartphone ownership, which is also 20 per cent lower for women than for men.¹⁰⁶ As societies become more digitized and participation increasingly requires meaningful access to broadband networks and digital services, the cost of exclusion of women is going to increase.

The gender gap is not driven by technology, but rather exacerbated by it. Furthermore, societal structures and biases that value women's work less, underpay women (thus limiting their purchasing power), limit their opportunities for education (thus reducing digital literacy) and compromise women's security (thus limiting their participation) only enhance the real-world divides. The same is true for the systemic biases against youth, the elderly and persons with disabilities. It is important to use the opportunity of financing to ensure that the response to these challenges is mainstreamed.

When assessing project proposals, USAFs and other financiers can develop and apply selection criteria based on the digital-inclusion framework (Figure 19) set out below. It is important to bear in mind the following when considering the analysis of project impact on women and other marginalized communities:

- a) It is a process, not an event - the publication of a gender-gap report or research on an aspect of ICT and gender is important to identifying and quantifying gaps that need to be addressed; it is not, however, enough on its own;
- b) It has to form part of a broader national strategy and policy framework on inclusion, with which USAF 2.0 should be aligned; and
- c) It must be implemented in a coherent manner by first identifying gender gaps before designing and implementing appropriate measures to address them, e.g. gender mainstreaming or specific measures.¹⁰⁷

¹⁰⁵ <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf>

¹⁰⁶ <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf>

¹⁰⁷ <http://standard.gendercop.com/about-the-standard/why-a-standard-on-gender-mainstreaming/index.html>

Figure 18: Digital inclusion framework

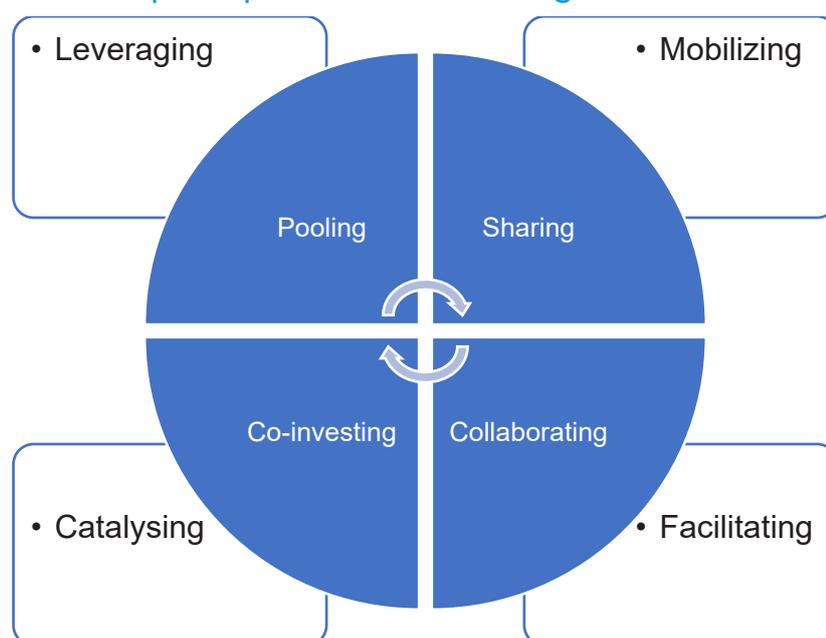
Step 1. Analysis	Step 2. Objectives and indicators	Step 3. Theme-specific competence	Step 5. Monitoring and evaluation
<ul style="list-style-type: none"> • Does the proposal include an inclusivity analysis of the intervention area (i.e. the analysis of differences in women's and men's situations and needs, the needs of immigrants, the needs of persons with disabilities – in their diversity – and the identification of relevant inequalities)? • Is qualitative and quantitative disaggregated data used to describe gender, persons with disabilities and other gaps and patterns? • Does the analysis refer to fund-specific, national and/or sub-national digital inclusion goals? 	<ul style="list-style-type: none"> • Are specific digital inclusion goals set for the project? Are they broken down into specific communities that are to be positively affected (women, immigrants, persons with disabilities, etc.)? • Are specific indicators set to facilitate the monitoring of objectives? Are general indicators related to individuals disaggregated by sex, type of disability, age or other measures, as appropriate, in order to enable effective monitoring? • Are broader, cross-cutting indicators that will assist in analysing socio-economic impact captured, e.g. age, socio-economic background, poverty, race, ethnicity, location (rural/urban), disability, sexual orientation (lesbian, gay, bisexual, transgender and others) and religion? 	<ul style="list-style-type: none"> • Does the project have access to internal gender/person with disability/immigration/youth competence? If not, will external expertise be used? Does the project include a budget for such external expertise? • Is expertise and competence a requirement in training and evaluation procurements? 	<ul style="list-style-type: none"> • Does the proposal explain how the project will monitor and assess the objectives, results and impacts of digital inclusion? • Does the proposal set out how the project will evaluate the objectives, results and impacts of digital inclusion?

Source: Author adapted from <https://eige.europa.eu/gender-mainstreaming/toolkits/gender-budgeting/concrete-requirements-considering-gender-equality-within-eu-funds>

19 Conclusion

Throughout this report, the benefits of extending broadband access and increasing citizen demand through the financing of network roll-out and funding of digital adoption, use and digital inclusion have been discussed in the context of finding ways to close access gaps. The question, though, is how does one go about it? The answer is to collaborate, pool and share. One cannot stop there, however: the objective of pooling is not simply to have more available capital for universal access, but to have more capital that can be leveraged to encourage private participation in the financing of universal access.

Figure 19: Private participation in the financing of universal access



There are myriad funders in the digital transformation arena, from private to philanthropic and development finance institutions, as well as public funding as a last resort. Among those actors, there are structural funds which provide lessons for USAF reform. Current USAFs are not built for the purpose of digital connectivity and therefore need to be either reformed to increase effectiveness and relevance or dissolved if they are not disbursing the funds collected. Neither scenario is an absolute as the direction a fund should take will depend on country context. Furthermore, in all scenarios, fund management should put in place mechanisms for periodic review of the fund to ensure effectiveness, including: annual financial and performance reports should be prepared and published; and performance, institutional and strategic reviews should be held every three to five years at the time of the strategic review. These reviews are critical to ensuring that the role and relevance of USAF 2.0 are aligned with national, regional and community requirements.

This report provides an overview of key legal and institutional considerations that will support the reform process and guide periodic reviews and suggests that, given the changed landscape, the new role and goals of the reformed USAF 2.0 might include:

- a) Acting as facilitator or intermediary and considering the pooling of its funds with those of other DFIs, donors and community funds, in line with the structural principles of blended finance to optimize leveraging of private capital;
- b) Targeting infrastructure that will have a significant impact on GDP growth and job creation across economic sectors;
- c) Targeting adoption and use activities that have high potential for growth and job creation, with few adverse effects on competition that could reduce the rest of the economy's growth and job potential;
- d) Facilitating innovation and SME development to benefit from economic and productivity gains as well as to encourage local innovation and R&D; and
- e) Always addressing digital inclusion as part and parcel of its investment strategy.

The report updates the thinking of universal access financing but maintains that, as has always been the case, public funding should be complemented by non-financial interventions to close gaps. It also argues that, borrowing from the blended-finance framework, public funding should seek to demonstrate additionality and bring to the table private capital that would otherwise not have been interested in development-oriented projects. This is part of a holistic approach to financing universal access to digital technologies and service, which bears in mind the following:

- a) **Broadband and digitalization have huge potential to improve economic performance and create jobs** – a well conceptualized national digital agenda, with clear objectives and measurable targets, is a first step to defining universal access objectives and will go a long way towards delivering a digital economy.
- b) **Collaboration is the name of the game** – the number of stakeholders in the digital ecosystem has grown and the pool of potential funders and financiers has increased beyond network providers, tower companies and ISPs to include other sectors and private investors. USAFs can collaborate with donor agencies, DFIs and multilateral and bilateral agencies, among others, to cover the geographic areas and people, as well as the innovative strategies, that are not worth it for the commercial market. USAFs must factor additionality into their collaboration with private sector funders and ensure that public and philanthropic funding is geared towards catalysing private funding so as to avoid market distortion.
- c) **Financing infrastructure is critical as it is the foundation of digitalization** – nevertheless, even where infrastructure and networks exist, people are not using them in some areas. Financing platforms, applications and content is imperative as they will increase the value of the network and the Internet for users. Locally relevant content is a key driver of adoption, as are applications that resonate with users and are useful to them in their local contexts, such as financial service, transport and security applications and locally generated content.
- d) **The availability of local and relevant content and adequate end-user skills is paramount** – digital skills and literacy are critical for promoting digital inclusion and facilitating broadband adoption. Investments in skills and content may take the form of establishing tech hubs, local content ecosystems or Internet literacy training programmes.
- e) **Regulation has to be flexible enough to enable universal access for all** – prescriptive regulation and legislation will hold back the sector's progress and constrain people's ability to make investment decisions.
- f) **People-centred financing is critical to facilitate user access** – this includes making sure that users can afford to use the Internet and that being online provides a meaningful experience.

Office of the Director
International Telecommunication Union (ITU)
Telecommunication Development Bureau (BDT)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdttdirector@itu.int
Tel.: +41 22 730 5035/5435
Fax: +41 22 730 5484

Digital Networks and Society (DNS)

Email: bdt-dns@itu.int
Tel.: +41 22 730 5421
Fax: +41 22 730 5484

Digital Knowledge Hub Department (DKH)

Email: bdt-dkh@itu.int
Tel.: +41 22 730 5900
Fax: +41 22 730 5484

Office of Deputy Director and Regional Presence
Field Operations Coordination Department (DDR)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdtdeputydir@itu.int
Tel.: +41 22 730 5131
Fax: +41 22 730 5484

Partnerships for Digital Development Department (PDD)

Email: bdt-pdd@itu.int
Tel.: +41 22 730 5447
Fax: +41 22 730 5484

Africa

Ethiopia

International Telecommunication Union (ITU) Regional Office
Gambia Road
Leghar Ethio Telecom Bldg. 3rd floor
P.O. Box 60 005
Addis Ababa
Ethiopia

Email: itu-ro-africa@itu.int
Tel.: +251 11 551 4977
Tel.: +251 11 551 4855
Tel.: +251 11 551 8328
Fax: +251 11 551 7299

Cameroon

Union internationale des télécommunications (UIT)
Bureau de zone
Immeuble CAMPOST, 3^e étage
Boulevard du 20 mai
Boîte postale 11017
Yaoundé
Cameroon

Email: itu-yaounde@itu.int
Tel.: +237 22 22 9292
Tel.: +237 22 22 9291
Fax: +237 22 22 9297

Senegal

Union internationale des télécommunications (UIT)
Bureau de zone
8, Route des Almadies
Immeuble Rokhaya, 3^e étage
Boîte postale 29471
Dakar - Yoff
Senegal

Email: itu-dakar@itu.int
Tel.: +221 33 859 7010
Tel.: +221 33 859 7021
Fax: +221 33 868 6386

Zimbabwe

International Telecommunication Union (ITU) Area Office
TelOne Centre for Learning
Corner Samora Machel and Hampton Road
P.O. Box BE 792
Belvedere Harare
Zimbabwe

Email: itu-harare@itu.int
Tel.: +263 4 77 5939
Tel.: +263 4 77 5941
Fax: +263 4 77 1257

Americas

Brazil

União Internacional de Telecomunicações (UIT)
Escritório Regional
SAUS Quadra 6 Ed. Luis Eduardo
Magalhães,
Bloco "E", 10^o andar, Ala Sul
(Anatel)
CEP 70070-940 Brasília - DF
Brazil

Email: itubrasilia@itu.int
Tel.: +55 61 2312 2730-1
Tel.: +55 61 2312 2733-5
Fax: +55 61 2312 2738

Barbados

International Telecommunication Union (ITU) Area Office
United Nations House
Marine Gardens
Hastings, Christ Church
P.O. Box 1047
Bridgetown
Barbados

Email: itubridgetown@itu.int
Tel.: +1 246 431 0343
Fax: +1 246 437 7403

Chile

Unión Internacional de Telecomunicaciones (UIT)
Oficina de Representación de Área
Merced 753, Piso 4
Santiago de Chile
Chile

Email: itusantiago@itu.int
Tel.: +56 2 632 6134/6147
Fax: +56 2 632 6154

Honduras

Unión Internacional de Telecomunicaciones (UIT)
Oficina de Representación de Área
Colonia Altos de Miramontes
Calle principal, Edificio No. 1583
Frente a Santos y Cía
Apartado Postal 976
Tegucigalpa
Honduras

Email: itutegucigalpa@itu.int
Tel.: +504 2235 5470
Fax: +504 2235 5471

Arab States

Egypt

International Telecommunication Union (ITU) Regional Office
Smart Village, Building B 147,
3rd floor
Km 28 Cairo
Alexandria Desert Road
Giza Governorate
Cairo
Egypt

Email: itu-ro-arabstates@itu.int
Tel.: +202 3537 1777
Fax: +202 3537 1888

Asia-Pacific

Thailand

International Telecommunication Union (ITU) Regional Office
Thailand Post Training Center
5th floor
111 Chaengwattana Road
Laksi
Bangkok 10210
Thailand

Mailing address:
P.O. Box 178, Laksi Post Office
Laksi, Bangkok 10210, Thailand

Email: ituasiapacificregion@itu.int
Tel.: +66 2 575 0055
Fax: +66 2 575 3507

Indonesia

International Telecommunication Union (ITU) Area Office
Sapta Pesona Building
13th floor
Jl. Merdan Merdeka Barat No. 17
Jakarta 10110
Indonesia

Mailing address:
c/o UNDP – P.O. Box 2338
Jakarta 10110, Indonesia

Email: ituasiapacificregion@itu.int
Tel.: +62 21 381 3572
Tel.: +62 21 380 2322/2324
Fax: +62 21 389 5521

CIS

Russian Federation

International Telecommunication Union (ITU) Regional Office
4, Building 1
Sergiy Radonezhsky Str.
Moscow 105120
Russian Federation

Email: itumoscow@itu.int
Tel.: +7 495 926 6070

Europe

Switzerland

International Telecommunication Union (ITU) Office for Europe
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: euregion@itu.int
Tel.: +41 22 730 5467
Fax: +41 22 730 5484

International Telecommunication Union
Telecommunication Development Bureau
Place des Nations
CH-1211 Geneva 20
Switzerland

ISBN: 978-92-61-34431-3



9 789261 344313

Published in Switzerland
Geneva, 2021
Photo credits: Shutterstock