

Advancing youth-centred digital ecosystems in Africa in a post-Covid-19 world

Melanie Pinet, Phionah Sanyu and Ariana Youn

March 2021

Key messages

Covid-19 has had multidimensional impacts on young people's lives and livelihoods. Digital technologies have enabled them to respond to these challenges through youth-led activism and community engagement. However, access, awareness and the quality of skills-building opportunities is unequal.

Barriers driving the youth digital divide in Africa are multifaceted. Youth are subject to a double disadvantage: unequal or inadequate infrastructure and affordability. Poor infrastructure restricts youth access to the internet and affordability limits access to devices and data. These limitations restrict young people's internet exposure, which they need to acquire basic digital skills. Greater investments and incentives to telecoms and the private sector are needed to provide opportunities for change.

Digital-enabled interventions and programmes aimed to equip youth with 21st-century skills should consider designs grounded in creative and participatory approaches, be tailored to young people's local contexts, reflect their lived experiences and aspirations, and go beyond short-term outcomes. Special attention should be paid to vulnerable groups including young women, young people with disabilities, youth migrants and LGBT youth and their intersecting vulnerabilities and needs.



Readers are encouraged to reproduce material for their own publications, as long as they are not being sold commercially. ODI requests due acknowledgement and a copy of the publication. For online use, we ask readers to link to the original resource on the ODI website. The views presented in this paper are those of the author(s) and do not necessarily represent the views of ODI or our partners.

This work is licensed under CC BY-NC-ND 4.0.

How to cite: Pinet, M., Sanyu, P. and Youn, A. (2021) Advancing youth-centred digital ecosystems in Africa in a post-Covid-19 world. London: ODI [www.odi.org/publications/17947-advancing-youth-centred-digital-ecosystems-africa-post-covid-19-world]

Acknowledgements

The authors would like to thank Awa Sanou, Albert van der Linden, Isabelle Carboni, Oliver Lough and Louise Shaxson for their helpful comments and review. The authors also like to thank all participants who took part in the ODI global consultation on youth and digital technologies in sub-Saharan Africa on 14 July 2020 as well as PeaceDirect, who hosted the consultation on Platform4Dialogue. Finally, the authors thank Aaron Bailey-Athias, Sarah Turner, Katie Forsythe and Matthew Foley for coordination, management and editorial support.

About this paper

This publication is part of the Youth Forward initiative supported by the Mastercard Foundation.

Contents

Acknowledgements / i

Boxes, tables and figures / iii

1 Introduction / 1

2 The youth digital divide / 2

2.1 Access and affordability: setting the scene / 2

2.2 Young women's access to technology / 5

2.3 Language / 6

2.4 Disability / 7

2.5 Awareness / 8

3 How Covid-19 has changed technology use by young people in sub-Saharan Africa / 10

3.1 Impact of Covid-19 lockdowns on youth lives and livelihood / 10

3.2 Youth civic participation, activism and technology / 11

3.3 Youth technology use in the (mis- and dis-) information age / 13

3.4 Youth-led digital innovations – the power of challenges / 15

4 Skills needed to navigate a connected, increasingly digital world / 17

4.1 Digital skills for youth / 18

4.2 Learning and digital skills building / 20

4.3 Digital-friendly learning approaches / 21

5 Conclusion: what is needed for youth to thrive in digital societies? / 23

Bibliography / 26

Display items

Boxes

Box 1 | Defining usage and coverage gaps / 3

Box 2 | Digital divides and meaningful connectivity / 6

Box 3 | Defining mis- and disinformation / 13

Box 4 | Core life skills / 17

Box 5 | Top seven soft skills young people are lacking / 18

Box 6 | Data literacy and media literacy / 19

Photos

Volunteers at the Lagos Food Bank Initiative carry out community engagement work in Ikotun, Lagos, Nigeria, 2020. Photo credit: Oluwafemi Dawodu/Shutterstock / 9

Students use their mobile phone and computer devices in a classroom, Nigeria, 2020. Photo credit: Confidence Marshall Nzew/Shutterstock / 16

Young women use masks during meeting at work, Ghana, 2020. Photo credit: Kwame Amo/Shutterstock / 25

1 Introduction

Evidence across the globe has shown that the impact of Covid-19 on youth (aged 15–24 years old) lives and livelihoods has been profound and multidimensional (UNFPA, 2020b), ranging from constrained access to education and employment, adverse effects on mental health and the increased spread of misinformation and online polarisation. The use of digital technologies, including social media platforms, has accelerated, making a simple smartphone a new tool of empowerment; yet, over 70% of Africa's youth is offline (AU, 2020). Across the African continent, 80% of youth (aged 15–35 years) consider Wifi as a fundamental human right (Ichikowitz Family Foundation, 2020). While the situation varies across African countries, a large proportion of young people live in rural (IFAD, 2019) and hard-to-reach areas with no access to electricity. Therefore, narratives that praise technology as a solution to youth challenges do not hold true for everyone.

The global pandemic has exacerbated pre-existing inequalities, deepened young people's intersecting vulnerabilities, such as for young women (Plan International, 2020a; Mpungose, 2020), young people with disabilities (Emirie et al., 2020; UNFPA, 2020a), youth migrants and LGBT youth (Ghoshal, 2020). New disparities have also emerged, making youth the biggest losers of the Covid-19 crisis. This is particularly the case for urban youth, who were highly reliant on the informal economy before lockdown measures were imposed (Amdeselassie et al., 2020a; Amdeselassie et al., 2020b; Chirisa et al., 2020). Consequently, the pandemic has revealed the need to develop resilient and sustainable systems and economies that leverage digital technologies as a tool for youth empowerment.

Despite these challenges, youth have been a positive force in their communities, and are leading the way in the Covid-19 response (OSAA, 2020; Pinet et al., 2020). Africa's current generation of youth is characterised by its energy, determination and acquaintance with digital technologies. They are better placed to shape their continent's transformation than generations of African youth before them (UNECA, 2014). However, without a conducive environment that includes skills building, young people will be unable to take full advantage of the opportunities the digital ecosystem has to offer in their region and beyond. Digital technologies have the potential to make up for the major development setbacks caused by Covid-19, but programmes, interventions and digital development must be youth-inclusive to be both effective and sustainable.

The findings and analysis of this briefing paper are based on insights from an online global consultation held on 14 July 2020 on Platform4Dialogue. Over 130 participants contributed to a series of online, text-based discussions, exploring young Africans' use of digital technologies in the context of the Covid-19 pandemic. They delved into youth activism and community engagement and questioned which digital skills are needed for youth to meaningfully engage in shaping our digital societies. Participants were selected via purposive sampling, considering the basis of their experience working with youth and digital technologies or by virtue of being young people themselves.

2 The youth digital divide

Getting basic internet access is just the first step. To participate in digital society you need an affordable quality connection, you need the digital skills to use the internet and you need to feel safe online. While Ghana has seen important progress, it is still the case that women here – and around the world – face a multitude of barriers preventing them from realising the internet’s full benefits (Chenai Chair, Web Foundation research manager for Gender and Digital Rights).

From a global view, digital skills are outlined as a specific target in the Sustainable Development Goals (SDGs), and are mentioned explicitly in Indicators 4.4.1 and 4.4.2 of SDG 4 or the education-focused goal (UNESCO and EQUALS Skills Coalition, 2019). Although SDG target 9c calls for a significant increase in access to information and communication technologies (ICT) that is universal and affordable in the least developed countries by 2020, the Covid-19 pandemic has highlighted digital exclusion and how far behind countries are in reaching this goal. As services have increasingly moved online (including public services, business transactions and access to information), unequal and inequitable meaningful access and use of digital technologies for youth in sub-Saharan Africa has been laid bare (UNECA, 2014). This youth digital divide is further accentuated when viewed in terms of skills, gender and language barriers.

Calls to tackle the digital divide from the international development community are not new but have unsurprisingly gained prominence in recent months due to the pandemic. In an online high-level meeting on digital inclusion, UN Secretary-General António Guterres stated that bridging the digital divide ‘could become the greatest equaliser in promoting equality’ and called for links and partnerships to be strengthened across sectors ‘to rally investment for the ambitious goal of connecting half the world to opportunities’ (United Nations Press Office, 2020).

Aside from the need for digital skills (explored later in this paper), several other issues were raised by consultation participants as challenges or impediments to technology use in the region. Half of the policy measures towards digital services (129 in total at the time of writing) are dedicated to digital infrastructure (including affordability and network expansion) across sub-Saharan Africa – an increase in response to the Covid-19 pandemic (World Bank, 2020). Our findings highlight the multidimensional nature of the problem, which we explore below.

2.1 Access and affordability: setting the scene

Despite developments in digital technologies, their role is for the most part underexploited due to access and financial constraints. Although it is possible to use 3D printers to create personal protective equipment (PPE), to design data visualisations to share information, and to fundraise for campaigns (Kazeem, 2020), such opportunities can rarely be taken advantage of. Some

entrepreneurial youth have capitalised on this lack of access to spot business opportunities during lockdown, for example using their Wifi router as a paid hotspot for others. The pandemic has created new needs and is likely to generate new economic opportunities beyond the health crisis.

Many consultation participants mentioned how access to digital technologies varies across the region, and within national contexts. They also noted an unevenness between rural and urban areas, including access to internet-enabled devices, computers and data and with varying levels of affordability and quality. Participants raised concerns over assumptions and generalisations regarding the urban–rural divide, noting that, although access to technologies tends to be higher in urban areas, in some countries digital innovation has been observed to be growing in the agriculture sector and in rural areas. Marginalised ethnic groups also tend to be less likely to have internet access than their fellow citizens due to political bias in internet coverage allocation (Weidmann et al., 2016).

On the whole, unequal access to technology exacerbates existing inequalities. This is particularly acute for individuals at a young age such as children and youth. School closures due to the pandemic impacted over 1.29 billion students (74% of the world’s student population) including 297 million students across the African continent, making them even more vulnerable. UNICEF has calculated that approximately 500 million learners globally did not have access to any remote learning. Research found that, when schools were closed in low-income countries due to lockdowns, only 25% were providing remote learning opportunities (Tawil, 2020; International Finance Corporation, 2020).¹ Such issues must be addressed at scale in order to bridge coverage and usage gaps (see Box 1).

Box 1 Defining usage and coverage gaps

Usage gap: those who live within the footprint of a mobile broadband network but are not using mobile internet.

Coverage gap: those who do not live within the footprint of a mobile broadband network.

There are still 3.4 billion people who live in an area covered by a mobile broadband network but who are not using the mobile internet – the usage gap. In fact, the usage gap is now 6 times larger than the coverage gap (GSMA, 2020d: 5).

Source: GSMA

¹ See also <https://gigaconnect.org/>

Although inadequate digital infrastructure was observed as a hindrance to digital inclusion, the issue of affordability was also prevalent, with several participants mentioning the high costs of internet and data bundles, which affect those in lower income brackets. Data costs vary enormously across the region with 1GB costing up to \$27 in Benin and Malawi, but less than \$1.5 in Kenya, Egypt, Zambia and Tunisia (Ang, 2020). While investments in digital infrastructure are urgently needed to help lower costs, other routes can also be explored such as lowering internet taxes (Stork et al., 2020), seeking alternative business models for data subsidies, and innovations in low tech data access not necessarily requiring investment in expensive phone masts and base stations.

During the pandemic, participants observed how mobile network companies across the region engaged with governments to lower or eliminate mobile money transaction fees and data fees on sites of public importance (e.g., for health or education). This proved important in creating an environment that increased market competition for telecoms to lower the price of data and offer different packages (other than daily, weekly or monthly).

During the early stages of the pandemic, almost all the telcos in Ghana implemented some cheaper internet charges to help the citizens. The mobile money transactions were done freely without charges (Abdulmanal Setor Tekpor, IT technician, Ghana).

Also some telecommunication providers [in Nigeria] increased their data volume to enable people to have access to the internet for instance a data plan of 1.2GB for a thousand naira was increase to 1.5GB for the same price (Solomon Tijani, Librarian, Nigerian Institute of Social and Economic Research, Nigeria).

In South Africa, state-owned tertiary institutions are facilitating at least 30GB of data for every student during the pandemic. However, this does not guarantee that every student has a gadget to access that data and use it productively to catch up on their modules (Muneinazvo Kujeke, Research Officer, Institute for Security Studies, South Africa).

One participant noted how Nigerian youth actively took part in campaigning efforts to lower prices:

Recently, in Nigeria, and most likely as a spillover of this pandemic, young people led the charge with demanding that the Nigerian government regulate the price of internet data (Consultation participant, founder of a youth-focused organisation, Uganda).

However, this alone did not solve the issue of access to devices that people need to use the internet. In some instances, participants gave examples of governments and organisations providing technologies directly to people as well as highlighting the importance of low costs and free internet as ways to boost digital inclusion.

Maybe some governments should explore a way to launch huge programmes of distribution of smartphone to the most vulnerable youth people. In Cameroon for example, since the

year 2019, the Cameroonian Head of State has launched a special programme in the higher Education level of ‘one student, one computer’. All the students in universities and institutions of higher education were granted a computer (Jean Emile Nobola, PhD candidate in Public Administration Political Science, Ankara Hacı Bayram Veli University, Turkey).

There are pros and cons to device distribution. Existing evidence in refugee contexts discourages free distribution of low-quality handsets, which can lead to market distortions and further accentuate access gaps (GSMA, 2020c). The technical challenges faced by the One Laptop Per Child (OLPC) programme in Rwanda is another example of the difficulties surrounding distribution. However, other government-led initiatives such as Kenya’s Digital Literacy Project and the small classroom programme (Government of Rwanda, n.d.) have emerged to improve youth digital literacy and access to digital equipment in the classroom.

Government or private organisations can provide either PC or Android for parents either free or on a ‘no-interest’ ground. Government could also partner with relevant network providers for some hours of free internet access per day (Victor Uduah, secondary school teacher, Nigeria).

Emerging services such as M-Kopa’s innovative pay-as-you-go and rent-to-own financing models for phone handsets ease mobile phone access by allowing users to pay in instalments while using the device.

2.2 Young women’s access to technology

Women tend to have lower ICT skills and be disproportionately targeted by internet crimes or online gender-based violence (GBV), hence the need for particular attention on digital competences for women to ensure safety both on- and offline (UNESCO and EQUALS Skills Coalition, 2019; Bester et al., 2020). Globally, men are 21% more likely to have access to the internet than women, with the gap increasing to 52% in the least developed economies (World Wide Web Foundation, 2020). Even as women are gaining more access to the internet, they face additional barriers preventing them from fully participating, including social norms and family approval (ibid.). Female technology users are more likely to have to borrow devices from male household members, who often control and monitor their use (GSMA, 2015).

A majority of primary and secondary schools in rural Africa, for example, do not have connectivity or ICT equipment, and travelling outside of the community to find a location to connect to a network is expensive for most youth and in many cases, not possible or safe for girls and young women (Consultation participant, local government ICT director, Kenya).

New research on women’s digital rights draws out some recommendations to close the gender digital divide (World Wide Web Foundation, 2020). These include:

- encourage the tech sector to collect and publish the gender gap rate;

- shift from the concept of ‘basic internet access’ to ‘meaningful connectivity’ (see Box 2) and adopt it as a target for internet use to tackle the gender gap;
- promote digital skills and ICT education for women and girls;
- support women’s participation in technology design and development, as well as local content creation and ICT innovation; and
- safeguard the online privacy of women and girls (ibid.).

These concepts align closely with existing literature classifying ‘first-order’ and ‘second-order’ digital divides (see Box 2).

Box 2 Digital divides and meaningful connectivity

‘First-order’ digital divides focus on access.

‘Second-order’ digital divides focus on meaningful use.

The Alliance for Affordable Internet (A4AI) defines ‘meaningful connectivity’ as being able to use the internet every day through an appropriate device with enough data and a fast connection.

Sources: van Deursen and van Dijk (2019) and A4AI (n.d.)

In terms of content creation, some organisations affirm that ensuring more content that is female-led could help to avoid it being gender-biased (UNESCO and EQUALS Skills Coalition, 2019). Training aimed at women human rights defenders, such as that led by Safe Sister in East Africa, which tries to improve online security and reduce online GBV, represent examples of good practice for digitally active young women and encourages those who are offline for privacy and security reasons to be connected.

2.3 Language

Language constitutes a barrier for digital inclusion and innovation; many digital technologies are produced for a Western audience, with English as the default language (UNECA, 2014). Participants in the consultation noted the lack of technology programmes catering to local contexts and languages, with one participant mentioning the need for more collaboration between technology developers and local linguists:

I strongly advocate for the technology programme writers to work with local linguists so that the technologies can be translated into local languages and expand the talent across many communities who are not able to read or write in English (Daniel Njoroge Karanja, researcher, lecturer and mediator in international conflict resolution, St Mary’s University, US).

It is therefore important to embed local languages in educational systems and curricula and include local linguistics from the outset to co-create technology solutions that are tailored to specific local contexts.

Beyond local linguistics, co-creation and localisation must be embedded at all stages of the innovation cycle, from design to outreach and marketing, as demonstrated by Localization Lab.² This is echoed by calls from multilateral agencies and organisations who advocate for the provision of science, technology, engineering and mathematics (STEM) education in local languages to better utilise local and tacit knowledge, in addition to improving English language skills among African youth (UNECA, 2014).

Finally, the quest for youth-centred digital ecosystems in Africa must embed language, principles and ideals that challenge current harmful narratives about and within the African continent that largely draw from colonial regimes (Curran, 2020). Internationally driven initiatives must move away from the white saviour complex and acknowledge the systemic racial inequality and exclusion driving development and technological interventions. Young people in the African continent are well placed to share their aspirations and ideas of how to do this when given a seat at the decision-making table (AU, 2020; We Robotics, 2021).

2.4 Disability

There are concerns around accessibility and the digital inclusion of people with disabilities. People with disabilities globally tend to have much lower levels of mobile and smartphone ownership, and are less aware of mobile internet or perceive it as less beneficial compared with non-disabled persons. This is primarily due to literacy and digital skills, affordability and perceived relevance barriers (GSMA, 2020e). However, people with disabilities who own mobiles can have comparable and sometimes even better usage of mobile internet (ibid.). Consequently, creators of digital technologies should consider disabilities that affect users' capacity to meaningfully utilise them, such as visual or hearing impairments. Visually impaired persons from indigenous communities want to explore new technologies, but if they remain unavailable in their own languages and are not accessible to them this could become another aspect of their lives 'where they are forced to assimilate to the cultural and linguistic context of the majority population' (Minority Rights Group International, 2020). Co-creating technologies by using assistive technology (AT) with persons with disabilities could further their inclusion in society while also widening tech companies' customer base. Initiatives such as the youth-serving Resilient Urban Mobility Hackathon held in Sierra Leone focusing on vulnerable groups in the transport sector (Arroyo Arroyo et al., 2019) or Ghanaian tech company Tech Era offer some examples of impact involving youth as well as young persons with disability in the design of AT.

2 See www.localizationlab.org/scroll-down

2.5 Awareness

An issue raised in the consultation was that of exposure to digital technologies as well as an understanding or awareness of their potential benefits. These issues are often overlooked as concerns and efforts concentrate on supply (e.g. improving infrastructure, providing equipment, ensuring affordability), but to boost demand it is important to consider barriers beyond cost. One study on the gender digital divide, for example, noted that ‘lack of understanding, interest or time was more commonly cited than affordability or availability as the reason for not using the internet’ (UNESCO and EQUALS Skills Coalition, 2019). An individuals’ interest and perception of need are both linked to the skills they have – people with little experience of using digital technologies tend to underestimate their benefits and utility (ibid.). However, personality traits and aspirations will ultimately influence young people’s use of digital technologies.

Not everyone understands what technology can do for them. Not many people will understand the kinds of information that can be accessed or delivered through a mobile phone or over the internet, or how this information can be used to improve lives and livelihoods (Consultation participant, local government ICT Director, Kenya).

For some it may not be a question of exposure; their low interest or resistance to using ICTs can be related to personal or cultural beliefs. Some communities or individuals may consider, for instance, the internet as a tool that could potentially negatively impact them. Inclusion programmes that work with individuals or communities holding such beliefs should carefully design implementation strategies and prioritise community-led designs, while being aware of what their funding and their organisation represent to those they seek to serve.

Is it anything to do with any cultural beliefs (e.g., some rural communities think internet can be seen as evil or a way to negatively impact the community so they may forbid it). Once there is a understanding and it is agreed that is the best way for the youth (not just a Westerner deciding this is best but the community want it as well) then educate them and empower them to use it and provision to teach other people in the community (Sarah Boateng, Founder, Investing in Girls Education in Africa (IGEA Enterprise), Ghana).

Technology itself can facilitate the communication of opportunities and ideas that could benefit communities, for example by raising awareness about how information can realistically improve lives and livelihoods, particularly for youth. There is a role for young people who already use ICTs to advance digital inclusion in their communities. Their skills and motivation could be further exploited by local governments and civil society organisations (CSOs), for example in delivering informal training and sharing their knowledge with their community about how to use technology for productive activities. Such actions are welcome, especially in response to youth economic hardship and limited job opportunities during the pandemic, but they could potentially be sustained if done continuously and systematically.

Community youth who can apply the use of this technology should offer community service by teaching members of their community how to use technology to enhance their living especially during and after this Covid-19 pandemic (Victor Uduah, secondary school teacher, Nigeria).



Volunteers at the Lagos Food Bank Initiative carry out community engagement work in Ikotun, Lagos, Nigeria, 2020. Photo credit: Oluwafemi Dawodu/Shutterstock

3 How Covid-19 has changed technology use by young people in sub-Saharan Africa

3.1 Impact of Covid-19 lockdowns on youth lives and livelihood

While youth have been disproportionately affected by the above-mentioned effects of Covid-19, segments of youth including young women, younger youth and youth living in lower-income countries remain most vulnerable (ILO, 2020). Youth and women, who are more likely to be in less skilled or secure jobs in sectors most impacted by the pandemic, were the first to be hit by unemployment and wage losses (ILO, 2020). These effects have been felt especially by groups such as youth refugees, who rely on humanitarian and development programmes as well as community-based businesses and activities including savings and loans groups, have also seen increasing vulnerability:

I can say in particular lives of both poor and refugees are more affected since majority depend on daily struggle to survive for basic needs. Youth and women programmes which used to help them were suspended due to the pandemic and there were restrictions. E.g. women circles for savings and loans were no longer progressing due to restrictions and lack of financial and participation in the groups, business and small-scale initiatives collapsed as a result of the pandemic (Anonymous consultation participant).

Social distancing measures have disrupted existing social practices and considerably altered the social fabric of African youths' communities. The toll on young people's mental health in sub-Saharan Africa has been underestimated. Current funding that has been shifted to the Covid-19 response will undoubtedly result in gaps that are further accentuated after the pandemic, especially around mental health and youth capacity to respond to shocks (UN, 2020a). Psychosocial services need to be strengthened now and continued after the pandemic (Semo and Frissa, 2020). Digital technologies have already allowed youth to respond to some immediate needs such as gathering health information, keeping in touch with their support networks and accessing mental health information and support. However, internet-based technologies could be further leveraged by young entrepreneurs to complement governments' (see for example Department of Social Development, n.d.) and development actors' support lines to promptly respond to these demands at scale and in a cost-effective way.

The mental health problems that's been generated by Covid is worrisome. I believe that there's opportunity to expand access to care by leveraging web-based and social media

technologies to scale up access. Youths hold the key here, all that's required is support to youth entrepreneurship to design user-friendly software/apps that's sustainable to reach millions (Dr Rashid Raji, Administrator, Citizen Wellness & Advocacy Foundation, US).

The Covid-19 pandemic has also triggered youth into adopting new learning and economic models that have shifted from analogue to digital, with mobile phones as the 'centre of gravity'. Examples of how young people have used mobile phones for productive activities include building a customer database to carry out financial transactions, organising the transportation of products and accessing markets.

In all walks of life young people have mobilised and played a critical role in the Covid-19 response; the health sector has become the largest employer of youth globally (Compact for Young People in Humanitarian Action, 2020). The pandemic has also given rise to a significant growth of youth-led community engagement and activism that often blends online and offline approaches. Online activism in particular has increased as a result of social distancing measures. These developments have accelerated the need for youth to acquire the relevant skills and knowledge to fully participate in their societies and to be able to protect themselves from dis- and misinformation, as well as other online risks such as cybersecurity or online GBV.

3.2 Youth civic participation, activism and technology

Technology use for the common good is a growing field globally. Innovations in civic technology are facilitating greater citizen-government engagement and accountability mechanisms, including through SMS-enabled chatbots and inclusive online platforms, cross-regional fact-checking initiatives, journalism labs and community reporting tools for informal settlements (Civic Tech Innovation Network, 2020). Africa has a long history of youth activism, for example in liberation movements in the 1960s and 1970s, and youth activism and campaigning are not new (Bosch, 2016). However, during the pandemic this is taking new forms and using different platforms. African youth predominantly use social media platforms such as WhatsApp (Hassan and Hitchen, 2020), Facebook, YouTube (Ntarangwi, 2020), Twitter (Obia, 2020), Instagram and TikTok (Campanella, 2020), as well as tools designed for low-end phone and limited bandwidth,³ to connect, organise and influence. These trends can also be observed in refugee contexts before Covid-19. When individuals' social ties are heavily fragmented as a result of displacement, social media helps foster civil society.

New models of collaboration between youth, international non-governmental organisations (INGOs) and social media platforms are emerging (Plan International, 2020b). Social media gives youth the power to raise awareness about their community priorities, meaning that, as new citizen reporters, they can be key in connecting their community with national and international institutions. They can also advocate for crystallising a longed-for inclusive knowledge exchange in

3 See www.grassroot.org.za

remote areas (Compact for Young People in Humanitarian Action, 2020). In doing so, youth are progressively institutionalising collaborative decision-making and facilitating their communities' integration into institutions through intergenerational co-leadership by demonstrating the need for their inclusion and active engagement in public services and governance processes (African Leadership Institute and African Union's Office of the Youth Envoy, 2020).

Young people have also used intergenerational digital storytelling to build trust and shift narratives between youth and older generations by spreading messages and photos on social media channels. Such blended approaches to storytelling have the potential to reach out to those less connected through digital technology. For instance, a consultation participant shared the example of a radio drama series developed in partnership between Tshepo 1 Million and Harambee on how to remain safe and supported during Covid-19. It was then translated into a comic book and shared on Facebook to accommodate for WhatsApp sharing by youth in South Africa.

Youth in turn serves as peace ambassadors who are to organise intergenerational story telling (IGST) in their communities, where older members of the communities are invited to share stories of how things were and used to be in the past, to change narratives and build trust among young people, these ambassadors have been organising the IGST and sharing photos on social media, preaching the message of peace on their social media platform (Alichu Ogbu, Monitoring and Evaluation Officer, Youth Initiative Against Violence and Human Rights Abuse (YIAVHA), Nigeria).

By applying a combination of online and offline approaches, youth-focused interventions can maximise their reach. Youth outside the community of intervention can be inspired to adopt similar approaches and change their perceptions of and attitudes to technology. The geographical reach of technology and its ability to connect youth beyond borders can snowball ideas and concepts beyond its initial audience.

Structural barriers to community engagement with digital technologies do remain, however, and can be accentuated by the urban/rural divide. However, there are also divides within urban centres and between youth activists themselves depending on whether they operate from informal settlements or other challenging environments. There are additional issues for refugees and marginalised populations with regards to technology use for identification, such as biometric or SIM card registration, which risk further excluding already vulnerable populations (Madianou, 2019). Using technology to break the 'continental divide' and facilitate exchanges between youth, particularly through youth-led movements, could increase cross-border youth collaboration towards inclusive growth and civic affairs.

Youth activists in urban areas do not connect enough with youth activists in rural areas and refugee camps. There is this tendency for us to stay in our micro communities or issue areas.

Going forward youth activists and movements need to cross these borders and collaborate and stand in solidarity with each other more (Syeda Re'em Hussain, Leadership Lead, Afresist Platform, Kenya).

3.3 Youth technology use in the (mis- and dis-) information age

The Covid-19 crisis has emphasised the need for reliable and timely information (see Box 3). Television, WhatsApp groups and Facebook were all more popular with youth seeking Covid-related information than official websites and health bodies (AU, 2020; AU Youth Envoy, 2020). Many organisations have adapted their communication channels and strategy in response to youth engagement and access to technology platforms.

Box 3 Defining mis- and disinformation

Misinformation is false and often harmful information, which is not shared with malicious intent. Disinformation is false and malicious information, which is shared deliberately to cause harm.

Source: Tanner (2020: 3).

At first, we used Zoom and streamed live sessions on our Facebook pages. We discovered that we were not getting as much engagement from our target audiences – out of school youth – as anticipated, and those looking to join the workforce. We continued with the sessions but instead put more effort towards transcribing them into blogs on our website and on medium that we shared on various platforms, and audio recordings that we distributed widely on WhatsApp platforms within our networks (Consultation participant, practitioner, Uganda).

We have also found that if we post a picture on Facebook we also write out the content in the post description so that those who can't download the pictures can still engage with what is shared (Dr Rashid Raji, Administrator, Citizen Wellness & Advocacy Foundation, US).

At the same time, social media also created a barrier to many young people accessing accurate and timely information, through misinformation and rumours, sometimes communicated by representatives in charge of managing the crisis (ibid.).

Young Africans have taken advantage of creating WhatsApp groups. These, to some extent help spread news, though sometimes fake news too. It is a cheaper and more accessible way. However, these groups are essential to update young people on the crisis and developing trends to stay safe (Muneinazvo Kujeke, Research Officer, Institute for Security Studies, South Africa).

Prior to the pandemic, misinformation in African countries had been shaped by extreme speech resulting in violence or the spread of ‘racist misogynous, xenophobic messages’. These online violent communications often use messaging platforms including Whatsapp, and appear to be correlated with lower levels of trust in social and national media (Wasserman and Madrid-Morales, 2019). The fact-checking, crowd-sourcing organisation Africa Check offers guidance on how to spot misinformation. A consultation participant shared how valuable Africa Check’s system is after having used their resources as part of their work with youth:

They [Africa Check] have a WhatsApp line which people can submit articles or news pieces to, which they use as a way of gathering what is floating around the world of social media. They then investigate these articles and release a weekly bulletin covering answers to the week’s most popular submissions on this WhatsApp line (Fuaad Coovadia, Pathway and Networks Manager, Harambee Youth Employment Accelerator, South Africa).

However, efforts to counter misinformation are limited by the scale of the issue, and the role and responsibility of social media platforms is being called into question:

These platforms must actively work to make sure misinformation is removed or challenged as soon as it starts to go viral, for example Twitter recently added a fact checking notification to some of Trump’s tweets and allowed users to read the actual guidelines regarding postal voting (Denis Kirya, Kantar Market Research Group, UK).

While this is not unique to the African continent or to youth, African youth have a role to play in the lifecycle of disinformation from its production to its transmission, reception and reproduction. Young people’s visual culture represents an entry point to meaningfully participate in addressing those challenges.

In such context, digital citizenship skills or the understanding of ‘values and norms around responsible and appropriate use of digital technologies’ (Cortesi et al., 2020) are increasingly important for youth to navigate the world in which they live. Being able to verify a source, a piece of information or an organisation is becoming necessary for youth to not only be safeguarded against cybercrimes and internet fraud, but also to meaningfully participate in the digital economy and social life of their country.

A lot more training is required to equip DT [digital technologies] users to be alert to such fraud and avoid consuming them as gospel truths (Consultation participant, researcher, Uganda).

For youth to be equipped with the appropriate digital citizenship skills and to engage in the digital space safely and actively, policies facilitating youth digital engagement in both creative and participatory ways must be tailored to young people’s own local contexts and reflect their lived experiences and aspirations (Cortesi et al., 2020). Ultimately, social media reflects the environments in which it is embedded. Hence, information, media ecosystems and sociopolitical contexts greatly affect the type

of solutions needed and must go hand in hand with digital literacy efforts. Applying a multi-stakeholder peacebuilding lens to address the ‘weaponization of social media’ (Mercy Corps, 2019) and monitoring the role social media plays in the wider information ecosystem (Fondation Hironnelle, 2019) can inform some of the strategies to address the roots and address the effects of mis- and disinformation.

3.4 Youth-led digital innovations – the power of challenges

During the pandemic, challenges (UNICEF, 2020b), competitions, hackathons and ideation campaigns enabled digitally savvy youth to contribute to creating innovative solutions. These events usually took place online via bespoke platforms (challenge platforms) and were promoted through social media (Joseph, 2020). Examples of this reported by consultation participants include a virtual hackathon led by the government of Nigeria to find innovative technology solutions during the pandemic and the Harambee Youth Employment Accelerator Lockdown challenge,⁴ an automated service accessible via SMS, Whatsapp and Facebook that allowed young people to commit to one way to be Safe, be Smart or be Kind on a daily basis during lockdown. Such challenges can easily attract youth attention and go viral if they are well designed, resonate with youth and are communicated via the appropriate channels as illustrated by the Lockdown challenge, which had reach outside its targeted users:

If a young person agreed to commit, they would be sent a relevant collectable badge. They could also forward the challenge to their friends to be agents of change in their community. The service is very viral with 17% of users being from outside of our core network – so we assume they learned about the service from their friends (Amantle Mokubung, Campaign Manager, Harambee Youth Employment Accelerator, South Africa).

In Nigeria, the government, through NCC [Nigerian Communications Commission], has organised a virtual hackathon to engage the youth in coming up with technology solutions to aid in containing the pandemic and reaching out to a wider community (Solomon Tijani, Librarian, Nigerian Institute of Social and Economic Research, Nigeria).

Governments and international organisations have expanded these efforts in East Africa with the recent launch of GeoHub, a regional innovation centre for African youths (Business Daily, 2020) as well as Kenya’s Ajira Digital Programme,⁵ UNICEF’s Generation Unlimited Youth Challenge (UNICEF, 2019) and the social innovators’ youth-led movement of the Digital Opportunity Trust (DOT).⁶ Such youth-targeted initiatives could play a role beyond the pandemic to help respond to

4 www.facebook.com/harambee.youthemployment/photos/take-the-lockdownchallenge-today-every-day-we-want-to-help-you-commit-to-one-thi/2890925954348585/

5 <https://ajiradigital.go.ke/home>

6 www.dotrust.org

the education and employment challenges of the African continent, but must be accompanied by structural changes to address systemic inequalities, including between young women and men, and the mismatch between the supply and demand sides of employment.



Students use their mobile phone and computer devices in a classroom, Nigeria, 2020. Photo credit: Confidence Marshall Nzew/Shutterstock

4 Skills needed to navigate a connected, increasingly digital world

As the world's connectivity and digitalisation continue to intensify, so do the demands of work and life. Covid-19 has accelerated the need to reskill the global workforce. Youth are often perceived as 'digital natives' and are assumed to inherently possess the skills required to participate in and progress their digital societies and economies. As well as not having access to basic devices and data, the digital divide also extends into skills – many youths across Africa do not have access to the training for key skills (see Box 4) that they need to be prepared for life and work in a digital world. Certain subsets of digital skills involve advanced technical acumen, but there remains a steep challenge regarding the fundamental digital skills that are essential for all young people's preparedness and navigation through a widely digital-dependent social and economic life. For instance, a qualitative study and test, led by Cenfri, that assessed youth digital skills in an informal settlement in Nairobi found that the vast majority of young people did not have the sufficient digital skills in order to access entry-level economic opportunities in the digital economy with test results averaging 55%, a mark far from the 80% normative framework benchmark (van den Berg and Johnston, 2019).

Box 4 Core life skills

Examples of core life skills include personal hygiene management, menstrual hygiene management, knowledge on sexual reproductive health, legal and citizenship rights, and understanding of notions of gender and social norms and financial literacy.

Source: Pinet et al. (2020b)

While necessary specific knowledge and skillsets largely depend on the needs of industries, often foremost missing are key life skills, soft skills and 21st-century skills. However, young people are speaking up⁷ about this lack of support. Training in key digital skills is consistently

7 During African Union's Africa Youth Month, November 2020, ODI launched a social media campaign through the Youth Forward initiative. Young leaders, some of whom took part in the July consultation, were asked 'what type of skills will be most important for youth to access jobs or improve their businesses in the coming decade?'. The campaign featured: Deborah Saki, Founder of Oniocha Books and a Member of WEF's Global Shapers Community in Ghana; Joseph Ngochi, Founder and Director of Boys Africa Foundation in Kenya; Maman Daouda Boukary, President of the Youth Council of the Conseil de l'Entente in Niger; Nandini Tanya Lallmon, lawyer and entrepreneur, Global Peace Chain in Mauritius; Sarah Boateng, Founder of Investing in Girls Education in Africa (IGEA Enterprise) in Ghana; and Vicky Aridi, Youth Focal Point of UN Joint-SDG Fund and Co-founder of the Policy Act Initiative in Kenya.

overlooked and underinvested in, despite being critical for youth in their pursuits to thrive in life, work, entrepreneurship, community development and social activism (Pinet et al., 2020). Furthermore, it is important that these skills are grounded in a broader skills-building framework, to enable young people to seize opportunities in the digital ecosystem. Harnessing these crucial skills enables youth to enact their individual principal rights and soft skills – such as confidence, communication, leadership, advocacy and storytelling – enabling them to tackle social issues in their communities.

Beyond the need for youth to cultivate core life skills for their own empowerment, employers comment that soft skills are often missing in today's graduates (see Box 5).

Box 5 Top seven soft skills young people are lacking

The African Institute for Mathematical Sciences (AIMS) lists the top seven soft skills which business leaders note are missing from young people: (1) initiative (2) problem-solving (3) self-awareness (4) collaboration (5) confidence (6) professionalism (7) conversational proficiency (AIMS). As can be understood, such key life and soft skills are paramount for young people to harness, regardless of the specific they pursue.

Source: consultation participant Charles Kimpolo, Director at AIMS, Rwanda

Other approaches categorise key skills for youth into four sets: behavioural skills (e.g. communication, creativity, leadership), analytical skills (e.g. writing, numeracy, critical thinking), technical skills (e.g. financial, accounting, STEM subjects) and digital skills (Sharma, 2020).

4.1 Digital skills for youth

Digital skills can fall into several categories including productive digital skills, e-leadership digital skills, consumer digital skills and developer digital skills (Bester et al., 2020). At the most central level, productive digital skills enable individuals to create content such as basic documents, presentations or spreadsheets; sell items online; and find work through online platforms, while e-leadership skills enable them to utilise digital technologies to conceive and implement business models and deliver goods. These skills facilitate income opportunities in digital economies, without having to acquire more technical or advanced digital acumen. Other frameworks such as the 'Skills for a Digital Age' not only outline the skills needed for the future of work but also innovative ways to deliver this training (Caribou Digital, n.d.).

Consumer digital skills are described within Cenfri's classification as the ability to browse and consume digital media, complete and submit online forms and make purchases or exchanges digitally (Bester et al., 2020). By applying critical thinking to media literacy (see Box 6) and

understanding digital identity, young people can better identify misinformation and address fraud as online consumers, as they increasingly interact with businesses and government services online. Furthermore, media literacy skills can empower youth to express themselves and to raise awareness around social issues that concern them and their communities (Rost et al., 2020).

Box 6 Data literacy and media literacy

‘Data literacy’, the ability to understand and interpret data such as statistics, is also essential in the digital ecosystem, with one consultation participant describing it as not necessarily just ‘being able to collect and analyse data, but rather understanding what kind of data a user is capable of generating, the value you get from having it, and the value that could be gained from combining with other data sources’. The same participant shared that for a young person trying to upskill, data literacy ‘can be demonstrated by a side project or case study that proves they’re able to work with some raw data, can summarise it and draw meaningful insights from it on their own’. Data literacy and data fluency can also help individuals to make sense of data in the media and avoid misleading statistics. Another consultation participant described an understanding of statistics as ‘useful for knowing the ways in which data can be misleading’ (survivorship bias, skewness, etc.) and how to prevent yourself from making erroneous data-based decisions.

Media literacy refers to one’s ability to consume and critically evaluate media content through different types of communication channels including newspapers, magazines, TV, radio, mail, telephone and the internet, and understanding the messages sent.

Source: authors

Youth often lack an understanding of how to most effectively manage and consume their mobile data, particularly when it comes to business-related activities. This can impact their ability to develop their customer base by accessing important information in real time. With both enhanced, equitable access to data and quality learning, more workers could optimise their usage of data and maximise opportunities from digital platforms.

We found some platform workers turn off their data to conserve data and battery, and in doing so miss out on jobs. For a lot of these workers internet packages were going unused because their expiry dates were reached before all the data had been consumed. When we speak about digital skills, even this basic understanding of how to manage and use data bundles can be an issue (Annabel Schiff, consultant, Caribou Digital).

Finally, in this typology, developer digital skills are referred to as technical skills in data science, artificial intelligence or the creation of apps, programmes, cyber security systems and networks

(Bester et al., 2020). Just as for other specialised industries, acquiring such a set of digital skills requires technical training. However, educational frameworks such as @iLabAfrica (University of Strathmore in Nairobi) can help bridge the gap between employers and the education system by encouraging partnerships and boosting youth preparedness.

Despite increasing attempts from practitioners and education specialists to categorise and promote 21st century skills including digital skills (van Laar et al., 2020), a large number of youth leave education without acquiring those or being assessed against them. Research on 21st century skills assessment in nine sub-Saharan African countries highlights the absence of assessment tools deliberately capturing those skills (Kim and Care, 2020). However, it also shows the potential for those tools to be tweaked to adapt to these new skills.

The classifications differed and some are bundled so you could not tell what could be counted for ‘digital skills’, plus much of the upskilling seems to be done privately (either online for those who can do that, or in private coding academies, etc.). It is hard to get a clear picture on the completion of skills training (Isabelle Carboni, former Digital World Lead, Cenfri).

4.2 Learning and digital skills-building

Across different countries and community contexts, concepts such as digital citizenship, digital literacy and new media literacy are being used to group skills that youth need to make better use of digital technologies, as well as to organise them under educational programmes that can be implemented in formal, informal and connected learning environments (Cortesi et al., 2020). Community learning is one way to potentially engage youth in passing on their skills, while also providing jobs. As one consultation participant recommended: ‘government should use IT graduates or IT students or people [who] have knowledge, on how to use the digital platforms to teach others since there are so many graduates with no jobs’.

Youth need to be prepared to respond to the dynamic demands of employers in their context while on the job; this would reduce the portion of work outsourced to other countries due to skills shortages. For example, the potential to retain and grow South Africa’s share of digital and ICT services should not be underestimated (Harambee, 2020).

Political will and commitment to investments in making tools available for youth to be equipped with digital skills from primary through to secondary learning is critical. One suggested approach is to make technology classes mandatory at the secondary education level, to avoid the ‘secondary school trap’ that causes many girls to lose their interest in digital skills (UNESCO and EQUALS Skills Coalition, 2020). Integrating digital skills learning throughout secondary education would also require consistent and quality training of teachers. One consultation participant referenced the ‘non-adaptive curriculum’, wherein many academic institutions do not have the mechanisms or flexibility in place to regularly review their curricula and align their preparation of

youth to employers' needs. More adaptive curricula grounded in the reality of the fast-evolving job market, urgent teacher re-training and flexible pathways between different types of education have the potential to fill the skills mismatch (Mastercard Foundation, 2020).

On one side of the table we had Vice-Chancellors who are defending their curriculums, responding to business leaders' criticism as they who were complaining about the mismatch between the skills that students have upon their graduation versus the skills that are needed in the job markets (Charles Kimpolo, Director, AIMS, Rwanda).

Research also shows that there is potential for greater involvement by the private sector in digital skills-building throughout primary and secondary education and beyond.⁸ Employers can be passive or absent in the realm of skills-building and training young people as potential employees or when onboarding them. However, a growing number of digital platforms now bear the cost of building digital skills by organising internal or external bespoke corporate training programmes to upskill employees (Bester et al., 2020). Similarly, tech giants such as Amazon, Apple, Alphabet, Microsoft and Facebook have been taking the lead in providing digital skills and reskilling during the pandemic (Jones, 2020). This includes the development of services specifically targeting the African continent, such as Google's Digital Skills for Africa (ibid.). Regardless of which stakeholder is speaking, it was noted by several consultation participants that young people themselves, as 'key stakeholders in the conversation, were absent'.

4.3 Digital-friendly learning approaches

As a result of the school closures due to Covid-19 (Kuwonu, 2020), the use of mixed mass media such as TV, radio, printed media and mobile phones became the only way for students to continue to learn.

Platforms that can suit some people for example in my community that is at Swahilipot Hub we learn through Zoom and if you missed the classes then some link of the recordings is sent via team viewer (Anonymous consultation participant).

However, while this worked for some communities, ensuring inclusion and accessibility based on the format, content and language of the learning rapidly became a crucial concern to ensure learning continuity for all young people.

Uganda, educational interventions have mainly been channelled through television, social media, and via radio. Many youth in village do not have access to any of this because they are poor (Consultation participant, practitioner, Uganda).

The pandemic has also highlighted the need for teachers to be trained to adapt to the lack of face-to-face time with students when interacting through digital means. This includes supplying teachers with the funds and equipment necessary to deliver teaching online, which was raised by one consultation participant.

In the medium term, ‘mainstreaming formal education in technologies from the primary levels onwards, into educational systems’ (UNECA, 2014) will necessitate investments and commitments from governments as well as multi-level, cross-sectoral partnerships to continue improving infrastructure and equipment access, developing content and platforms for online education (Joynes, 2020). Additional research is needed to inform existing programmes and projects on how learners use their digital devices and engage with digital education interventions to take on greater ownership of the learning process and become more independent and disciplined (Moss Coflan et al., 2020).

In terms of learning approaches, global research shows that digital learning for young women needs to be enjoyable and practical, and that this group favour digital games (UNESCO and EQUALS Skills Coalition, 2020). The more skills are connected to real life issues, the more successful they will be among young women. For example, linking women-targeted technologies to health was found to be effective (ibid.). Hands-on education methods and digital games also seem to be best suited to transmit cultural ‘ideologies, teachings and aesthetics to indigenous youth’ (Minority Rights Group International, 2020). Through the technical development of video games, young people can contribute their unique cultural experiences, stories, practices and languages to build authentic representations of themselves and debunk stereotypes (ibid.).

During the consultation, a participant from the AIMS shared their experience of the Work-Integrated Learning (WIL) concept that embeds academic learning within its application in the workplace. Another highlighted the improved availability of inexpensive components and mini PCs and programmable microcontrollers by Raspberry Pi that are progressively bridging the accessibility gap for learners⁹. Uganda-based organisation Fundi Bots¹⁰ aims to bridging technological divides between the classroom and the real world by giving youth learners the practical skills and resources to enable them to become innovative ‘problem-solvers experienced and knowledgeable employees, and exceptional technology entrepreneurs’.

9 <https://www.raspberrypi.org/> and <https://www.arduino.cc/>

10 <http://fundibots.org/>

5 Conclusion: what is needed for youth to thrive in digital societies?

All children must be able to learn. The first step to ‘avert a lost COVID generation’ (UNICEF, 2020a) is to close the digital divide. While young people are a non-homogenous group with multiple identities, they must all be adequately prepared and equipped to cope with today’s (and indeed tomorrow’s) fast-evolving and uncertain environment. Young people must be deliberately involved in decision-making in order to ensure policies do not have unintended consequences. Thinking about the unintended impact of current policies on different youth populations by deliberately involving them in decision-making must be a priority to avoid exacerbating existing vulnerabilities. Frontier technology can redefine the parameters of what youth believe to be possible (Cortesi et al., 2020) and can inspire them by exposing them to innovators they can relate to and identify with (ibid.). As a consultation participant illustrates, organisations working with and for youth must become facilitators and adapt to young people’s language:

Brands and organisations need to meet young people where they are by rethinking the use of language (vernacular where applicable and catchy phrases and lingo that will get youth hooked) and by incorporating characters in their storytelling. Furthermore, organisations should move into becoming facilitators of conversations and providers of spaces in which youth can network and share solutions to youth challenges (promote the idea of creating solutions for youth by youth) (Amantle Mokubung, Campaign Manager, Harambee Youth Employment Accelerator, South Africa).

Given that youth represent the largest demographic in many African countries, their views must be better incorporated into national decision-making through fora such as youth councils and youth parliaments to progressively bridge the generational divide. An intergenerational lens must be applied by leadership to decision-making, and accountability mechanisms should be put in place (African Leadership Institute and African Union’s Office of the Youth Envoy, 2020). Government youth strategies must be leveraged for implementation (OECD, 2020a) and updated in view of the new challenges raised by the Covid-19 pandemic. There should also be a concerted effort to give youth voices the opportunity to speak out and be heard in such forums.

Young people need to be given the opportunity to participate in all aspects of the innovation cycle for the digital technologies and infrastructures that will affect them, from design to outreach and marketing. These approaches should take into account their views and local contexts and reflect their lived experiences, intersecting needs and aspirations, and go beyond short-term outcomes. Youth should also be empowered to use their digital skills to amplify the voice of their communities and contribute to the workforce effort to educate all generations to become digitally literate and act against disinformation and misinformation. This would go some way to improve the problem of rising youth unemployment in the continent, which has been exacerbated by the pandemic.

But before this can happen, basic needs such as access to electricity, basic literacy and economic constraints linked to the opportunity cost of learning have to be addressed. Digital literacy must be made mandatory in secondary education settings, and all groups, especially more vulnerable populations such as women and people with disabilities, should have access to the skills they need to prepare for life and work in a digital world. Technological access also needs to be addressed. Too many young people do not have regular access to the devices or data services necessary to be connected. Greater investments and incentives to telecoms and the private sector are needed to create opportunities to overcome the digital divide.

At the same time, coordination mechanisms between grassroots, local, youth-led organisations and established (I)NGOs, international organisations and governments need to be prioritised. As a consultation participant pointed out, newly established local efforts and needs for resources and information can be overlooked in favour of long-standing organisations:

We found that, as we are relatively new (operating since October [2019]), it has been difficult to engage with organisations as they usually choose long-standing organisations that have a bigger name rather than grassroots like us (Sarah Boateng, Founder, Investing in Girls Education in Africa (IGEA Enterprise), Ghana).

Innovative and unconventional partnerships rooted in indigenous youth knowledge must be designed to find rapid solutions and the financing needed to realise them. By capitalising on existing groups' understanding of their communities' needs with youth at the heart and sharing their knowledge and skills, these partnerships can create sustainable solutions to make the digital ecosystem an inclusive reality.

Collaborating with local inter-faith/faith-based institutions of learning could establish local enduring training centres firmly rooted in the local indigenous milieu which will not be suspect of 'western' cavalier interventionism (Daniel Njoroge Karanja, researcher, lecturer and mediator in international conflict resolution, St. Mary's University, US).

Partnerships can also help to put pressure on governments to improve internet access. Internet shutdowns and restrictions (AU, 2020) must be criminalised and governments perpetuating them held accountable. Global efforts to think about internet norms and rules and the roles of tech companies in enabling control of the internet are underway. There is a fundamental set of needs around meaningful access to the internet and children and youth need to learn 21st century and digital skills for the future of work through edtech.

As critical thinkers, change-makers, innovators, communicators and leaders, young people have a critical role to play in the achievement of the SDGs (UN, n.d). Covid-19 has provided a glimpse of the need for ethically designed and implemented digital technologies to provide education and

employment opportunities for youth as well as empowering them as future leaders. This means that lessons emerging from the unprecedented times we are experiencing should serve as ongoing and future changes for policy and practice to accomplish youth-centred digital ecosystems.



Bibliography

African Leadership Institute and African Union's Office of the Youth Envoy

(2020) *Greater inclusion of African youth in public service and governance*. Joint Report. Johannesburg: African Leadership Institute (<https://au.int/sites/default/files/documents/39165-doc-greaterinclusionofafricanyouthreportaugust2020.pdf>).

Amdeselassie, T., Emirie, G., Gezahegne, K. et al. (2020a) 'Experiences of vulnerable urban youth under covid-19: the case of domestic workers'. Policy brief. London: Gender and Adolescence: Global Evidence (<https://www.gage.odi.org/wp-content/uploads/2020/08/Experiences-of-vulnerable-urban-youth-under-covid-19-the-case-of-domestic-workers.pdf>).

Amdeselassie, A.T., Emirie, G., Iyasu, A., et al. (2020b) 'Experiences of vulnerable urban youth under Covid-19: the case of youth working in factories and industrial parks'. Policy brief. London: Gender and Adolescence: Global Evidence (<https://www.gage.odi.org/wp-content/uploads/2020/08/Experiences-of-vulnerable-urban-youth-under-covid-19-the-case-of-youth-working-in-factories-and-industrial-parks.pdf>).

African Union – AU (2020) *Facts and figures of Africa youth agency, challenges and recovery roadmap on Covid-19*. Africa Youth Lead Policy Paper. Addis Ababa: AU Commission (https://au.int/sites/default/files/documents/39662-doc-facts_figures_of_africa_youth_agency_challenges_and_recovery_roadmap_on_covid-19_au_1.pdf).

African Union Youth Envoy (2020) *How do African youth access Covid-19 information? A report of a survey carried out by the African Youth Front on coronavirus*. Survey Report. Addis Ababa: AU.

Alliance for Affordable Internet – A4AI (n.d.) 'Meaningful connectivity – unlocking the full power of internet access'. Webpage. A4AI (<https://a4ai.org/meaningful-connectivity/>).

Ang, C. (2020) 'What does 1GB of mobile data cost in every country?'. Visual Capitalist, 3 July (www.visualcapitalist.com/cost-of-mobile-data-worldwide/).

Arroyo Arroyo, F., Espinet, X. and Matekenya, D. (2019) 'Through technology and creative thinking, African youth are reinventing the future of urban transport'. World Bank blog, 19 September (<https://blogs.worldbank.org/transport/through-technology-and-creative-thinking-african-youth-are-reinventing-future-urban>).

Banga, K. (2019) 'Why skills development is key for digital transformation in Africa'. Insight Blog. ODI (www.odi.org/blogs/why-skills-development-key-digital-transformation-africa).

Bester, H., Carboni, I., van der Linden, A. et al. (2020) *Skills for a digital economy with a focus on Ghana, Kenya and Senegal*. Cenfri Report. Bellville: Cenfri (<https://cenfri.org/wp-content/uploads/2020.06-Skills-for-a-digital-economy.pdf>).

Bosch, T. (2016) 'Twitter activism and youth in South Africa: the case of #RhodesMustFall' *Information, Communication & Society* Volume 20, 2017 – Issue 2 Pages 221-232 (<https://www.tandfonline.com/doi/abs/10.1080/1369118X.2016.1162829>)

- Business Daily** (2020) 'Kenya to host innovation centre for African youths'. 23 November (www.businessdailyafrica.com/bd/corporate/technology/kenya-to-host-innovation-centre-for-african-youths--3206778).
- Cable.co.uk** (2020) 'Worldwide mobile data pricing: the cost of 1GB of mobile data in 228 countries'. Electronic dataset, Cable.co.uk (www.cable.co.uk/mobiles/worldwide-data-pricing/).
- Campanella, M.** (2020) 'TikTok in Africa empowers youth'. The Borgen Project, 29 June (<https://borgenproject.org/tiktok-in-africa/>).
- Caribou Digital** (n.d.) 'Skills for a digital age'. Webpage. Caribou Digital (www.cariboudigital.net/skillsforadigitalage/).
- Chebbi, A.** (2020) 'Covid-19 in Africa: youth perspectives - Aya Chebbi'. Blog. Mo Ibrahim Foundation (<https://mo.ibrahim.foundation/news/2020/covid-19-africa-youth-perspectives-aya-chebbi>).
- Chirisa, I., Mutambisi, T., Chivenge, M. et al.** (2020) 'The urban penalty of Covid-19 lockdowns across the globe: manifestations and lessons for Anglophone sub-Saharan Africa' *GeoJournal* (<https://doi.org/10.1007/s10708-020-10281-6>).
- Civic Tech Innovation Network** (2020) 'Looking to learn from African civic tech initiatives'. Webpost. Civic Tech Innovation Network (<https://civictech.africa/looking-to-learn-from-african-civic-tech-initiatives-2/>).
- Compact for Young People in Humanitarian Action** (2020) 'Covid-19: working with and for young people'. Guidance note. New York: UNFPA (<https://www.unfpa.org/sites/default/files/resource-pdf/COMPACTCOVID19-05.pdf>).
- Cortesi, S., Hasse, A., Lombana-Bermudez, A. et al.** (2020) 'Youth and digital citizenship+ (plus): understanding skills for a digital world'. *Berkman Klein Center for Internet & Society Research Publication No. 2020-2* (<http://dx.doi.org/10.2139/ssrn.3557518>).
- Curran, T.** (2020) *New narratives report*. Report. London: British Council (www.britishcouncil.org/sites/default/files/new_narratives_report.pdf).
- Deloitte and Global Business Coalition for Education** (2018) *Preparing tomorrow's workforce for the Fourth Industrial Revolution. For business: a framework for action*. Report. London: Deloitte (www2.deloitte.com/global/en/pages/about-deloitte/articles/gx-preparing-tomorrow-workforce-for-the-fourth-industrial-revolution.html).
- Department of Social Development** (n.d.) 'About us' [Webpage] (<http://gbv.org.za/about-us/>).
- Department for Transport** (2016) 'Road safety data'. Electronic dataset, Department for Transport, UK Government (<https://data.gov.uk/dataset/road-accidents-safety-data>).
- Donner, J., Dean, M., Osborn, J. et al.** (2019) *Platform-led transformational upskilling: how marketplace platforms can transform emerging markets by investing in skills development*. Skills for a Digital Africa White Paper. Farnham: Caribou Digital (www.cariboudigital.net/wp-content/uploads/2020/01/Platform-Led-Transformational-Upskilling-Whitepaper.pdf).
- Emirie, G., Iyasu, A., Gezahegne, K. et al.** (2020) 'Experiences of vulnerable urban youth under Covid-19: the case of youth with disabilities'. Policy brief. London: Gender and Adolescence: Global Evidence.

- Flood, Z.** (2020) 'How Africa's tech innovators respond to the coronavirus pandemic'. Al Jazeera, 15 April (www.aljazeera.com/economy/2020/4/15/how-africas-tech-innovators-respond-to-the-coronavirus-pandemic).
- Fondation Hirondelle** (2019) 'Study on sources and circulation of information in North Kivu, DRC'. 11 November (www.hirondelle.org/de/studien/1000-social-influencers-in-the-drc-our-joint-study-on-sources-and-circulation-of-information-in-north-kivu).
- Ghoshal, N.** (2020) 'LGBT Africans share challenges of life during pandemic'. Human Rights Watch, 19 May (www.hrw.org/news/2020/05/19/lgbt-africans-share-challenges-life-during-pandemic).
- Government of Rwanda** (n.d.) 'Social transformation' (www.gov.rw/highlights/social-transformation).
- GSM Association – GSMA** (2015) *Bridging the gender gap: mobile access and usage in low- and middle-income countries*. Connected Women 2015 Report. London: GSMA (www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/Connected-Women-Gender-Gap.pdf).
- GSMA** (2020a) *The mobile economy: sub-Saharan Africa 2020*. GSMA Report. London: GSMA (www.gsma.com/mobileeconomy/wp-content/uploads/2020/09/GSMA_MobileEconomy2020_SSA_Eng.pdf).
- GSMA** (2020b) *Powering youth employment through the mobile industry in sub-Saharan Africa by 2025: spotlight on Ghana, Senegal and Nigeria*. Report. London: GSMA (www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/01/CIU-Youth-Employment-in-SSA.pdf).
- GSMA** (2020c) *Mobile for humanitarian innovation*. Annual Report. London: GSMA (www.gsma.com/mobilefordevelopment/resources/mobile-for-humanitarian-innovation-annual-report/).
- GSMA** (2020d) *The state of mobile internet connectivity 2020*. Connected Society Report. London: GSMA (<https://www.gsma.com/r/somic/>).
- GSMA** (2020e) *The mobile disability gap report*. Report. London: GSMA (www.gsma.com/mobilefordevelopment/resources/the-mobile-disability-gap-report-2020/).
- Hassan, I. and Hitchen, J.** (2020) 'How hashtag activism moves offline in The Gambia'. Democracy in Africa, 29 September (<http://democracyinafrica.org/hashtag-activism-gambia/>).
- Harambee Youth Employment Accelerator** (2020) *Mapping of digital and ICT roles and demand in South Africa*. Final Report. Johannesburg: Harambee (<http://digital.harambee.co.za/>).
- Honwana, A. and Honwana, N.** (2020) 'How are the youth stepping up to Covid-19 in Africa?'. Africa at London School of Economics (LSE) Blog. LSE (<https://blogs.lse.ac.uk/africaatlse/2020/07/06/youth-stepping-up-covid19-africa-community-technology/>).
- Ichikowitz Family Foundation** (2020) *African youth survey 2020: the rise of afro-optimism*. White paper. Johannesburg: Ichikowitz Family Foundation (<https://ichikowitzfoundation.com/wp-content/uploads/2020/02/African-Youth-Survey-2020.pdf>).
- International Fund for Agricultural Development – IFAD** (2019) *Creating opportunities for rural youth*. 2019 Rural Development Report. Rome: IFAD (https://www.ifad.org/documents/38714170/41133075/RDR_report.pdf/7282db66-2d67-b514-d004-5ec25d9729a0).

International Finance Corporation – IFC (2020) *e-Conomy Africa 2020: Africa's \$180 billion Internet economy future*. Report. Washington DC: IFC (https://www.ifc.org/wps/wcm/connect/publications_ext_content/ifc_external_publication_site/publications_listing_page/google-e-conomy).

International Labour Organization – ILO (2020) *Youth & Covid-19: impacts on jobs, education, rights and mental well-being*. Survey Report. Geneva: ILO (www.ilo.org/global/topics/youth-employment/publications/WCMS_753026/lang-en/index.htm).

Jones, C. (2020) 'These tech giants want to help prepare the world for the future of work'. World Economic Forum, 22 October (www.weforum.org/agenda/2020/10/technology-giants-global-reskill-initiatives/).

Joseph, K. (2020) 'Youth-led solutions during COVID-19: harnessing social media'. World Bank blog, 13 July (<https://blogs.worldbank.org/jobs/youth-led-solutions-during-covid-19-harnessing-social-media>).

Joynes, C., Gibbs, E. and Sims, K. (2020) *Overview of emerging country-level responses to providing educational continuity under Covid-19: what's working? what isn't?* Report for EdTechHub (ODI). Reading: Education Development Trust (<https://edtechhub.org/wp-content/uploads/2020/05/whats-working-whats-not.pdf>).

Kaseje, N. and Kaseje, D. (2020) 'How youth and technology can drive Africa's Covid-19 response'. Blog. World Economic Forum – WEF (www.weforum.org/agenda/2020/05/covid-19-and-young-people-in-sub-saharan-africa/).

Kazeem, Y. (2020) 'How a youth-led digital movement is driving Nigeria's largest protests in a decade'. Quartz Africa, 13 October (<https://qz.com/africa/1916319/how-nigerians-use-social-media-to-organize-endsars-protests/>).

Kim, H. and Care, E. (2020) *Capturing 21st century skills: analysis of assessments in selected sub-Saharan African countries*. Report. Washington DC: Brookings (https://www.brookings.edu/wp-content/uploads/2020/09/UNESCO-Kim-Care_Africa-ministudy-2020.pdf).

Kuwonu, F. (2020) 'Radio lessons: in Africa schools are closed, but learning goes on'. Africa Renewal, 15 May (www.un.org/africarenewal/magazine/may-2020/coronavirus/africa-schools-are-closed-learning-goes).

Mastercard Foundation (2020) *Secondary education in Africa: preparing youth for the future of work*. Report. Toronto: Mastercard Foundation (www.issuelab.org/resources/35972/35972.pdf).

Mercy Corps (2019) *The Weaponization of Social Media: How social media can spark violence and what can be done about it*. Report. Oregon: Mercy Corps (https://www.mercycorps.org/sites/default/files/2020-01/Weaponization_Social_Media_FINAL_Nov2019.pdf).

Minority Rights Group International (2020) *Minority and indigenous trends 2020: focus on technology*. Report. London: Minority Rights Group International (<https://minorityrights.org/trends2020/>).

Moss Coflan, C., Chuang, R., Kaye, T. et al. (2020) 'Nine takeaways from our reviews of COVID-19 education responses'. EdTech Hub, 31 August (<https://edtechhub.org/2020/08/31/nine-takeaways-from-helpdesk-reviews-of-covid-19-education-responses/>).

- Mpungose, L.** (2020) 'Issues affecting young women in Africa during Covid-19'. Africa Portal, 24 July (<https://www.africaportal.org/features/issues-affecting-young-women-africa-during-covid-19/>).
- Neary, M.** (2020) 'How technology can help youth cope during Covid-19 crisis'. Blog. Martha Neary/Medium (<https://medium.com/psyberguide/how-technology-can-help-youth-cope-during-covid-19-crisis-1cf70eae1365>).
- Nganjo, M.** (2020) 'Covid-19 finds African youth capitalising on digital space'. Impakter, 29 April (<https://impakter.com/covid-19-finds-african-youth-capitalising-on-digital-space/>).
- Ntarangwi, M.** (2020) 'Social media and youth popular culture in Kenya can counter political exploitation'. LSE blog, 3 September (<https://blogs.lse.ac.uk/africaatlse/2020/09/03/social-media-youth-popular-culture-music-kenya-counter-political-exploitation/>).
- Obia, V.A.** (2020) '#EndSARS, a unique Twittersphere and social media regulation in Nigeria'. LSE blog, 11 November (<https://blogs.lse.ac.uk/medialse/2020/11/11/endsars-a-unique-twittersphere-and-social-media-regulation-in-nigeria/>).
- Organisation for Economic Co-operation and Development – OECD** (2020a) 'Youth and Covid-19: response, recovery and resilience'. OECD Policy Brief. Paris: OECD (www.oecd.org/coronavirus/policy-responses/youth-and-covid-19-response-recovery-and-resilience-c40e61c6/).
- OECD** (2020b) 'Young people and women hit hard by jobs crisis'. Data visualisation. OECD (www.oecd.org/coronavirus/en/data-insights/young-people-and-women-hit-hard-by-jobs-crisis).
- United Nations Human Rights Office of the High Commissioner – OHCHR** (2020) 'Covid-19 and young people: urgent action needed to stem “severe and long-lasting” impacts'. OHCHR News, 12 August (www.ohchr.org/EN/NewsEvents/Pages/Youth_and_COVID-19.aspx).
- Office of the Special Adviser on Africa – OSAA** (2020) 'Youth and creativity: the African response to Covid-19'. OSAA News. OSAA (www.un.org/en/africa/osaa/newsroom/2020/news5.shtml).
- Pinet, M., Boateng, E. and Sanyu, P.** (2020a) 'This is how the youth is mobilising tech during Covid-19'. Blog. African Arguments (<https://africanarguments.org/2020/05/activists-not-leaders-how-the-youth-have-used-tech-under-covid-19/>).
- Pinet, M., Unnikrishnan, V., Marc, L. et al.** (2020b) *Improving youth livelihoods in the Ghana cocoa belt: an impact evaluation of the MASO programme*. Working Paper. London: ODI (<https://www.odi.org/publications/17470-improving-youth-livelihoods-ghana-cocoa-belt-impact-evaluation-maso-programme>).
- Plan International** (2020a) 'African girls in the Covid-19 pandemic'. Policy brief. Woking: Plan International (<https://plan-international.org/publications/african-girls-covid-19-pandemic>).
- Plan International** (2020b) 'Instagram teams up with girl activists to address online harrasment'. 10 October (<https://plan-international.org/news/2020-10-10-instagram-teams-girl-activists-address-online-harassment>).
- Rost, L., Samuels, F., Leon-Himmelstine, C. et al.** (2020) *Digital approaches to adolescent mental health: a review of the literature*. ODI Working Paper. London: ODI (www.odi.org/publications/17423-digital-approaches-adolescent-mental-health-review-literature).

- Save the Children** (2020) *The global girlhood report: how Covid-19 is putting progress in peril*. Report. London: Save the Children (www.savethechildren.org/content/dam/usa/reports/ed-cp/global-girlhood-report-2020.pdf).
- Schiff, A. and Carboni, I.** (2020) 'How do we develop work-ready youth in a digital age?'. Blog. Annabel Schiff/Medium (<https://medium.com/caribou-digital/how-do-we-develop-work-ready-youth-in-a-digital-age-eoad006d162d>).
- Semo, B. and Frissa, S.M.** (2020) 'The mental health impact of the Covid-19 pandemic: implications for sub-Saharan Africa' *Psychology Research and Behavior Management* 2020(3): 713–720 (<https://dx.doi.org/10.2147/PRBM.S264286>).
- Sharma, A.** (2020) 'Understanding the skills-gap facing youth employment through the mobile industry'. Blog, 15 July. GSMA (<https://www.gsma.com/mobilefordevelopment/blog/2/understanding-the-skills-gap-facing-youth-employment-through-the-mobile-industry/>).
- Sharpe, E.** (2020) 'Covid-19 Policy Brief: misinformation and freedom of expression'. Web Foundation Covid-19 Policy Brief. London: World Wide Web Foundation (http://webfoundation.org/docs/2020/04/Covid-Policy-Brief-Misinformation_Public.pdf).
- Stockholm International Peace Research Institute – SIPRI** (2020) *Online identity formation: a growing challenge to peace*. Video recording of open session. SIPRI/YouTube, 20 May (www.youtube.com/watch?v=dbCwaM2okXQ).
- Stork, C., Nwana, H.S., Esselar, S. et al.** (2020) *Over the top (OTT) applications & the internet value chain: recommendations to regulators, policy makers and tax authorities*. Commonwealth Telecommunications Organisation (CTO) Study Report. London: CTO (<https://cto.int/wp-content/uploads/2020/05/CTO-OTT-REPORT-2020.pdf>).
- Tanner, J.** (2020) '10 things to know about misinformation and disinformation'. ODI Briefing Note. London: ODI (www.odi.org/publications/17330-10-things-know-about-misinformation-and-disinformation).
- Tawil, S.** (2020) 'Six months into a crisis: reflections on international efforts to harness technology to maintain the continuity of learning', Background Paper for Mobile Learning Week 2020. Paris: UNESCO (<https://unesdoc.unesco.org/ark:/48223/pf0000374561>).
- United Nations – UN** (2020a) *A UN framework for the immediate socio-economic response to Covid-19*. Report. New York: UN (<https://unsdg.un.org/resources/un-framework-immediate-socio-economic-response-covid-19>).
- UN** (2020b) 'Innovative tech and connectivity key to fighting Covid-19 in Africa'. UN Africa Renewal News, 29 April (www.un.org/africarenewal/news/coronavirus/innovative-tech-and-connectivity-key-fighting-covid-19-africa).
- UN** (2020c) 'Covid-19 halting crucial mental health services in Africa, WHO survey'. UN Africa Renewal News, 9 October (www.un.org/africarenewal/news/covid-19-halting-crucial-mental-health-services-africa-who-survey).
- UN** (n.d.) 'Youth – United Nations Sustainable Development'. Webpage. UN (www.un.org/sustainabledevelopment/youth/).

- UN Press Office** (2020) ‘Narrowing digital divide could become “greatest equalizer” in promoting equality, Secretary-General tells online conference, calling on nations to support youth’. Secretary-General Statements and Messages Press Release SG/SM/20225, 1 September (<https://www.un.org/press/en/2020/sgsm20225.doc.htm>).
- United Nations Department of Economic and Social Affairs – UN/DESA** (2020) ‘Protecting and mobilizing youth in Covid-19 responses’. UN/DESA Policy Brief #67. New York: UN/DESA (www.un.org/development/desa/dpad/publication/un-desa-policy-brief-67-protecting-and-mobilizing-youth-in-covid-19-responses/).
- United Nations Economic Commission for Africa – UNECA** (2014) *Youth and innovation in Africa: harnessing the possibilities of Africa’s youth for the transformation of the continent*. Summary Report of Online (D-Groups) Discussions. Addis Ababa: UNECA (www.uneca.org/archive/sites/default/files/PublicationFiles/youth_and_innovation_eng.pdf).
- UNESCO and EQUALS Skills Coalition** (2019) *I’d blush if I could: closing gender divides in digital skills through education*. Policy Paper. Paris: UNESCO (<https://unesdoc.unesco.org/ark:/48223/pfo000367416.page=1>).
- United Nations Population Fund – UNFPA** (2020a) ‘Covid-19 persons with disabilities: key messages’. UNFPA Infographic (www.unfpa.org/resources/covid-19-and-persons-disabilities-key-messages).
- UNFPA** (2020b) ‘My body, my life, my world through a Covid-19 lens’. Technical Briefs. New York: UNFPA (www.unfpa.org/featured-publication/my-body-my-life-my-world-through-covid-19-lens).
- UNICEF** (2019) ‘Generation Unlimited Youth Challenge launched in search of Kenya’s young innovators’. Press release, 21 November (www.unicef.org/kenya/press-releases/GenerationUnlimited).
- UNICEF** (2020a) ‘Averting a lost COVID generation: a six-point plan to respond, recover and reimagine a post-pandemic world for every child’. World Children’s Day 2020 Data and Advocacy Brief. New York: UNICEF (www.unicef.org/reports/averting-lost-generation-covid19-world-childrens-day-2020-brief).
- UNICEF** (2020b) ‘African youth offer solutions to COVID-19 challenges in their communities’. 29 September (www.unicef.org/esa/press-releases/african-youth-offer-solutions-covid-19-challenges-their-communities).
- van den Berg, I. and Johnston, Z.** (2019) *Tech savvy: skills for the digital economy*. Report on experimental qualitative research. Bellville: Cenri (https://cenfri.org/wp-content/uploads/2020.05_Techsavvy-report-on-experimental-qualitative-research.pdf).
- van Deursen, A.J.A.M. and van Dijk, J.A.G.M.** (2019) ‘The first-level digital divide shifts from inequalities in physical access to inequalities in material access’ *New Media and Society* 21(2): 354–375 (<https://journals.sagepub.com/doi/10.1177/1461444818797082>).
- van Laar, E., van Deursen, A.J.A.M., van Dijk, J.A.G.M. et al.** (2020) ‘Determinants of 21st-century skills and 21st-century digital skills for workers: a systematic literature review’ *SAGE Open* (<https://doi.org/10.1177/2158244019900176>).

- Wasserman, H. and Madrid-Morales, D.** (2019) 'An exploratory study of "fake news" and media trust in Kenya, Nigeria and South Africa' *African Journalism Studies* 40(1): 107–123 (<https://doi.org/10.1080/23743670.2019.1627230>).
- Weidmann, B.N., Benitez-Baleato, S., Hunziker, P. et al.** (2016) 'Digital discrimination: political bias in internet service provision across ethnic groups' *Science* 353(6304): 1151–1155 (<https://dx.doi.org/10.1126/science.aaf5062>).
- We Robotics** (2021) 'Foundation Botnar funds youth robotics across flying labs'. 20 January (<https://blog.werobotics.org/2021/01/20/fondation-botnar-funds-youth-robotics-across-flying-labs/>).
- World Bank** (2020) 'Global digital development policy response database'. Data visualisation and database. World Bank (https://dataviz.worldbank.org/views/DD-COVID19/Overview?:embed=y&isGuestRedirectFromVizportal=y&:display_count=n&:showAppBanner=false&:origin=viz_share_link&:showVizHome=n).
- World Wide Web Foundation** (2020) *Women's rights online: closing the digital gender gap for a more equal world*. Report. London: World Wide Web Foundation (<http://webfoundation.org/docs/2020/10/Womens-Rights-Online-Report-1.pdf>).