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The geopolitics of digital literacy and skills cooperation with Africa

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Compared to digital infrastructure or governance frameworks, digital skills and literacy are often overlooked in geopolitical discussions. Yet, they will have a huge influence on economies and societies. Governments across the world are trying to develop a whole-of-society approach to digital literacy and skills to accelerate their inclusive digital transformation, ensure sustainable and inclusive economic growth and equip their citizens with the competencies needed to respond to future challenges. China, the US and the EU each take different approaches to digital skills and literacy at home and pair them with different global engagement strategies.

This paper explores the way forward for digital skills in Africa, drawing on the examples of Rwanda, Senegal and South Africa. Africa's demand for investment in digital skills and literacy is particularly high because of its rapid demographic growth and wide digital divide. But, as the continent plays catch-up with major digital powers, it is vulnerable to harms such as online disinformation, cybercrime, data breaches and digital surveillance driven by commercial and state interests. Despite the growing threats that digital technologies present for individuals and societies, African governments have mainly focused on hard skills, while less effort and resources have been invested in soft skills (eg. media literacy, ability to navigate government e-services, social skills to behave online, et cetera), which are key to navigate the internet safely and responsibly.

This paper argues that African governments do not need to reinvent the wheel to develop comprehensive digital literacy frameworks and policies. The EU – whose approach to digital literacy articulated in its DigComp Framework combines both economic and citizenship aspects – can be a key partner.

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Acronyms

AfCFTA	African Continental Free Trade Agreement
AFD	Agence Française de Dévelopment
AfDB	African Development Bank
AI	Artificial intelligence
AU	African Union
BRI	Belt and Road Initiative
CCP	Chinese Communist Party
COMESA	Common Market for Eastern and Southern Africa
CSO	Civil society organisation
D4D Hub	Digital for Development Hub
DigComp	Digital Competence Framework for Citizens
EAC	East African Community
ECOWAS	Economic Community of West African States
EU	European Union
FYP	Five-Year Plan
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPI	Global Partnership for Infrastructure and Investment
GSMA	Global System for Mobile Communications Association
ICDL	International Computer Driving Licence
ICT-CFT	UNESCO ICT Competency Framework for Teachers
IoT	Internet of Things
ITU	International Telecommunications Union
MSMEs	Micro-, Small and Medium-sized Enterprises
NDICI	Neighbourhood, Development and International Cooperation Instrument
NEET	Not-in-employment-education-or-training
OECD-DAC	OECD Development Assistance Committee
PSET	Post-School Education and Training
PYEI	Presidential Youth Employment Initiative
REC	Regional economic community
SADA	Smart Africa Digital Academy
SADC	Southern African Development Community

SDG	Sustainable Development Goals
TVET	Technical and Vocational Education Training
UN	United Nations
UR	University of Rwanda
US	United States
USAID	US Agency for International Development

Executive summary

Governments across the world recognise the need for a whole-of-society approach to digital competence, from high-level ICT skills all the way down to the general workforce and population. In Africa, the development of technical digital skills in key sectors is a priority with the goal of industrialising and addressing the labour demands of the growing digital economy. This is reflected in the continental and country policy agendas and attempts to develop national digital literacy frameworks.

The EU, China and the US, who have developed their own approach to digital skills and literacy, attempt to influence the development of digital literacy policies and frameworks and contribute to the development of digital literacy in partner countries through official development and research cooperation and through efforts by their private sectors. However, these interventions predominantly focus on technical (hard) skills for employment and competitiveness – reflecting an overwhelming African priority and development need.

Despite a strong focus on hard digital skills to boost African industrialisation, there is a growing recognition that digital literacy (both in the formal and informal sectors) has to encompass elements of online safety, media literacy and online civic participation. For the EU, this is an important element for promoting a values-based approach in the age of geostrategic competition. There is a general consensus among the international policy community and academia that the EU's digital literacy framework, which encompasses a whole-of-society approach and combines hard and soft digital skills, is the globally leading normative framework. The EU has also taken on a leading role in investing in digital education and skills through global multilateral forums as well as through bilateral partnerships with African countries. The EU aspires to empower citizens and communities with the technical skills needed for a successful digital economic transformation while addressing media literacy and participation (digital citizenship) - key elements of its vision of a human-centric and values-based digital society. However, a look at the EU's cooperation with African countries on digital skills and literacy reveals some of the setbacks of a fragmented approach.

In this paper, we present three case studies - Rwanda, Senegal and South Africa - to illustrate the experiences of individual African countries in developing national digital skills policies and literacy frameworks and attracting investment for digital skills projects. **Rwanda** has taken a proactive, state-driven approach in close collaboration with local entities, the private sector and international partners. It also provides a strong academic offer in the field of computer science and ICT, attracting students from across the African continent to train in advanced and highly specialised digital skills. The private sector and civil society remain too weak to address the skills supply and demand mismatch. In **Senegal,** despite the government's effort to deepen the digital transformation, reflected by the adoption of national AI and data economy strategies, the budget for digital skills development is very low. The digital skills ecosystem is growing, albeit with promising local start-ups getting minimal support from international actors. CSOs have taken up the role to promote digital literacy including cybersecurity, data protection and civic participation to fill a gap created by a lack of clear

leadership and resources. **South Africa,** compared to the other two selected countries, is very advanced in the development of digital policies with its own digital skills competency framework 'DSFOne'. The challenge for South African policymakers and industry remains how to translate policy frameworks into processes and projects that can address the country's skills demand. The three countries show a strong focus on hard technical skills, and all of them face challenges in ensuring inclusion in digital skills projects and in adapting their frameworks and projects to emerging needs for digital skills such as in the AI sector.

In the last section of this paper, we provide policy recommendations for European policymakers to highlight areas where the EU could improve its offer in digital skills and literacy development as part of its broader support to the digital transformation on the African continent. Under the Global Gateway initiative, the EU has increased the budget for education and skills development. We argue that the EU has not yet developed a clear offer of digital skills and literacy as part of its efforts to increase investment in digital infrastructure in partner countries. The EU needs to coordinate better with member states on digital skills projects. It needs to promote more public-private partnerships (PPPs) with the European private sector to develop an offer that combines digital skills training with connectivity to ensure an inclusive digital transformation. We also argue that the EU should integrate training on digital rights, cybersecurity, and data protection in its digital skills programmes and aim to scale up existing projects in this area in Africa. Finally, creating more opportunities for academic and expert exchange would help address the demand for digital talent in Europe through a more equitable partnership.

1. Introduction

Digital technologies are rapidly transforming economies, labour markets and societies. Citizens need a variety of skills and capacities to operate in a highly digital economy and society. The basis for digital innovation and competitiveness in the global economy is a well-trained professional elite with high-level digital skills, whilst the digital transformation of basic services increasingly requires all citizens to have basic digital literacy. Additionally, basic and intermediate digital competences across the population and workforce are needed to ensure inclusive growth and resilient societies – by creating the conditions for employability and financial resilience, enabling citizens to become discerning consumers of information and media in the age of disinformation, as well as to participate in social and political life. For young people and marginalised groups like rural communities and women, lacking digital literacy not only reinforces their socio-economic exclusion but also exposes them to safety risks and information manipulation.

Box 1: Conceptual framework for digital literacy

The terms digital literacy, digital skills and digital competence are often used interchangeably, but they contain different elements for different actors.

'Digital literacy' encompasses:

- **'Hard skills':** Technical skills needed to operate a computer, install software, create online content et cetera. Different levels of these skills - from basic to advanced - are needed across the population.
- **'Soft skills'**: Internet/media literacy, knowledge of data protection, ability to navigate government e-services, social skills on how to behave online, et cetera. These are needed at a whole-of-society level, from school children to rural women to the formal and informal workforce.

This use of the term 'digital literacy' is equivalent to 'digital competence' in the **EU's Digital Competence Framework** (which differentiates between knowledge, skills and attitudes rather than hard and soft skills).

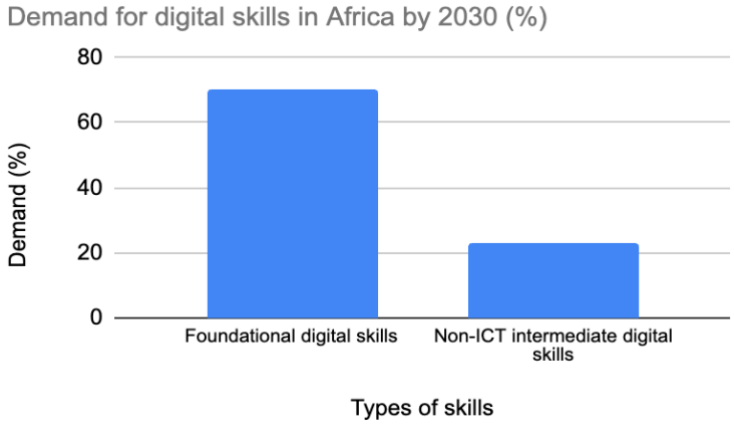
Countries need both highly educated ICT experts and a digitally literate general workforce and population to become competitive actors in the global digital economy and ensure their digital sovereignty.[1] Most digital literacy frameworks converge on the importance of providing tools to use digital technologies in both economically productive and socially meaningful ways. Most also agree that digital literacy can protect citizens from harm and help them understand their rights – although the definition of what constitutes harm and rights varies depending on the political system.

1 It is a term widely used by policymakers but there is no consensus about its meaning. Digital sovereignty refers to the need for control over the physical layer (infrastructure, technology), the code layer (standards, rules and design) and the data layer (ownership, flows and use) (Musoni et al. 2023).

Training programmes and curricula may not carry the same geostrategic connotation as 5G networks and data centres, but who trains a population, who develops curricula for digital skills and literacy and with what values, as well as whose technology is being used in the process are highly political issues. China, the United States (US) and the European Union (EU) each take very different approaches to digital literacy and pair these approaches with very different engagement strategies at the global level. The EU's whole-of-society approach to digital literacy has a strong value component with a focus on inclusive development, equity, sustainability, responsible and critical civic participation, and digital rights. The EU aims to both promote economic development and empower citizens in the digital space. The public debate in the US has started to converge with EU notions of digital rights such as data privacy (although there is still no federal legislation), and the term 'digital citizenship' is promoted in the context of freedom of expression and democratic participation. Unsurprisingly, democratic participation is absent in China's definition of 'internet literacy,' while it emphasises digital capacities for economic growth.

Despite the rapid digital transformation of economies and societies, the level of digital skills and literacy is inadequate around the globe and critically low in Africa, although even in Africa this varies substantially. For example, in 2019, the estimated adoption rate of digital skills averaged 25-30% across sectors in the case of Kenya, compared with just 5-10% in Mozambique (ITU 2022). For the African Union (AU) and African governments, the development of continental and national digital literacy policies and frameworks is essential to respond to their socio-economic needs, shape the digital societies they want and ensure their agency in international digital cooperation. According to the International Telecommunications Union (ITU), the gap between the African population using the internet (at 86% in 2022) and those with digital skills indicates that many might be using the internet without being able to fully benefit from it or avoid its dangers. Meanwhile, various statistics indicate that Africa will need to create around 18 million jobs, and train 650 million workers in digital skills by 2030 (Dupoux et al. 2022). Because of the impact of the ICT sector in other industries, 230 million jobs will require digital skills, even though only 2 million will be directly in the ICT and e-commerce sector (IFC 2019).

Figure 1: Demand for digital skills in Africa by 2030 %



Source: Weforum 2020

This paper looks at various international approaches to digital skills and literacy and argues that the AU and African governments have an interest in adopting their own comprehensive approaches to digital skills and literacy to strengthen African ownership of - and agency in - digital transformation. If the AU and African governments want to build competitive and productive economies and empower their citizens to respond to existing and emerging risks online, they need to invest in the foundations of digital transformation. These include reliable basic infrastructure such as electricity, widespread connectivity, affordable devices, and digital literacy and skills. The EU can be a key partner in supporting the AU and African governments to develop a holistic framework for digital literacy and skills. This can and should go hand in hand with planned increases in investments in digital infrastructure and services under the EU's Global Gateway initiative.

This research starts by looking at international approaches to digital literacy, with a focus on the EU, China and the US. It then analyses current efforts at developing and implementing policies and frameworks for digital literacy in Africa: at continental, regional and national levels, with case studies on Rwanda, Senegal and South Africa. The research then discusses key opportunities and challenges for digital skills partnerships on the continent and provides recommendations for European policymakers as they mobilise EU member states' capacities and resources for a meaningful offer on digital skills and literacy under the Global Gateway initiative.

The research was developed through desk research of digital skills and literacy policies, frameworks and programmes, as well as over 50 in-person and online interviews with representatives from government, private sector, international organisations, as well as civil society organisations (CSOs).

2. Digital literacy: Positioning the EU between China and the United States

Digital skills and literacy are not often considered to be as geopolitically relevant as digital infrastructure or governance frameworks, and yet the approach to teaching them will have a huge influence on economies and societies. China, the US and the EU each take different approaches to digital skills and literacy at home and pair them with different global engagement strategies. In this section, we look first at their diverging approaches to digital literacy, then turn to their engagement with Africa specifically and finally look at how they work with multilateral organisations.

2.1. Diverging definitions of digital literacy and underlying values

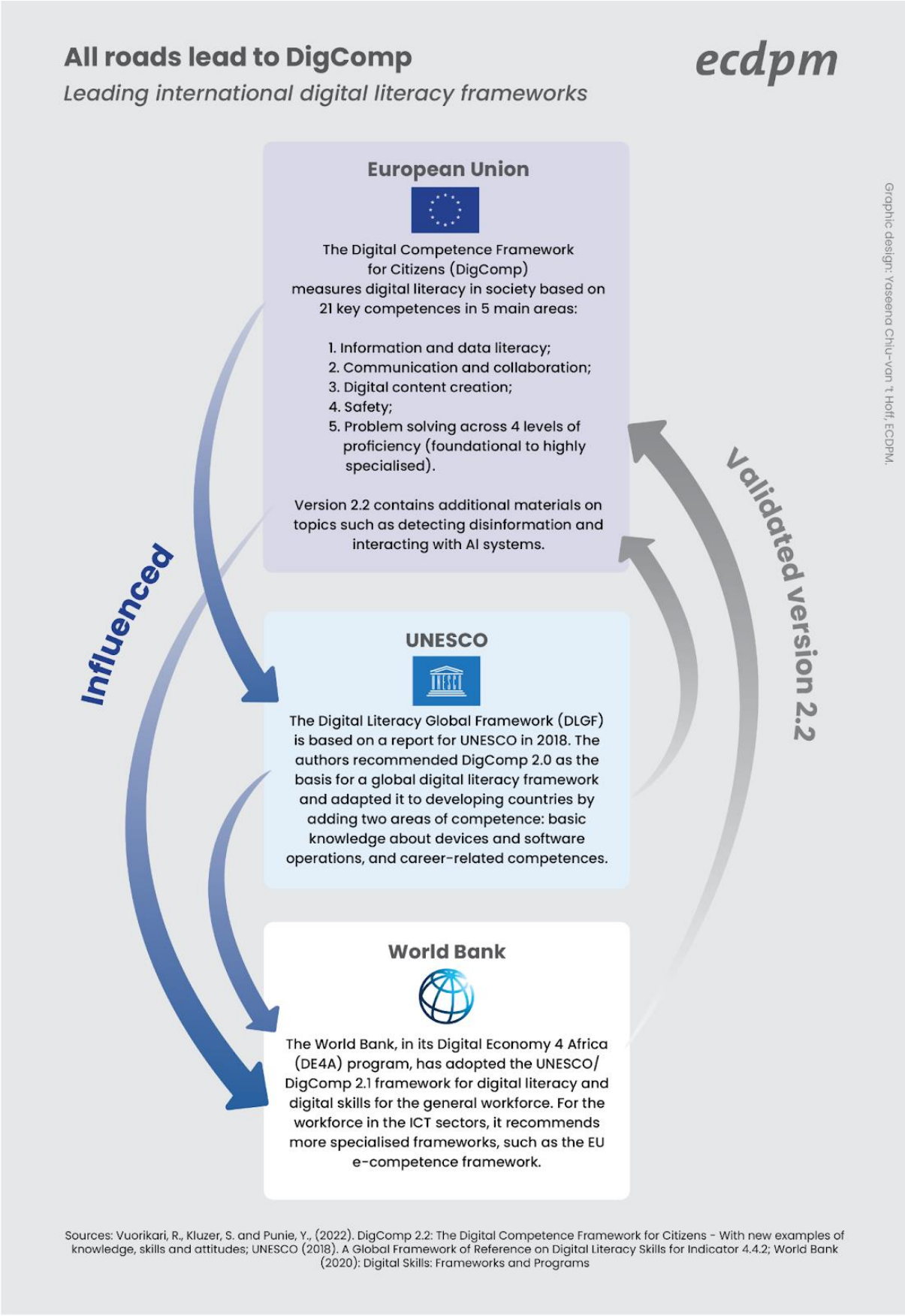
The EU has very mature frameworks for digital literacy across skill levels. The EU's Digital Competence Framework for Citizens (DigComp) measures digital literacy in society based on 21 key competences in five main areas and across four levels of proficiency (from foundational to highly specialised) (Vuorikari et al. 2022). The latest update contains additional materials on

topics such as detecting disinformation and interacting with artificial intelligence (AI) systems. Complementary frameworks exist for teachers and education organisations as well as for consumers. For highly advanced technical skills, the European e-Competence Framework has become the EU's benchmark for training ICT professionals.

DigComp has a strong value base with a focus on inclusive development, equity, sustainability, civic participation and digital rights. One can say that it fosters economic development (for example, by enabling users to develop digital content) and social equity (for example, by enabling citizens to use digital identity systems to access public services). DigComp lists competencies that also address sustainability (protecting the environment), and the ability to 'seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies. DigComp also reflects the EU's focus on data protection and privacy.

Due to its comprehensive nature, DigComp has been adapted in other leading international frameworks, from UNESCO to the World Bank (Law et al. 2018: Bashir and Miyamoto 2020). Thanks to its thorough and inclusive consultation and development process, it is seen as a global gold standard for a whole-of-society approach to digital literacy (Bashir and Daniels 2023). Education experts also confirm that the DigComp categories hold up well in a fast-changing technology environment and can be easily adapted to different contexts, including measuring competence on topics such as AI.

Figure 2: All roads lead to DigComp



The US, on the other hand, does not have a federal framework for digital literacy. There are some frameworks at state and city levels, which incorporate elements from EU DigComp and private tech and education companies. Some frameworks (Wedlaker et al. 2019) reflect the focus in the overall US debate on equity and inclusion (of racial and gender minorities as well as rural areas) in providing access to digital literacy. Digital skills are an important pillar of the Biden administration's Digital Equity Act, which has allocated $2.75 billion for bringing fast broadband connectivity and skills to underserved communities in the US. The US also places value on digital citizenship and the Biden administration recognizes that digital rights such as data privacy and protections from algorithmic discrimination, online hate speech and disinformation, are the prerequisite for exercising it. The prerequisite for digital citizenship in the EU sense is a regulatory environment that protects citizen's privacy, dignity and free speech. The US lacks comprehensive federal digital rights legislation on data protection, platform regulation or AI, but the Biden administration has established standards for AI safety, protects citizen's privacy and promotes equity and civil rights (The White House 2023), recognising that digital rights are the prerequisite for exercising digital citizenship.

China so far only has digital literacy frameworks for the education sector (for teachers, schools, universities and Technical and Vocational Education Training [TVET] organisations), but experts believe that a more comprehensive document may be in the making. China addresses the need for a whole-of-society approach to digital literacy in the 14th Five-Year Plan (FYP) for National Informatisation (DigiChina 2022) and in an 'Action plan to lift up digital literacy and skills for the entire population' (CAC 2024).[2] Rather than listing specific indicators and competences (as in the 'Digital Literacy of Teachers' framework), the action plan is a political document pointing out the general direction. Both documents share some language with the EU on gender inclusion. The FYP places special emphasis on rural digital development and on closing the digital divide with 'information-disadvantaged groups'.

China – like the EU – uses the term **'human-centric digital development',**[3] but in a different political context. China has laws that protect citizens from the private sector, but these protections do not extend to rights against the Communist party-state. When talking about soft skills, the plan mentions data security and data privacy and it contains vague references to a 'civilised' internet culture and 'ethical digital society'. In the passages on 'internet literacy' in China's action plan, there is no mention of democratic participation. In light of the document's emphasis on guidance by the Chinese Communist Party (CCP), the call to 'guide netizens[4] to consciously resist bad information and illegal behaviours on the internet' means that the CCP decides what is good or bad information.

2 The plan is rather broad, but the fact that it was jointly released by the Cyberspace Administration of China (the internet regulator under the powerful Central Cyberspace Affairs Commission) and the ministries for education, ICT and human resources and discussed in leading official media lends its political weight.

3 The Chinese adjective 以人为本 (yi ren wei ben) is usually translated as 'people-centric' but could also be translated as 'human-centric'.

4 Netizen (Chinese: 网民, wangmin) is a neologism describing a person who uses the internet to engage in public debates, 'a citizen of the net'.

Due to these differences in underlying values, while DigComp enjoys wide global recognition, including in China's academic discourse (Yuan 2024), complete alignment will not be possible between liberal democracies and China. China's Digital Literacy of Teachers focuses on educators' qualifications and responsible behaviour (from technological skills to social responsibilities)[5] and does not contain an equivalent to the focus on empowering learners as digital citizens contained in DigComp Edu, the DigComp derivative for teachers (MoE 2022). The UNESCO's ICT for Teachers framework does not integrate these elements either (neither does it refer to the social responsibilities in China's framework). Both the EU and China are currently consulting African governments and regional organisations on emerging digital skills frameworks in the education sector in Africa – illustrating that the EU 'gold standard' is contested.

2.2. Digital skills agenda with Africa: Domestic values meet geostrategic interests

The EU, China and the US all view digital skills as an indispensable component of their global connectivity initiatives and their bilateral cooperation with Africa. Under the EU's Global Gateway, digital skills – along with an enabling policy and regulatory environment – make up the soft connectivity' elements that complement the provision of reliable, open and secure connectivity in the form of cables, satellites and data centres. The US-led G7 initiative Global Partnership for Infrastructure and Investment (GPI), although not spelled out in as much detail, is guided by a similar approach.

The EU and the US frame their digital skills cooperation with Africa through a lens of values and interests. The EU views it as part of its domestic interest to align its values-based internal digital agenda with its global digital agenda. The **2023 Council Conclusions on EU Digital Diplomacy** encourage the EU and its member states to use 'all diplomatic and policy tools' to ensure 'complementarity and coherence between internal and external policies' (EU 2023a). Digital capacity-building and cooperation with Africa is highlighted as a priority action area. Following the same logic, the 2030 Digital Compass, which introduces a 'digitally skilled population and highly skilled digital professionals as the first of four priorities for the EU,[6] also states that 'actions at home should be complemented by support to enhance digital literacy globally, to achieve the United Nations (UN) Sustainable Development Goals (SDGs)'. To this end, the EU has significantly increased funding for its Erasmus programme over the past years (EC 2018). Only in 2022, the Erasmus+ allowed more than 32,000 students and teachers from partner countries to get training in Europe and more than 17,000 European teachers to train in partner countries (EC 2023).

Education - including addressing the digital skills gap - is a key priority of the EU. Between the 2021 and 2023 period, the EU allocated $3 billion for education, which amounts to 13% of the

5 These responsibilities range from observing copyright and protecting learners' data to 'observing the order of online communication and using the Internet to spread positive energy'.

6 The section sets numerical domestic goals for enhancing basic digital skills in the adult population (to 80% by 2030) and increasing the number of ICT specialists (to more than 20 million by 2030).

Neighbourhood, Development and International Cooperation Instrument (NDICI) budget (EU 2024a). These include the new EUR 100 million Regional Teachers Initiative for Africa and the TVET Global Gateway flagship which focuses on advanced skills in emerging sectors including the green and digital sectors (EU 2023b). During the Global Gateway high-level event on education held on 11 April in Brussels, the EU also launched the new regional Team Europe Initiative, Opportunity-driven Skills and Vocational Education and Training for Africa (EU 2024b). During the event, EU officials reported that three-quarters of the EU's country programmes in Africa have identified the need to tackle digital skills gaps for citizens and the workforce. One interesting European initiative that actively creates outsourcing opportunities for ICT talent is the Digital Explorers programme, which the Baltic countries launched as part of the Team Europe approach, bringing together the EU, member states, their financial institutions, and development agencies, as well as the private sector. The programme, which was pioneered by Lithuania, includes a short-term training stay in the Baltic countries (Estonia, Lithuania and Latvia) and aims to match 150 entry-level data analysts, experienced front- and back-end developers and DevOps engineers from Kenya, Nigeria and Armenia with both local and Baltic ICT companies. Other member states, including Germany, Belgium and France have also developed projects that integrate digital skills such as the Generation Digital Project, which promotes digital skills among children and young people and is implemented in 25 Sub-Saharan African countries.

In the White House's initiative on **Digital Transformation with Africa**, digital skills are one of three pillars – along with digital infrastructure and an enabling policy and regulatory environment (The White House 2022a). The Biden administration promised to invest $350 million and mobilise another $450 million to implement this initiative. The target groups are defined as youth and women; entrepreneurs and workforce; and public sector employees. The US Strategy Towards Sub-Saharan Africa highlights the need to provide 'online undergraduate and certificate-level courses in science, technology, engineering, and math' (The White House 2022b: 15). The section combines US interests and values by referencing opportunities for US academia and companies in offering these courses and by pledging to strengthen digital democracy by fighting disinformation or countering gender-based online harassment.

The US has translated this approach into its development cooperation in a **Digital Literacy Primer**, which the US Agency for International Development (USAID) developed for its staff and partners. The document uses the EU DigComp as a guide for the agency's programming, breaking down the competencies by their relevance for more or less mature digital ecosystems (USAID 2022). Furthermore, it recommends integrating digital literacy into other skills development objectives (workforce development, economic empowerment, and civic engagement) to better align with partner countries' development goals. It provides argumentative help for why digital literacy is an important development objective by listing the risks of digital illiteracy (digital divide, digital sexual and gender-based crime, hate speech and violent extremism online, mis- and disinformation, cyberattacks, and risks to privacy and security, especially of vulnerable populations).

China typically focuses on technical skills in its approach to digital literacy in Africa. China's digital cooperation through its Belt and Road Initiative (BRI)– or in this case the 'Digital Silk Road' – continues to be driven by the motivation to create markets as well as investment and trade opportunities for Chinese companies abroad. In China's state-led economy, these companies are expected to work in lockstep with the government to pursue geostrategic goals, such as in the Digital Silk Road. As the phase of major Chinese infrastructure investments has been winding down in light of mounting debt, China's President Xi Jinping has given out a new directive to pursue projects that are 'small yet smart' (Xinhua 2023). The new focus on promoting e-commerce fits that bill, as does capacity-building – in many cases to train a local workforce to maintain Chinese-built infrastructure.

According to one of our interviewees, Chinese institutions have brought state-of-the-art training to African partners – also often with a focus on skills for the green and digital transition. China has been setting up vocational training labs at higher education institutions under the catchy label 'Luban Workshop'. What began as an initiative by the Tianjin Vocational Institute is now branded as part of the BRI – and as an alternative to the language and culture-focused Confucius Institutes, which have come under scrutiny (or were banned in many Western countries) for teaching CCP propaganda. Out of 12 Luban workshops in Africa, as of late 2023, some have an explicit focus on digital skills linked to the economic interests of the BRI (Chen 2023). The impact of the workshops is difficult to evaluate but the fact that Chinese representatives hail them at international TVET conferences - according to one of our interviewees - shows that they see them as an important part of China's footprint.

One notable exception to this practical approach is arguably Chinese offers targeting public sector officials, to train them on cybersecurity, which is closely related to issues of governance and sovereignty. When it comes to exporting values, China engages with government officials to muster support for its authoritarian model of digital governance. In the Dakar Action Plan, which emerged from the 2022 Forum on China-Africa Cooperation, China pledged to offer capacity-building on cybersecurity for African government officials based on the initiative on 'Jointly Building a China-Africa Community with a Shared Future in Cyberspace' – a concept associated with China's vision for internet governance in which national sovereignty trumps the free global flow of data and information (Focac 2021).

Much more than the EU is able to, the US and China have both relied on their globally leading tech companies to pave the way into Africa. In the US, such alliances are often an alternative for public funding, in light of the difficulties in securing development funding from Congress. The close ties to private tech companies and foundations give the US an advantage in leading multi-stakeholder efforts such as the **Women in the Digital Economy Initiative**, launched at the G20 Summit in India in 2023, which attracted pledges of more than $515 million – ten times more than what its incubator, the Women in the Digital Economy Fund, started by USAID and the Gates Foundation, had committed earlier (USAID 2023). Private US companies also make offers on their own, especially in the field of specialised ICT skills, where tech giants like Cisco and Amazon offer training courses and certifications.

Like the US, China is home to some of the world's leading tech companies, which cover the entire technological spectrum from network infrastructure (Huawei, ZTE) to the platform economy (Alibaba, Baidu, Tencent, Bytedance). In the high-level digital engineering skills sector, Huawei competes (so far with limited success) with Cisco, which has the longest presence in this field in Africa and offers coveted certifications. Similar to when Huawei rolled up Africa's 5G network market fuelled by generous state support, Alibaba is at the centre of the current e-commerce push into Africa – competing with Amazon in this field. Alibaba officially cooperates with Rwanda, which has been designated as the first Electronic World Trade Platform (eWTP) hub, and the Alibaba Business School has reportedly started an undergraduate program in e-commerce for Rwandan students in Hangzhou (Alizila 2018; CGTN Africa 2023). The online Alibaba Academy offers training to local SMEs to enter the Chinese market or to learn from China's experience in digitalising rural areas.

2.3. Collaboration within international organisations

In many ways, the observed behaviour of the three actors illustrates what Anu Bradford has described as the **EU's right-based, China's state-led and the American market-driven model** (Bradford 2023). The observations in this paper also confirm the blurred lines between these models: EU countries have become more eager to team up with their own national private-sector companies as training providers (for example, Estonia closely works with the ICT cluster and Cybernetica to support four African countries to deepen their digital transformation including funding projects on digital skills (ESTDEV 2024) - see other examples below), while USAID's embrace of EU DigComp illustrates the increasing convergence of the current US administration's view on digital rights and digital citizenship with the EU's. As democracies, the EU and the US align on core values such as freedom of expression and democratic participation. As geostrategic allies, they exchange information and have identified areas for collaboration in the G7 or the Transatlantic Trade and Technology Council, despite their diverging approaches to the tech economy.

These actors also compete under the roof of international organisations, such as the World Bank and the many UN organisations engaging on digital skills and literacy (UNESCO, ITU, UNDP, ILO, UNICEF, UNCTAD, UN Women), to internationalise their initiatives. One example is the Digital Transformation Centres Initiative. Launched by the ITU and Cisco in 2019, it provides equipment and access to training materials and train-the-trainer programmes to local partners in 14 countries with a range of US-based and local private sector companies and foundations. Chinese companies are also part of several UN initiatives: Huawei is a member of UNESCO's Global Alliance for Literacy and of the ITU's Partner2Connect initiative; Alibaba offers an e-Founders fellowship for African digital entrepreneurs together with UNCTAD. Chinese and Western actors rarely engage in the same digital skills initiatives in multilateral and multi-stakeholder fora, as interviewees in international organisations and Africa confirmed. In the ITU, Chinese companies are perceived as very active in efforts to influence global technology standards, but less so on digital skills cooperation. The ITU Academy's online course schedule hosts courses by Chinese, EU or US organisations on similar topics but with different national

angles, illustrating that in many cases, the best the UN organisations can do is provide a neutral platform for the diverging visions of its members.7

China also engages on the topic of digital skills as a member of the BRICS. At its summit in South Africa in 2023, the members of this organisation of emerging economies pledged to explore cooperation opportunities on digital education, for example through the BRICS university network (BRICS 2023). Prior to this, the founding members of the organisation (Brazil, Russia, India, China and South Africa) took turns organising BRICS Future Skills Challenges, a contest open to young technologists from those countries on topics ranging from robotics to data science. Outside of these contests, there does not appear to have been much activity. Apart from China, India and Russia have demonstrated a certain level of ambition in digital skills cooperation but the impact has remained limited. With its leading ICT universities and domestic policy frameworks on digital skills, India would be best positioned as a player in this field. In 2021, India was reportedly one of the top five destinations for African higher education students, while thousands of Indian faculty members were teaching in Africa. India has also expressed interest in engaging in Africa and was part of a World Bank initiative to facilitate Africa's relationships with new donors, but compared to China or Korea, observers noted a lack of follow-up (WB n.d.). Russia sporadically announces skills training activities for African officials but its development cooperation is mostly focused on the former Soviet space and the Russian-speaking diaspora.

The EU, China and the US will remain the most visible providers of digital skills training in Africa for the time to come, most likely with parallel activities as each actor aims to protect its interests and promote its values. The EU is in a strong position to support digital literacy in Africa based on its own internationally accepted frameworks and its long-standing relationships with regional actors and ministries of education and ICT in partner country governments. At the same time, if it wants to effectively respond to African priorities and compete with offers by Chinese or US actors, it has to translate this conceptual advantage into a coordinated approach to programming and implementing projects, combining a clear rights-based, inclusion-driven and sustainability-anchored approach to digital skills and literacy with better mobilisation of Team Europe as a whole, building on the combined efforts of the EU, its member states and its private sector.

3. State of development of digital literacy policies and frameworks in Africa

The AU and its member states take a very pragmatic approach to digital skills development and cooperation. **Digital literacy agendas in Africa tend to prioritise creating employment opportunities**, fostering economic development, and furthering regional and continental integration while strengthening the continent's global competitiveness.

7 At the time of writing, the ITU academy's courses included a class on the development of the 5G industry globally and in China, offered by the China Academy of Information and Communications Technology, as well as a class on global e-governance with examples from the EU, offered by the Tallinn University of Technology.

Many African governments and regional organisations recognise that the growth in online disinformation, hate speech and cybercrime pose a major challenge for societies, and require a more holistic approach to digital literacy. Responding to these challenges requires financial investment and the integration of soft skills into digital literacy policies and programmes, and education curricula. At the same time, in some African countries internet shutdowns, media blockages and shrinking democratic space for CSOs that advocate for digital rights, show that African states do not always prioritise digital citizenship and rights as part of digital literacy.

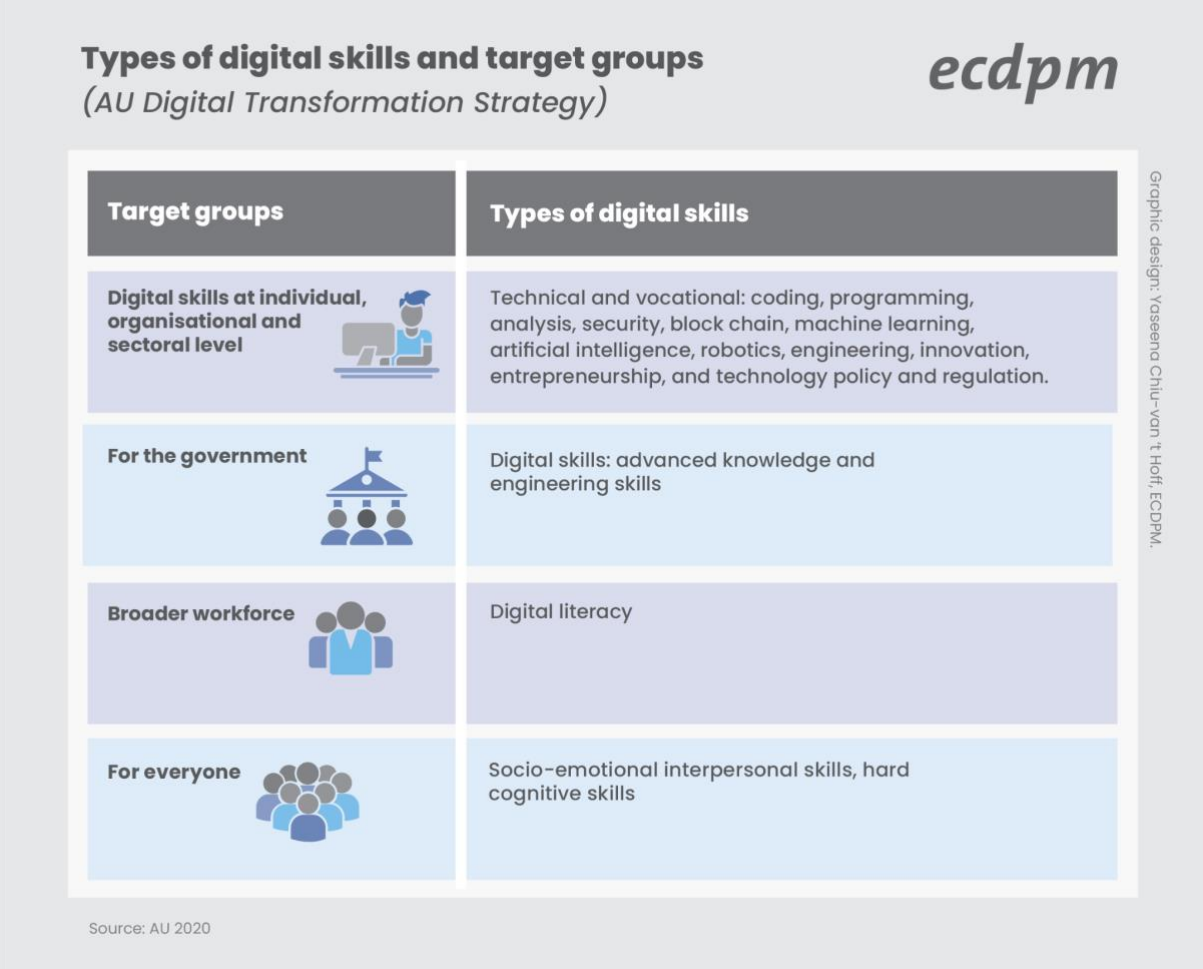
In the following section, we analyse efforts to develop digital skills policies and frameworks in Africa at continental, regional and national levels, drawing on the examples of Rwanda, Senegal and South Africa to understand to what extent African governments are developing holistic digital skills and literacy policies, and what types of digital skills and industries are most relevant in different parts of the diverse African continent.

3.1. The digital literacy policies and frameworks at the continental and regional level

The AU and member states want to promote self-reliance, drive innovation, and enhance African ownership in the digital sector. These objectives are reflected in the AU's Digital Transformation Strategy (2020-2030). The strategy also says that they want to design and implement a 'people-centred, locally owned [...] process to empower individuals, organisations and the society as a whole' (AU 2020). Similar to the EU's 2030 Digital Compass (EU n.d.), the AU considers **digital literacy as a foundational pillar of its digital transition strategy**. In its Digital Transformation Strategy, it pledges to develop a 'massive online e-skills development program to provide basic knowledge and skills on security and privacy in a digital environment', illustrating that a digitally literate population is crucial to achieving its cybersecurity and data protection goals. Because of these complementary African objectives, the EU is uniquely positioned to share its expertise and support the AU in improving digital literacy.

Digital literacy is crucial to African ownership and agency over its own digital transformation. To enable citizens to be competitive producers and not just passive consumers in the global digital economy, African governments need to invest in the foundations of digital transformation, including digital literacy and skills alongside other components such as reliable basic infrastructure. **Responsible and safe engagement in online spaces will become even more important as African countries work towards regional integration. A harmonised approach to digital literacy and skills will be essential to the adoption of continental policies across a number of different areas.**

Figure 3: Types of digital skills and target groups



An important step towards fostering African agency in digital transformation is the **AU's Digital Education Strategy and Implementation Plan (2023-2028)**, a strategy drafted under the trilateral AU-EU-ITU Policy and Regulation Initiative for Digital Africa (PRIDA), which lays out how to raise the levels of digital literacy across the continent. Drawing on the lessons learned during the COVID-19 pandemic, one of its objectives is to elaborate and implement a continent-wide Teachers' Digital Literacy and Skills Certification Framework based on the UNESCO ICT Competency Framework for Teachers (ICT-CFT) and the EU's DigComp Framework for Educators (DigCompEdu). Meanwhile, the **Smart Africa Alliance**, a partnership among 37 African countries to accelerate socioeconomic development using digital tools, has drafted a digital literacy framework for the African continent. The **Smart Africa Digital Academy** (SADA) is about to finalise a Pan-African framework that draws on seven international frameworks, including EU DigComp2.2, UNESCO's Digital Literacy Global Framework, as well as UNICEF's Digital Literacy for Children and the digital skills frameworks of Nigeria, South Africa and the United Kingdom. Smart Africa's strategic partners include the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the World Bank, ITU, Global System for Mobile Communications Association (GSMA), the African Development Bank (AfDB), the private sector, academia, and initially also Huawei.

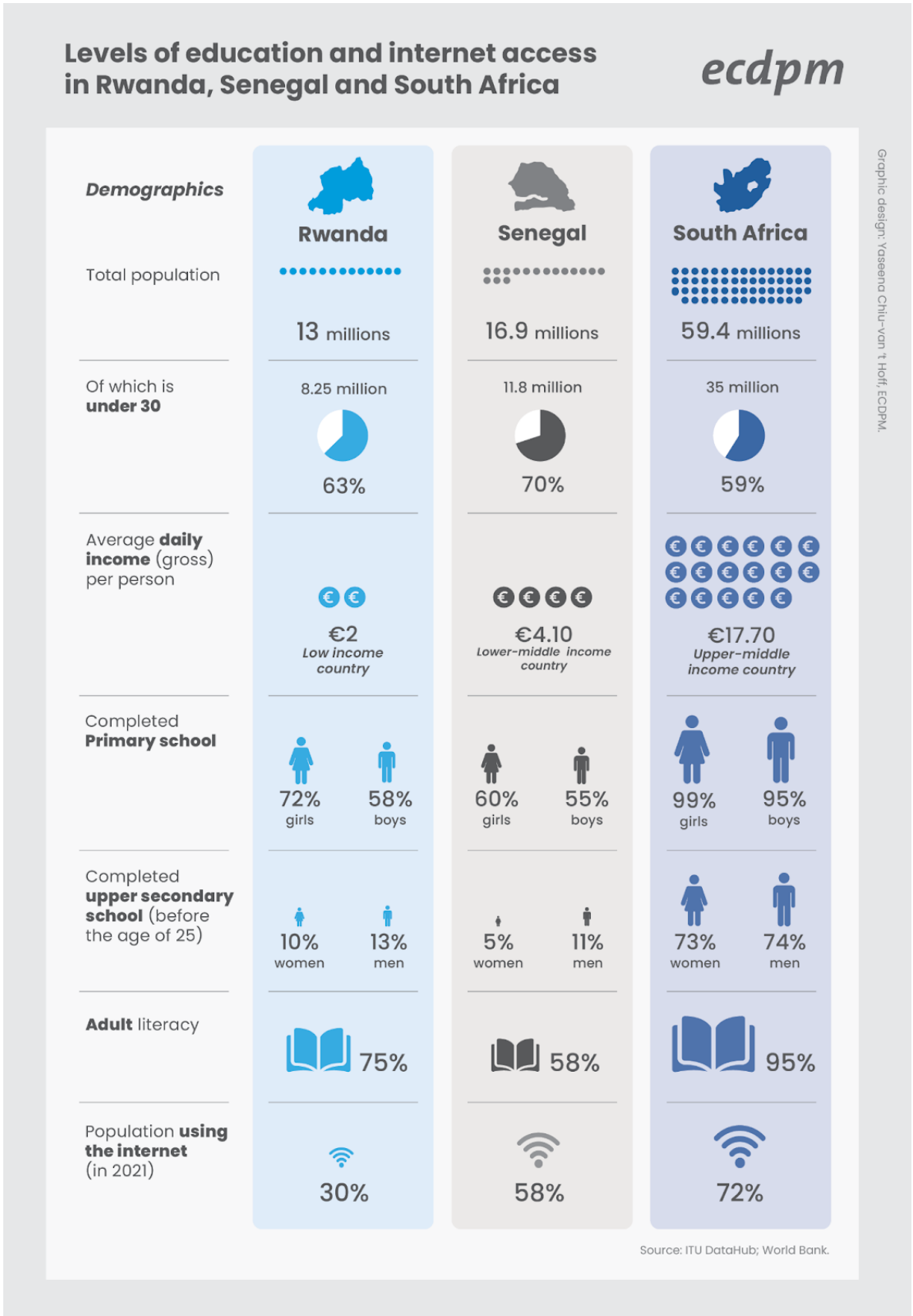
When tailoring the digital literacy frameworks to the African context, SADA followed the UNESCO example to expand the EU DigComp2.2 by including a new proficiency level for people without any digital skills and digital technology. The six pillars (devices of operations, information and digital literacy, communication, digital content, safety, and problem-solving) cover the skills set needed to engage responsibly and safely in the digital space, protecting oneself, the organisation, and the society as a whole from risks and harms arising from digital tools. SADA further enhances its influence across the continent by building national digital academies in six African countries, namely Benin, Ghana, Ivory Coast, the Republic of Congo, Rwanda, and Sierra Leone. In Rwanda, where Smart Africa is headquartered, the alliance partnered with the government to deliver short-term training for ICT personnel in the public sector, while other programmes focused on experts, teachers, entrepreneurs, consumers and citizens. SADA is also in the process of developing a Digital Skills Index for Africa.

The RECs and national governments, which are to implement the continental ambitions, emphasise digital skills for employment, productivity and economic development, often also with a view to the inclusion of women and marginalised groups. The Economic Community of West African States (ECOWAS), for example, adopted the **Regional Integrated Human Capital Development 2030 Strategy** in 2019 aiming to become a 'top-performing REC in human capital development by 2030 in Sub-Saharan Africa'. In 2023, ECOWAS member states validated a **draft TVET Strategy for Skills Improvement and Employability** (ETSSIE) (Kokutse 2023). Aside from these efforts, RECs have played a limited role in the elaboration and implementation of digital literacy policies and frameworks (AU 2022). This is because most RECs are underfunded and understaffed, and the development of digital literacy frameworks traditionally fell outside the trade-oriented scope of most RECs. Nevertheless, some regional projects have picked up on digital literacy as a prerequisite for the (cross-border) digital transformation of trade, including e-commerce and digital financial literacy. For instance, in 2023, Common Market for Eastern and Southern Africa (COMESA) launched an e-learning portal with modules on financial literacy, e-commerce or the use of COMESA's Digital Retail Payments Platform, and issued certificates to over 50 women-run micro-, small and medium-sized enterprises (MSMEs) (Nzioki 2023). But RECs still need to partner more with the private sector and civil society, who have the technological know-how (Ronceray et al. 2023).

Due to a lack of detailed data on digital literacy levels, many countries struggle to tailor programmes to the population's needs. Nevertheless, the level of education, average income, and internet access rates reveal some of the main obstacles in tackling low levels of digital literacy. For instance, modules on online disinformation must take adult literacy rates into account. Similarly, cybersecurity modules may have to adapt to the education level of its participants–while primary school students are expected to possess basic cognitive and practical skills to solve routine tasks, secondary school graduates should be able to generate solutions to specific problems (EU n.d.). The average income directly affects the affordability of smart devices and connectivity (for example, mobile data bundles), with consequences for internet usage and broader exposure to digital tools. These are some of the socio-economic indicators that directly or indirectly affect digital literacy levels and the design and

implementation of different types of training, as shown for Rwanda, Senegal and South Africa in the graph below.

Figure 4: Levels of education and internet access in Rwanda, Senegal and South Africa



3.2. Case studies: Rwanda, Senegal and South Africa

Most African countries address digital literacy in their broader ICT strategies but only a few, including Botswana, Kenya, Nigeria, Rwanda, and South Africa, have developed stand-alone national digital skills policies or frameworks. Those that have a form of digital literacy framework stress the need to build digital competencies to enhance socio-economic development, boost meaningful employment and become competitive at regional or global levels in specific domains such as research and development. In light of threats of online surveillance, driven by states and by predatory business models of the US or Chinese big tech companies, sophisticated online disinformation and cybersecurity threats, more emphasis needs to be placed on digital soft skills and digital literacy, which would empower citizens to navigate the internet safely.

The following sections look at the experiences of Rwanda, Senegal and South Africa in developing policies and strategies for digital skills and literacy development and opportunities for cooperation with international partners. The three countries were selected based on the demand for digital skills, the level of digital transformation, and their strategic role in the East African Community (EAC), ECOWAS, and Southern African Development Community (SADC) economic regions in leading the development of national digital literacy strategies and frameworks.

3.2.1. Approaches to digital skills

Rwanda, Senegal and South Africa have prioritised the digital sector as a potential source of job creation, while they also see digital skills as a potential contributor to indirect job creation. There is a growing appreciation of the importance of digital literacy in tackling disinformation and allowing for wider development, but to date, this remains a secondary concern in the three countries' approaches to digital skills.

Digital upskilling is at the core of Rwanda's aspirations to become a high-income country by 2050, a regional ICT hub and a global competitor in innovation, research and development (Vision 2050). Rwanda aspires to become a data-driven economy and knowledge-based society that offers gainful employment to its citizens while eradicating extreme poverty. The goal is to create 3 million ICT-enabled jobs by 2030, up from 1 million in 2016 (National Skills Development and Employment Promotion Strategy 2019-2024). By fostering excellence in research and development, Rwanda also wants to turn from a skills importer into a skills exporter to compete in the global digital economy.[8]

The main bottlenecks in achieving Rwanda's vision are the affordability of devices and the low level or lack of digital literacy and skills. The government considers only 30% of the youth (aged

8 It is also worth noting that Rwanda has systematically invested in ICT infrastructure, with the result that since 2019, more than 98% of the population are covered by at least a 4G/LTE network, while the African average was at less than 50% in 2022 (ITU n.d.-a). Despite the near-universal physical connectivity, only a third of Rwandans used the internet in 2022, compared to 40% in Sub-Saharan Africa where fewer people are covered by state-of-the-art mobile networks (ITU n.d.-b).

16-30) digitally literate, while the digital divide is particularly felt along urban-rural and gender lines. Such low numbers of internet usage slow down national development and limit the country's regional and global competitiveness in various ways. Without basic digital literacy, most of the population cannot access e-government services through the e-portal 'Irembo'. Low levels of digital skills among the working-age population also mean that millions forgo meaningful employment and lack professional prospects that could help lift them and their families out of poverty. As a result, international companies may shy away from the Rwandan labour market because of the low human capital, despite the high scores on 'ease of doing business' and general infrastructure quality and reliability.

Senegal is highly ranked in digital infrastructure and innovation rankings among West African countries but needs to deepen its digital transformation at a broader societal level. As such, the government of Senegal pledged to raise the contribution of the digital industry from 3.5% to 10% of the national GDP and develop the industry so it can create value for its citizens (SN 2025: GIZ 2021). **One of Senegal's objectives is to create more than 50,000 direct and 160,000 indirect jobs by 2030.** This is part of a broad objective to drive economic development, respond to global challenges and become an innovative leader in the digital economy (Teevan and Domingo 2022).

However, the country faces challenges to ensure inclusion in its digital transformation. In 2022, mobile phone penetration was higher than 100%, but only 8 million out of a population of 17.42 million used the internet (Digital Virgo 2023).[9] The rapid growth in the use of mobile phones in the country by young people has shed light on new challenges such as online disinformation and manipulation, as well as cybercrimes. Similarly to other countries across Africa, Senegal struggles to develop a successful solution to these challenges, and instead the government has limited access to the internet during politically tense situations, hindering citizens' democratic participation (Access Now 2024).

In South Africa, digital skills and literacy programmes are designed to address high unemployment, underemployment, low workforce participation and access to pathways from in-demand skills to jobs, to promote economic stability and inclusive growth in the country. The mismatch between the skills demanded by the digital economy and those possessed by the workforce contributes to high rates of unemployment and underemployment, hindering economic progress and social mobility. The official unemployment rate climbed to 32.1% and the graduate unemployment rate stood at 9.6% in 2023 (Government of South Africa 2023). A decline in formal sector employment contrasted with an increase in informal sector employment, suggests a shift towards informal income bases. Youth aged 15-24 years and 25-34 years have the highest unemployment rates at 59.4% and 39.0% respectively.

9 The country also presents a wide geographic and gender digital divide with only 16% of people in rural areas having access to the internet compared with one third of the population in urban areas (Tikum 2022). Women living in rural areas are 32% less likely to use mobile internet than their male counterparts (GSM 2020).

The South African government has formulated an economic recovery plan which includes a comprehensive skills strategy to tackle rising unemployment, poverty, and inequality. A key objective of the plan is to prepare the Post-School Education and Training (PSET) system to provide the necessary skills to implement the plan. More so than Rwanda and Senegal, the government relies on a variety of policies and frameworks to develop digital skills. In South Africa, given the emphasis on addressing youth unemployment as a major lever of economic transformation, digital skilling and digital literacy for young people are viewed as crucial to inclusive economic growth.

3.2.2. Roll out of digital skills policies and programmes

The three governments have each adopted different approaches in attempting to address their citizens' need for digital skills and literacy. Rwanda adopted the 'Digital Talent Policy 2016,' and has taken a relatively strong state-led approach to the actual roll out of digital skills and literacy. Senegal adopted a human capital action plan as part of its Digital Senegal Strategy but ultimately the roll out of digital skills and literacy programmes has largely relied on NGOs and international partners. South Africa has the most comprehensive policy framework of the three countries, including not just a series of strategies but also a detailed implementation plan and a digital skills competency framework 'DSFOne.'

In **Rwanda**, the Ministry of ICT and Innovation developed the 'Digital Talent Policy 2016', which follows a three-tiered approach to digital upskilling for the general population, the current and future workforce and experts. The government has partnered with both private sector actors and international institutions to rapidly upskill broad segments of society while investing in high-end ICT skills and expertise.

Rwanda has done particularly well on three aspects of its approach to digital literacy and skills. Firstly, Rwanda pursues a **proactive, state-driven approach** in close collaboration with local entities, private sector players and international partners. The Ministry of ICT and Innovation, in particular, manages a plethora of digital literacy and skills programs, which it reviews regularly and adapts to the needs on the ground. For instance, the Digital Ambassadors Programme targets the general population with a particular focus on rural areas and is therefore delivered in Kinyarwanda.10 Programmes targeting out-of-school youth are delivered at the state youth centres that exist in all provinces. It also targets the general public with specific modules on the use of the government's e-portal 'Irembo' as well as other online services.

Secondly, to facilitate the adoption of e-government services, the government offers digital skills training for civil servants and trains the general public in digital literacy. The training of civil servants is necessary to enable the digitisation of administrative procedures and the efficient use of e-government portals by government employees. Therefore, various government entities (for example, tax revenue authority) sought accreditation by the International Computer Driving Licence (ICDL) Foundation, a non-profit organisation

[10] Kinyarwanda is the native language in Rwanda spoken by over 90% of the population.

headquartered in Dublin (Ireland) that provides computer literacy certifications, in order to train their employees autonomously and in a self-sustaining fashion.

Thirdly, Rwanda is exemplary because of its **strong academic offer** in the field of computer science and ICT. While most African universities struggle with outdated equipment and lack of expertise, the University of Rwanda (UR), the main public university, hosts four internationally-funded African Centres of Excellence, including in Internet of Things (IoT), data science and e-health. In addition to funding from the World Bank and the AfDB, the Rochester Institute of Technology in the US supports UR's College of Science and Technology with technical equipment and expertise. Moreover, students can pursue postgraduate degrees at the African campus of Carnegie Mellon University in Kigali or at the African Leadership University. Consequently, Rwanda offers a stimulating academic environment, attracting students from all over Africa to train in advanced and highly specialised digital skills.

To achieve its economic objectives, **Senegal** has developed ambitious policies and strategies and accompanied these by an ambitious approach to digital skills. These policies include the Digital Senegal Strategy, national Data Economy Strategy and AI Strategy, which all have digital skills as key pillars. **As part of the Digital Senegal Strategy, the government has developed a human capital action plan with the priorities to strengthen ICT in primary and secondary education curricula, develop learning modules on digital skills (big data, Cloud AI, IoT), promote research and development and innovation in the digital sector, and implement digital skills programmes for entrepreneurs with a focus on women and youth.** A consortium of digital education was formed with the *Inspection de l'Academie de Dakar*, the NGO Social Change, Groupe SIM and Cosydep. The action plan also states the goal of building partnerships with international donors in digital skills certification.

Various international actors are attempting to add value with different offers ranging from supporting the government to funding CSOs or setting up their own platforms. Their offers (see Box 2) focus on hard skills (e-commerce, coding, app or software development, et cetera), with the exception of small initiatives that have managed to include soft skills.

Box 2: Examples of digital skills programmes by international actors

The Senegalese government gets technical, financial and advisory support from different international actors. The following are key players in the growing digital skills ecosystem:

European development agencies:

- **Enabel**: Support for digital literacy and skills; inclusion; personal data protection
- **GIZ**: Digital skills for all sectors: agriculture, climate, tourism; employment; entrepreneurship; AI and national data protection strategy (with Smart Africa); inclusion (women, people with disabilities); TVET; PPP
- **LuxDev**: Vocational education; e-health, developed a private-public partnership platform

- **Expertise France**: Digital skills for employability and entrepreneurship and AI strategy
- **French embassy**: Cyber harassment

European private sector:

- **Orange Sonatel**:[11] Entrepreneurship, innovation, inclusion
- **Nokia-UNICEF**: Digital education and inclusion (rural, 'underserved areas')
- **Oxfam and La Lumière**: The 'INEDIT' programme implemented by the Senegalese NGO La Lumière and Oxfam and supported by AFD helps overcome the disproportionate lack of access to banking for rural populations and women (AFD n.d.).

US development agency:

- USAID and especially private sector companies like CISCO
- Microsoft, Google, Amazon, Facebook, Oracle, and others

UN organisations:

- **UNESCO**: Support for digital skills in public education, TVET

Foundations:

- **Mastercard Foundation and the Virtual University of Senegal** launched a program to train 80,000 young people in digital skills until 2026 (Hollywood University 2023)
- **ICDL:** First Accredited Test Centre by ICDL Africa was launched in Senegal in 2020

Chinese private organisations:

- **Huawei:** Huawei ICT Competition financed scholarships for Senegalese students (Amani 2020). In partnership with the Ministry of Education, the ICT Ministry, Orange Sonatel and Close the Gap, Huawei launched the Senegal DigiTruck program in August 2023 (in partnership with the GSMA, the EU delegation, UNESCO et cetera). DigiTruck will provide digital skills training for 5,000 young people, with a focus on addressing the digital divide. The project is part of Huawei's global digital inclusion initiative TECH4ALL..

Senegalese CSOs have taken on the task of filling gaps in terms of delivery of training in areas such as cybersecurity and data protection for online users and activists. Private initiatives, such as the Soft Skills Academy, launched by Groupe ISM (an initiative bringing together four schools of law, engineering, management and leadership) attempt to take a comprehensive approach to digital literacy but are available only to a limited number of students. This initiative complements the technical skills taught at schools with soft skills (teamwork, communication, advocacy, et cetera) and dialogue about the problems young people deal with online (Domingo and Salzinger 2024; Groupe ISM n.d.). The government is slowly taking steps to redress its inaction in this area, recently training the Senegalese police on cyber abuse and developing a legal tool for female online victims, yet a wider approach to digital literacy for government workers and the wider population is missing.

11 Orange Sonatel is the leading telecommunications company in Senegal. The French telecommunications company Orange has a 42% stake in the Sonatel group.

Unlike the other two countries, South Africa has developed **a digital skills competency framework 'DSFOne'**. This was to facilitate a local, shared understanding of digital skills through a unifying framework that acknowledges the six particular digital competences and four broad, definable digital skills ecosystems relating to digital technology use (Craffert et al. 2024). The DSFOne largely follows the EU DigComp model. The DSFOne is a comprehensive framework that includes digital skills competencies needed at basic, intermediate and advanced levels. In the context of low levels of digital inclusion in South Africa, the DSFOne advocates basic digital work readiness skills and basic digital skills needed for participation in society as a digital citizen.

South Africa has also developed detailed policy frameworks, including the Implementation Plan for the Digital and Future Skills Strategy is the overarching guide to implementation and includes the measures, lead institutions and stakeholders, activities and initiatives (2021-2025) to address the digital skills gaps and create a strong digital skill building ecosystem (Government of South Africa 2021). Focus is placed on digital skills for decent jobs for youth, noting that more than 8 million young people were classified as 'not-in-employment-education-or-training' (NEET) at the time of developing the implementation plan in 2021. It also focused on gender balance and persons with disabilities, with calls for specific interventions for such persons to improve skills equity in South Africa. In 2024, the Digital Skills Forum was announced.12 The Skills Strategy (2022): Support for the South African Economic Reconstruction and Recovery Plan, and the Digital and Future Skills Strategy for South Africa (2020) focus on access to skills development and workplace-based learning programmes for young people, as well as developing necessary digital skills for the future workforce respectively (Government of South Africa 2022; Government of South Africa 2020a). It emphasises collaboration through public-private partnerships, capacity-building for educators, promoting digital inclusion and equity, and implementing an evaluation framework for continuous improvement. The strategy anticipates future work, encourages knowledge sharing and emphasises the importance of policy review and evolution to adapt to changing digital landscapes.

Other key policy frameworks include the Report of the Presidential Commission on the Fourth Industrial Revolution and the development of a Digital Economy Masterplan (Government of South Africa 2020b; Ellipsis 2020). In 2024, the government announced the convening of a multistakeholder Digital Skills Forum to support the implementation of the Digital and Future Skills Strategy.

South Africa also has an active coordination mechanism between skills stakeholders including the private sector, government, and donors through the Presidential Youth Employment Initiative (PYEI). This group works to improve the coordination of interventions for skills for work (including improved pathways from digital skills to work in digital sectors and sectors with digital skills needs). The PYEI additionally coordinates an Interdepartmental Working Group to align on digital skills challenges and needs.

[12] See Announcement of the Digital Skills Forum (2024) and the ToR for the Digital Skills Forum.

Following a successful pilot programme in private schools, South Africa is planning to announce a coding and robotics curriculum for basic education in public schools.

South Africa benefits from an active civil society, which includes organisations such as Harambee Youth Employment Accelerator. Harambee has driven an innovative platform called SA Youth, which brings together many partners to create a single national network to allow young people to access jobs and skilling opportunities, and for opportunity holders to access young engaged work-seekers - at no cost. Other notable organisations include Geekulcha, Digify, We Think Code and GirlCode - each offering digital skills training aimed at young people.

3.2.3. Main gaps across the three countries

Despite some real advances, various gaps persist in all three countries. Senegal faces budget constraints that cause sluggish implementation of the ambitious policies. In Rwanda and South Africa, one of the major issues is that, despite successes in delivering digital skills training, the labour market lags behind in absorbing the increasingly qualified workforce.

Senegal successfully created an enabling policy environment for digital transformation. However, the government has allocated a very small budget for digital skills and literacy development. The administration initially struggled with the implementation of policies but Macky Sall's government was seen as a proactive actor with a pragmatic approach to international digital partnerships. Despite increased collaboration with international skills providers, the ICT ministry has limited capacity to coordinate international support with efforts to expand the scope of ICT mainstreaming in key sectors such as health, while it attempts to improve coordination with Senegal Numerique, who is in charge of The Digital Skills Academy.

Further, digital skills training programmes that target women and young people in Senegal have not been responsive to the needs and social context of the country. There are good examples of organisations with experience that can guide the inclusion of social norms in digital skills programs. These include the Senegalese start-up Digital Nisa, which runs specific awareness-raising programmes in rural areas to inform women about the opportunities digital skills offer to improve their lives. The German non-profit Digital Skills Accelerator for Africa (DSAA) partners with local private companies to tailor digital skills programmes so that women can better reconcile these trainings with their family responsibilities.

Similar to Senegal, **South Africa faces specific challenges in translating policy statements into the delivery of in-demand skills or jobs that can deliver inclusive economic growth.** The lack of a unified, coordinated digital skills strategy across key stakeholders is a concern. The proliferation of policies takes away from the agility needed to efficiently address evolving skill requirements.

Even in cases where digital skilling and reskilling are delivered in post-school education including TVETs, South Africa lacks processes to enable industry to absorb graduates. Specific barriers include rigid accreditation systems that have not been updated to recognise new or

emerging digital skills and the persisting mismatch between the supply of skills training and industry demand.

At the systemic level, **South Africa's digital skills efforts are challenged by the digital divide entwined with historical legacies of apartheid, socio-economic inequalities, and constraints in its communications infrastructure.** Disparities in internet access and digital literacy disproportionately affect marginalised communities, rural areas, and low-income households. These discrepancies underscore the urgency of addressing digital inclusion challenges to foster a more inclusive and equitable digital society.

In **Rwanda**, several challenges persist. Despite government incentives, the **local private sector** remains weak and therefore does not offer the digital ecosystem needed to absorb high school and university graduates, regardless of their skill level. Similarly, **civil society** is comparatively weak in Rwanda due to its social structure, tumultuous history, and state-centred governance. This puts the country at a disadvantage since these organisations are particularly suited to reach those out of formal education or employment but also to strengthen democratic participation and citizen engagement in a *de facto* one-party state. Moreover, Rwanda's **regional engagement** remains reluctant, although it is a member of numerous regional organisations. The government could tap into the potential of regional cooperation, especially with regard to cross-border enterprise and knowledge exchange, in order to advance its aspirations to become a regional hub or globally competitive.

3.2.4. Takeaways for a whole-of-society approach to digital literacy

The countries of the three case studies - Rwanda, Senegal and South Africa - are more digitally mature than other Sub-Saharan African countries but lag behind globally. From an economic perspective, there is a pressing need for digital hard and soft skills in order to actively engage in the fast-paced and highly competitive global economy. Failing to invest in digital upskilling could exacerbate the digital divide with other regions. Digital literacy among the workforce and the general population are also key to developing Africa's local industries such as agriculture and services, while creating meaningful employment and reducing poverty among African youths. All three case studies suggest that these considerations underpin the strong emphasis on employability and 'productive' digital skills. This focus often has the unintended consequence of missing the most vulnerable such as women in rural areas, people with disabilities, or low-income households with limited access to digital devices.

All three countries aim to implement a whole-of-society approach to digital literacy with varying degrees of success. Rwanda's Digital Ambassadors Programme, which trains the general population in basic digital literacy, has been hailed as a success. In Senegal, NGOs and CSOs have taken the lead in digital literacy training with more diverse but less systematic upskilling. South Africa sees digital literacy mainly as a means to tackling the record-level unemployment rates in the country–mostly at the expense of a broader whole-of-society approach.

Finally, the policies and programmes in Rwanda, Senegal and South Africa underestimate the importance of digital citizenship. As African countries are increasingly the target of online disinformation campaigns and cybersecurity threats, digital soft skills including critical thinking and responsible online behaviour among all groups of society are needed to build confidence in digital tools and applications, to foster online trust, and to prevent democratic backsliding. In this sense, the continental frameworks as well as the EU's holistic digital literacy framework are invaluable resources when designing and implementing digital literacy programmes.

3.3. Challenges for international partnerships

International partnerships are mushrooming to meet the pressing demand for digital skills and literacy. Building on the continental and national strategies, it is now time to support the implementation of these policies and frameworks. While each initiative contributes to boosting competences among certain target groups, international partners, including the EU and its member states, face a number of challenges when engaging with African stakeholders.

Firstly, most digital skills and literacy projects in Africa currently focus on technical skills for the general workforce (TVET) or high-level ICT skills, while a more comprehensive approach that encompasses digital citizenship is still in its infancy. Responding to the demand of partner countries like Rwanda, Senegal or South Africa, most cooperation projects have built on long-standing partnerships in the TVET sector to boost youth employment. More recently, the Fourth Industrial Revolution is magnifying the demand for digital hard skills to manage automated and digitised manufacturing processes, including those needed for the digital and green 'twin transition'. The strong emphasis on digital hard skills in African countries overshadows the urgent need to also promote digital soft skills that enable all citizens to partake in the digital transition in a safe and meaningful manner – an approach that is well reflected by the EU's holistic digital literacy framework. Given their advanced frameworks and domestic experience, the EU and its member states are uniquely positioned to highlight the benefits of a more holistic approach to digital literacy and to embed it in their partnerships.

Secondly, digital skills programmes are limited in their approach to inclusion. Democratising access to digital literacy and skills projects ensures that citizens and societies are less exposed to privacy and security threats as well as abuse of digital technologies by internal and external actors for political or commercial objectives. An intersectional approach (that is, taking into account different factors like age, gender, disability, place of living, education level, et cetera and the way they interact and reinforce each other) would help democratise access to digital skills programmes and prevent exacerbating inequalities. For example, the need for digital skills programmes is higher in rural and underserved areas; yet, there are very few programmes that go beyond urban areas. In many cases this is due to the lack of digital infrastructure - highlighting the need to combine digital literacy projects with infrastructure support. The private sector – dominated by Chinese and US companies – is often in a better position to make such offers at scale and offset deficits in official cooperation efforts.

Furthermore, people in rural areas are more likely to be excluded from programmes because they tend to have lower levels of education and speak primarily in local languages (Domingo 2023). Moreover, current digital skills and literacy programmes are short-term modules, which means that they are more often targeting people with mid-level digital skills, while the skills gaps across the continent would benefit from more structural interventions both at basic and higher levels. Training programmes also fall short of accommodating the needs of disadvantaged groups. Women tend to drop out of programmes due to social norms, including family responsibilities. Finally, there are very few organisations and projects that cater to disabled people. In Senegal, the International Telecommunication Union (ITU) and ST Foundation are rolling out a course on 'Introduction to Computer Basics for Visually Impaired', and both Cisco and Huawei offer training for the blind, but the broader development of frameworks and projects accommodating the needs of people with disabilities is still nascent (ITU 2023; Domingo and Salzinger 2024). African governments need to centre inclusion in their digital literacy frameworks, policies and wider approaches to avoid deepening inequalities in the access to and use of digital technologies.

Thirdly, there is a risk of duplication and fragmentation because different international partners, including providers, developers and implementers of digital skills and literacy projects are not yet coordinating sufficiently. Different stakeholders agree that there is room for better coordination and collaboration, including between the EU and multilateral institutions like the UN and World Bank. To keep track of all the digital literacy initiatives, whether stand-alone projects or project components, a marker for digital literacy would be needed. International actors could use such a marker to code the activities under their aid budgets. The OECD Development Assistance Committee (DAC) is in the process of elaborating a marker for digital skills, but it only tracks digital hard skills.

The EU, member states, their development agencies and their private sectors are beginning to make progress through the Team Europe approach. Yet, as more and more digital cooperation projects contain skills and literacy components, it has remained difficult to map and align the dispersed activities and respective expertise of member states. Recently, the EU D4D Hub started coordinating member states' joint investment plans for a digital skills and literacy project under the Global Gateway Initiative, although discussions are still at an early stage. For the EU and member states, coordinating their digital skills and literacy projects under one clear and visible project could help to develop a more comprehensive approach to digital literacy, present their offer to African governments in a coherent manner and maximise their resources and capacity to achieve developmental and political objectives.

These challenges - a focus on employment-oriented training of digital hard skills, their shortcomings in ensuring inclusion and the difficult coordination of countless digital literacy projects and project components - highlight the potential added value of the EU in developing a more coordinated and comprehensive approach to digital literacy in partner countries. While these are challenges that all international and local digital literacy providers face, the EU and member states are uniquely positioned to tailor their digital literacy offer to the needs of

African partners not only for economic development but also for an inclusive, human-centred and sustainable digital transition.

4. Conclusion

Africa's young population is expected to grow over the coming years, putting pressure on governments and the private sector to create jobs to respond to high labour demand. Yet, these countries face considerable challenges such as poor infrastructure and low education levels. Digital skills will be essential not only for jobs in the digital sector but increasingly for jobs across the whole economy. At the same time, digital technologies and AI will continue to transform our societies and cultures, making digital literacy essential to be an active and informed citizen and to prevent a wide range of potential risks, including online disinformation and hate speech, abuse of personal data and online fraud. In this paper, we argued that a comprehensive approach to digital skills and literacy is essential to ensure digital sovereignty and that the AU and African governments have an interest in developing comprehensive digital skills and literacy frameworks and programmes that encompass both hard and soft skills.

African governments do not need to reinvent the wheel. Existing international digital skills and literacy frameworks can be adjusted to respond to local needs and social contexts. In addition to local actors, international public and private sector players are competing over providing training in digital skills, predominantly from the EU, China and the US. American providers have an edge in providing certificate programmes for high-level ICT skills, while China combines investments in digital infrastructure with related technical skills training. In contrast with China and to a higher degree than the US, the EU is in the unique position to offer a holistic approach to digital literacy based on its human-centric approach.

The EU can share its experience in developing and implementing its own comprehensive digital literacy framework, which combines hard, technical skills with the concept of sovereign and responsible citizens in the digital age, who know about their rights and can make informed judgments on dealing with online information. Team Europe needs to develop a more united and comprehensive offer for implementing this approach in projects on the ground. The EU and its member states can build on decades of experience with vocational training in Africa, many of which are today related to digital skills. The broader concept of digital literacy should be mainstreamed across these programmes. This comprehensive approach to digital skills and literacy should also be developed as part of the Global Gateway investment package for Africa. Digital skills and literacy should be mainstreamed into Global Gateway initiatives focused on digital infrastructure.

We suggest recommendations in four different areas: better coordination amongst Team Europe members, a more comprehensive offer for hard skills, a more strategic approach to integrating digital literacy into programmes and a scaling up of people-to-people partnerships through academic, civil society and innovation exchanges.

4.1. Policy recommendations for the EU and its member states

Improve Team Europe coordination

1. The EU and its member states need to better coordinate the digital skills support of various Team Europe players in partner countries by systematically tracking and mapping vocational skills projects with digital skills components. The EU can draw examples and lessons from the development of the new OECD-DAC marker for digital skills components in projects (currently only measuring digital skills for employment). However, the EU and its member states should also use their influence at the ITU to advocate for the development of a more comprehensive SDG indicator aligned with EU Dig Comp 2.2. and sector-related frameworks (for example, e-Competence, education) to be able to measure efforts focused on both digital skills and literacy development in partner countries.
2. **The EU and its member states should take advantage of the D4D Hub, including the Digital Skills Working Group, to bring together a broader range of stakeholders relevant to digital skills training based on the lessons learned from the Erasmus Programme and the Horizon Programme in building partnerships for R&I.** This effort should be combined with creating stronger communication between the development community and the EU's different policy departments and directorates including DG CNECT, DG EAC, et cetera.

Respond to the demand for digital skills for employability, linking this with investments in infrastructure and concrete efforts to develop job opportunities under the Global Gateway

1. If the EU wants to be visible and present as a digital skills partner in Africa, **it has to address the biggest needs on the continent, as well as African partner countries' overwhelming priority**: **digital skills for economic development and youth employment.** For the EU, applied digital skills for manufacturing, health, government and other areas can be a promising area to focus resources but these should be carefully matched with Global Gateway investments in these different areas (for example, for manufacturing projects, e-health, e-government, et cetera.). European countries have high-quality vocational training systems and European companies – largely SMEs – are innovators in the digitisation of industry (IoT applications). Another key area of demand is **high-level digital skills for an elite of ICT professionals who can take the lead in shaping a country's digital transformation and innovation.** The EU can provide guidance for general frameworks or university curricula and it is making efforts to mobilise its companies to enter public-private partnerships in the non-formal education sector.
2. **The EU and member states should involve the European private sector more when developing comprehensive digital skills programmes - combining digital skills with investment in digital infrastructure as part of the Global Gateway investment package for Africa.** The EU can follow the example of ITU, which is building a partnership with the Indian telecommunication company Airtel to bring basic connectivity to rural

areas as part of their digital skills offer, while Cisco provides virtual switches.[13] European companies have in the past partnered directly with African partners or international organisations (Ericsson with SADA on training government officials, Siemens with South African TVET colleges or Nokia with UNICEF on schools in Senegal). Under the Global Gateway, the EU has a unique opportunity to advance the digital skills agenda by consistently integrating digital skills in investment packages for digital infrastructure.

Communicate and leverage the EU's added value in digital literacy and cybersecurity

1. **The EU should integrate digital literacy and digital citizenship training in all sectors and across all levels of digital skills training (basic, intermediate and expert)**, in addition to aligning its values with partner country priorities (employment and high-level skills). Team Europe can convey **the added value of digital literacy training through concrete examples that are relatable in the African context.** This includes highlighting how critical and responsible online behaviour can limit the real-life harms from data breaches, algorithmic discrimination, surveillance, or online mis- and disinformation. In its Digital Literacy Primer, USAID gives good examples of how to do this. Stand-alone offers on digital literacy and citizenship can be made for school-aged children and youth as well as for vulnerable groups where needed, such as for gender or ethnic minorities, or human rights defenders.
2. **The EU and member states should also scale their support for cybersecurity capacity-building for governments and other actors from critical sectors**. The EU already runs a number of training initiatives, including CyberNet and what it plans to make a regular summer school on diplomacy, first held in Tallinn in 2023 (EEAS 2023). Yet, in Africa there is a critical shortage of both human and technological capacity that are key to ensure cybersecurity, starting at the national level. The EU could step up training programmes in this area together with digital literacy projects for government officials under the new action, Safe Digital Boost with Africa (SDBA), which will focus on cybersecurity, e-governance and e-commerce. Moreover, the EU can support the AU in increasing awareness of the relevance of enhancing governments' capacity on cyber security for national interests, including national security, economic necessity and digital sovereignty (for example, defending election integrity).

Promote stronger partnerships between European and African academia and CSOs

1. **The EU should encourage more research and education partnerships between European and African students, academics and universities,** by building on its Erasmus+ exchange programmes in both universities and vocational training, and on research partnerships under HORIZON Europe. Firstly, more funding should be earmarked for partnerships with African universities, with a particular focus on creating more incentives for STEM departments at European universities to partner with African

[13] A virtual switch is a 'software-based' network switch that operates within a virtualized environment, such as a virtual machine or cloud infrastructure. It enables communication between virtual machines, as well as between virtual machines and the external network' (VPN Unlimited n.d.).

ones, or to include African institutions in university consortia. Secondly, these partnerships should include the sponsoring of state-of-the-art equipment to African labs following the example of the partnership between the Rochester Institute of Technology (US) with the College of Science and Technology in Kigali. Thirdly, Erasmus+ could be scaled up to provide more opportunities for African STEM students to both gain high-level technical skills, but also to engage with the European research and technology ecosystem, thereby building important people-to-people links.

2. **The EU and member states should work more with local authorities and CSOs to develop digital skills and literacy programmes that are responsive to the needs of people and the labour market.** Working with CSOs is key to identifying the needs of the population including the most disadvantaged groups and ensuring the sustainability of digital skills and literacy programmes. While there is growing support from the EU and some member states to CSOs working on digital rights (for example, through the Charter Project, or the Digital Democracy Initiative, led by Denmark) the general approach has been sporadic support to CSOs (EU 2023c). The EU and member states should sustain their engagement with local CSOs beyond the consultation and mapping exercises through the development and implementation of projects.

References

Access Now. 2024. *#KeepItOn: government of Senegal must ensure open and secure internet access throughout the 2024 presidential elections*.

AFD N.d. *Inedit project: digital inclusion, digital savings and technological innovations*. Agence Française de Dévelopment (AFD).

Alizila 2018. *Rwanda first in Africa to Join Alibaba-Led eWTP*.

Amani, A. 2020. *Cinq étudiants décrochent des bourses d'études en Chine*. Seneplus.

AU. 2020. *The Digital Transformation Strategy for Africa (2020-2030).* African Union.

AU. 2022. *Digital Education Strategy and Implementation Plan*. African Union.

Bashir, S. and Daniels, C. 2023. *Chapter 13 on Digital Skills in Africa*: Prospects for AU–EU Collaboration in Africa-Europe Cooperation and Digital Transformation. Routledge.

Bashir, S. and Miyamoto, K. 2020. *Digital Skills: Frameworks and Programs.* Washington DC: World Bank Group.

Bhorat, H. Signé, L. Asmal, Z. Monnakgotla, J. And Rooney, C. 2023. *Digitalisation and digital skills gaps in Africa| an empirical profile*. Brookings.

Bradford, A. 2023. *Digital Empires: The Global Battle to Regulate Technology*. Oxford University Press.

BRICS. 2023. *BRICS and Africa: Partnership for Mutually Accelerated Growth, Sustainable Development and Inclusive Multilateralism*. XV BRICS Summit Johannesburg II Declaration.

CAC. 2024. *中央网信办等四部门印发《2024年提升全民数字素养与技能工作要点》* (Cyberspace Administration and three other agencies publish "2024 Action plan to lift up digital literacy and skills for the entire population"). Central Government of the People's Republic of China.

Chen, X. 2023. *Luban Workshop in Africa a valuable asset for vocational education empowering locals*. Global Times.

CGTN Africa. 2023. *Alibaba set to open e-commerce class for Rwandan students*.

Craffert, Leona and Grove, Wouter and Katunga, Natasha and Keating, Carlynn and Claassen, Walter. 2024. *DIGITAL SKILLS FRAMEWORK ONE DSFOne Concepts and building blocks of the unified digital skills framework*. University of the Western Cape.

DigiChina. 2022. *Translation: 14th Five-Year Plan National Informatization* - Dec.2021. DigiChina project. Stanford University.

Digital Virgo. 2023. *Country focus: The digital ecosystem in Senegal*.

Domingo, E. and Tadesse, L. 2022. *Digitalisation and democracy: Is Africa's governance charter fit for the digital era?* ECDPM Discussion Paper 331. Maastricht: ECDPM.

Domingo, E. 2023. *The Achilles' heel of Kenya's growing digital economy*. ECDPM Commentary. Maastricht: ECDPM.

Domingo, E. and Salzinger, M. 2024. *Senegal's digital skills initiatives should have equity in mind*. ECDPM Commentary. Maastricht: ECDPM.

Dupoux, P. Dhanani, Q. Oyekan, T. and Rafiq, S. 2022. *Africa's Opportunity in Digital Skills and Climate Analytics*. Boston Consulting Group (BSG).

EC. 2018. *EU budget: Commission proposes to double funding for Erasmus programme*. Press release. Brussels: European Commission.

EC. 2023. *Erasmus+ supported 26,000 projects and 1.2 million learning mobility opportunities in 2022, annual report shows*. Brussels: European Commission.

EEAS. 2023. *Upholding a free, open, safe, and secure cyberspace*. Tallinn Summer School of Cyber Diplomacy 2023. Concept note. European External Action Service.

Ellipsis. 2020. *ICT and Digital Economy Masterplan for South Africa*.

ESTDEV. 2024. *ESTDEV to fund nine new projects in Africa*. Tallinn: Estonian Centre for International Development.

EU. n.d. *Europe's Digital Decade: digital targets for 2023*. European Union. Brussels: European Union.

EU. n.d. *European Qualifications Framework (EQF)*. Brussels: European Commission.

EU. 2023a. *Digital diplomacy: Council sets out priority actions for stronger EU action in global digital affairs*. Press release. Brussels: European Union.

EU. 2023b. *Quality education in Africa: EU launches €100 million Regional Teachers' Initiative*. Press release. Brussels: European Union.

EU. 2023c. *Promoting inclusive democracy in the digital age: EU and Denmark launch the Digital Democracy Initiative*. Brussels: European Union.

EU. 2024a. *EU leads global mobilisation for increased investments in inclusive and quality education for all*. Press release. Brussels: European Union.

EU. 2024b. *Global Gateway: The EU launches new regional initiatives in Africa to boost youth mobility and skills, including the unique Africa-* Europe Youth Academy. Brussels: European Union.

Focac. 2021. *Forum on China-Africa cooperation Dakar Action Plan (2022-2024)*.

GIZ. 2021. *Sector Brief Senegal: Information and Communications Technologies*. Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH.

Government of South Africa. 2020a. *National digital and future skills strategy South Africa*. Department of Communications and Digital Technologies.

Government of South Africa. 2020b. *Report of the Presidential Commission on the 4th Industrial Revolution*.

Government of South Africa. 2021. *Implementation programme guide for the national digital and future skills strategy of South Africa*.

Government of South Africa 2022. *Skills Strategy: Support for the South African Economic Reconstruction and Recovery Plan*.

Government of South Africa. 2023. *Quarterly Labour Force Survey*. Department of Statistics South Africa.

Groupe ISM. N.d. *Le "Savoir-etre" indispensable dans la formation de l'étudiant*.

GSM. 2020. *The Mobile Gender Gap Report 2020*.

Hollywood University. 2023. *Sénégal: lancement d'un programme destiné à ña formation numérique de 80.000 jeunes d'ici 2026*.

ITU. N.d.-a. *Population coverage, by mobile network technology*. DataHub. The International Telecommunications Union.

ITU. N.d.-b. *Individuals using the Internet*. DataHub. The International Telecommunications Union.

IFC. 2019. *Digital skills in Sub-Saharan Africa: spotlight on Ghana*. International Finance Corporation (IFC).

ITU. 2022. *Digital Skills Insights 2021*. International Telecommunications Union.

ITU. 2023. Global DTC Workshop: Accelerating Digital Skills Development. International Telecommunications Union.

Kokutse, F. 2023. *ECOWAS considers skills and employability action plan*. University World News.

Law, N., Woo, D., de la Torre, J. and Wong, G. 2018. *A Global Framework of Reference on Digital Literacy Skills for Indicators 4.4.2.* Information Paper No.51. Montreal: UNESCO Institute for Statistics.

MoE. 2022. *教师数字素养* (Digital Literacy of Teachers). JY/T 0646—2022. Ministry of Education of the People's Republic of China.

Musoni. M., Karkare. P., Teevan, C and Domingo, E. 2023. *Global approaches to digital sovereignty: Competing definitions and contrasting policy*. ECDPM Discussion Paper 344. Maastricht: ECDPM.

Nzioki, M. 2023. *Launch of COMESA Business e-Academy to play a leading role in the region's Digital and Financial Literacy Skills development*. Comesa Business Council (CBC).

OECD. N.d. DAC gender equality policy marker.

Ronceray, M., Tine, L., Salzinger, M. and Bakari, R. 2023. *The ECOWAS democracy agenda: Channels, lessons and digital technologies for civil society engagement*. ECDPM Discussion Paper 350. Maastricht: ECDPM.

Stewart, A. 2021. *Orange Digital Center - A partnership for innovation, digital skills and job creation*. Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH.

Teevan, C. and Domingo, E. *The Global Gateway and the EU as a digital actor in Africa*. ECDPM Discussion Paper 332. Maastricht: ECDPM.

Tikum, N. 2022. *Le Sénégal en passe de réussir sa transformation digitale?* UNDP.

USAID. 2022. *Digital Literacy Primer*. Washington DC: United States Agency for International Development.

USAID. 2023. *USAID Announces New Partner Commitments to the Women in the Digital Economy Fund and launches the Women in the Digital Economy Initiatives.* Washington DC: United States Agency for International Development.

Vuorikari, R., Kluzer, S. and Punie, Y. 2022. *DigComp 2.2: The Digital Competence Framework for Citizens - with new examples of knowledge, skills and attitudes*. Luxembourg: Publications Office of the European Union.

VPN Unlimited. N.d. *Virtual switch*.

WB. N. d. *Partnership for skills in Applied Sciences, Engineering and Technology (PASET).* The World Bank.

Weforum. 2020. *Africa needs digital skills across the economy - not just the tech sector*. World Economic Forum.

Wedlaker, S., Lothian, K., Keyes, D. and Coward, C. 2019. *Digital skills sets for diverse users.* Government of Seattle.

The White House. 2022a. Fact Sheet: *New Initiative on Digital Transformation with Africa (DTA)*. Statements and release.

The White House. 2022b. *U.S. Strategy Toward Sub-Saharan Africa*.

The White House. 2023. Fact Sheet: *President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence*. Statements and releases.

Yuan, Y. 2024. *数字中国视域下的数字素养研究新趋势* (New trends in digital literacy research under the Digital China Vision). Educational Media Research.

Xinhua 2023. *Xi announces measures to advance practical cooperation for BRI.*

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