



EDUCATION WORKING PAPER

No. 16 | June 2025

Analyzing the Gender Digital
Skills Divide in Sub-Saharan
Africa: Current State and
Contributing Factors

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Please cite the work as follows: Voufo, C., P. M. Gala, and M. R. Barron Rodriguez. 2025. *Analyzing the Gender Digital Skills Divide in Sub-Saharan Africa: Current State and Contributing Factors*. Education Working Paper Series No. 16. Washington, DC: World Bank Group.

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Analyzing the Gender Digital Skills Divide in Sub-Saharan Africa: Current State and Contributing Factors

Christiane Wendy Voufo, Priyal Mukesh Gala, and Maria Rebeca Barron Rodriguez

Abstract

This paper examines the current state of the gender digital skills divide in Sub-Saharan Africa (SSA), drawing on a broad set of data sources to assess disparities between men and women across key dimensions of digital readiness. The analysis explores differences in educational attainment, digital skills levels, access to digital infrastructure and devices, labor force participation, and representation in STEM and ICT fields. It also investigates the influence of gender norms—including both societal attitudes and internalized perceptions among women—on digital engagement and skills development. To contextualize regional findings, the paper compares SSA with other regions in the Global South and with High-Income Countries, highlighting both shared patterns and region-specific challenges. The assessment reveals that women and girls in SSA face persistent barriers to developing and applying digital skills, with particularly pronounced gaps in access to internet-enabled devices, digital learning opportunities, and advanced training in STEM-related fields. These disparities are further compounded by prevailing gender norms and limited exposure to female role models in the digital economy. Across most indicators, SSA lags both comparator regions and global averages, underscoring the urgency of narrowing the divide. This paper contributes to the evidence base needed to understand the scope and drivers of the gender digital skills gap in SSA and serves as a foundational input for future policy design and programmatic action.

JEL Classification: I20, I23, I24, J20, J24, N37

Keywords: Digital Skills, Gender Gap, Labor Force Participation, STEM, Gender Norms

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Acknowledgments

This World Bank Working Paper was prepared by Christiane Wendy Voufo, Priyal Mukesh Gala, and Maria Rebeca Barron Rodriguez, under the guidance of Alex Twinomugisha.

The authors would like to express their sincere gratitude to Alex Twinomugisha and Robert J. Hawkins for their invaluable guidance and unwavering support throughout this research.

This work was conducted with the support of the Mastercard Foundation, and it is part of a series of background papers being published under the Youth Skills and Resilient Hybrid System Global Public Goods and Capacity Building program. The report was edited by Kia Penso, and Mabel Martínez performed the production editing.

Acknowledgment of Artificial Intelligence (AI) Assistance

This report was developed with the assistance of the generative AI tools like ChatGPT and MAI, which were used to refine and restructure content based on specific prompts and feedback.

While the generative AI tools provided valuable assistance in data interpretation and content generation, all analyses, conclusions, and final recommendations were reviewed, edited, and approved by human experts to ensure accuracy, relevance, and ethical considerations.

The use of AI in this report which is about digital skills reflects the authors' commitment to leveraging advanced technologies to enhance their analytical capabilities, while maintaining human oversight and judgment in the final product.

Abbreviations

ICT	information and communications technology
IFC	International Finance Corporation
ILO	International Labour Organization
ITU	International Telecommunication Union
MICS	Multiple Indicator Cluster Survey
OECD	Organisation for Economic Co-operation and development
STEM	science, technology, engineering, and mathematics

1. Introduction

The fourth industrial revolution is bringing about an acceleration in the change to technology and to the ways that technology is leveraged for economic advancement. Innovations like generative artificial intelligence (GenAI) are changing labor market demands and prompting fears that a failure to keep up with these demands will result in a loss in employability. In Africa, the digitalization of economic activity (the digital economy) is expected to lead to a US\$180 billion return by 2025, and up to US\$712 billion by 2050 ([Boston Consulting Group 2022](#)).¹ Sub-Saharan Africa has the highest youth dividend in the world; 41.8 percent of the population are between the age of 0 and 14 years old, and 49.5 percent of these are female.² Capitalizing on the economic returns of digitalization will mean investing in the development of digital skills in both girls and boys through education.

The World Bank's Digital Economy for Africa initiative outlined five dimensions to digitalization: 1) digital infrastructure, which includes access to affordable connectivity services, the internet of things, and data centers, as well as institutions and rules regulating competition within the telecommunications market; 2) digital platforms that facilitate digital transactions and support digital businesses and various types of service delivery; 3) digital financial services that provide individuals and families with the means to complete financial transactions using digital tools and platforms; 4) digital entrepreneurship, where innovators create new products and services through technology and digitally-enabled business models; and 5) digital skills, which are broadly defined as a range of abilities to use digital devices, communication applications, and networks to access and manage information ([World Bank Group 2020](#); [UNICEF 2023](#)).

As the world economy becomes more reliant on technology, the demand for a digitally literate workforce will only increase. The International Telecommunication Union (ITU) estimates that 90 percent of future jobs will require digital skills, and the International Finance Corporation (IFC) estimates that 230 million of those jobs will be in Africa by 2030 ([equalsintech 2023](#); [IFC 2019](#)). This is especially true for the services sector, as it has the highest rate of digital adoption, with an expected 60 percent adoption rate in Sub-Saharan Africa by 2030 ([World Bank, IFC, and DDP 2021](#)).

The digitalization of the labor market is estimated to lead to the loss of approximately 50 percent of the world's current jobs (IFC, 2018). A 2019 McKinsey study reviewed trends in the labor market across six mature economies (Canada, France, Germany, Japan, the United Kingdom, and the United States) and four emerging economies (China, India, Mexico, and South Africa), accounting for approximately 50 percent of the world's population and 60 percent of its gross domestic product (GDP), to predict how the future world of work would change for women and men due to automation ([McKinsey 2019](#)). They found that by 2030, automation may lead to 107 million women (20 percent) losing their jobs compared

¹ The International Monetary Fund defines the digital economy as online platforms and the activities that depend on them ([IMF 2018](#)). For this paper, the digital economy will be defined as the digitalization of economic sectors.

² [World Bank Gender Data Portal 2022](#)

to 163 million men (21 percent) ([McKinsey 2019](#)). However, in emerging economies, such as India's, where a high percentage of women work in the agriculture sector, job losses to automation could go up to 28 percent for women and down to 16 percent for men ([McKinsey 2019](#)). This has great implications in Sub-Saharan Africa, where more than 50 percent of men and women worked in the agricultural sector as of 2022 ([WDI 2022](#)).

The African Union's Digital Transformation Strategy recognizes digital skills as key to the digital transformation needed for the continent to increase its global competitiveness. However, it also recognizes that the region's digital skills gap is exacerbated by gender, with girls lagging boys ([African Union 2020](#)). This gender digital divide is evident in indicators like access to devices and telecommunication services, among other aspects. Generally, research on digital skills in Sub-Saharan Africa is quite limited; it is even more so for the gender digital divide. The few studies that are available for digital skills do not account for the components of digital skills as outlined by multiple international organizations like the United Nations Educational, Scientific and Cultural Organization (UNESCO), the European Commission, and the ITU (Box 1.1). Instead, digital skills have been measured through proxy indicators such as school enrollment, mean years of schooling, literacy rates, and internet access in schools ([Bhorat et al. 2023](#); African Union, 2020).

Box 1.1: Components of Digital Skills across International Organizations

European Commission: Digital Skills Components

The European Commission's Digital Competences Framework DigComp2.2, organizes digital skills into five competence areas, denoted domains 1–5. Each domain is further subdivided into 4 proficiency levels denoted, foundational, intermediate, advanced, and highly specialized (not included in the box).

Domain 1: Information and Data

- 1.1 Navigate, search, and filter data, information, and digital content
- 1.2 Evaluate data, information, and digital content
- 1.3 Manage data, information, and digital content

Domain 2: Communication and Collaboration

- 2.1 Interact through digital technologies
- 2.2 Share content using digital technologies
- 2.3 Engage in citizenship through digital technologies
- 2.4 Collaborate via digital technologies
- 2.5 Netiquette
- 2.6 Manage digital identity

Domain 3: Digital Content Creation

- 3.1 Create digital content
- 3.2 Integrate and modify digital content
- 3.3 Copyrights and usage licenses
- 3.4 Programming

Domain 4: Protection and Security

- 4.1 Protect digital devices

Box 1.1 (continued)

- 4.2 Protect personal data and privacy
- 4.3 Protect health and well-being
- 4.4 Protect the environment

Domain 5: Problem Solving

- 5.1 Solve technical problems
- 5.2 Identify digital/technological needs and solutions

UNESCO: ICT Skills Components

Under the UNESCO's Sustainable Development Goal 4, indicator 4.4.1, which measures the number of youth (15-24 years old) with Information and Communication Technologies (ICT) skills, ICT skills are defined by a set of nine skills.

1. Copying or moving a file or folder
2. Using copy and paste tools to duplicate or move information within a document
3. Sending e-mails with attached files (e.g. document, picture, video)
4. Using basic arithmetic formulas in a spreadsheet
5. Connecting and installing new devices (e.g. a modem, camera, printer)
6. Finding, downloading, installing and configuring software
7. Creating electronic presentations with presentation software (including images, sound, video or charts)
8. Transferring files between a computer and other devices
9. Writing a computer program using a specialized programming language

International Telecommunication Union (ITU): Digital Skills Components

The ITU launched a digital skills toolkit in 2018, in which they outlined components of digital skills organized in three levels of competence, from basic to advanced.

Basic Skills

1. Word processing
2. Managing privacy settings
3. Emails
4. Using keyboards and touchscreens

Intermediate Skills

1. Desktop publishing
2. Digital graphic design
3. Digital marketing

Advanced Skills

1. Artificial intelligence
2. Digital entrepreneurship
3. Big Data
4. Cybersecurity
5. Internet of Things
6. Virtual Reality

Source: [European Union 2022](#); [UNESCO 2018](#); [ITU 2018](#).

Although these indicators are important, they are not a direct measure of digital skills but of factors that influence their development in both boys and girls. A global review of the gender digital divide was recently conducted by UNICEF, across 32 countries, using data from the Multiple Indicator Cluster Survey (MICS) comparing girls' access to internet and mobile devices, as well as their level of digital skills, to those of boys. This review found that only 4 of the 32 countries analyzed—Lesotho, Viet Nam, Mongolia, and Samoa—had attained gender parity ([UNICEF 2023](#)), whereas in 17 countries, fewer than 10 percent of girls have digital skills and, in some countries, almost no girls possess digital skills. In seven countries—Tunisia, Suriname, Turks and Caicos Islands, Fiji, Tuvalu, Cuba, and Tonga—girls were ahead of boys in digital skills, but were lagging boys in 21 countries, most of which are in South Asia and Sub-Saharan Africa.

Improving digital literacy for men and women in Sub-Saharan Africa requires a better understanding of the state of the gender digital divide and its main constraints within the region.

2. Understanding the gender digital skills divide

2.1 The importance of addressing the gender digital skills divide

2.1.1 Education

The COVID-19 pandemic taught us many lessons, an important one being that our education systems must be resilient enough to ensure the continuity of learning in the face of disruptions. When digital technology became something that was not just a nice adjunct but a necessity for education, the extent to which girls were at a disadvantage became unavoidably evident, and addressing it became a more urgent necessity. In many regions, girls faced greater barriers in accessing digital devices and online learning platforms, exacerbating existing educational inequalities. We saw that countries that did not have in place the basic digital infrastructure in place or the digital learning resources needed, along with the curriculum and trained teachers equipped to implement them, fared much worse than countries that did. For example, in the Republic of Korea 58.4 percent of the online learning content was created by teachers ([OECD & World Bank 2022](#)). By contrast, for many countries in the global south, programs (many supported by the Bank) had to be implemented to provide teachers with the digital skills needed to teach online. This was the case in the Democratic Republic of Congo under the World Bank–funded *Projet d'Education pour la Qualité et la Pertinence des Enseignements aux Niveaux Secondaire et Universitaire*, where public-private partnerships between the government and telecommunication companies as well as educational platforms like Whizz-Education provided teachers with online teaching and learning material and as well as the training needed to facilitate their use (MINEDU-NC 2020). As schools adopt more digital content, digital skills will become increasingly important for teachers as well as male and female students to advance academically.

It is estimated that in Sub-Saharan Africa during the pandemic, 89 percent of students did not have access to a computer at home and 82 percent did not have access to internet ([equalsintech 2023](#)). In cases where technological devices were available to students at home, girls and young women between 15 and 24 years old were 13 percent less likely to have ownership over them, as is the case for mobile devices ([UNESCO 2022](#)). Girls were thus especially vulnerable to disruptions in learning. This gender disparity in access to digital devices has detrimental effects on the development of information and communications technology (ICT) skills for girls. A 2020 analysis by UNICEF of girls' and boys' ICT skills in households with computers and without computers in Sub-Saharan Africa found that the presence of a computer widened the digital skills gap ([Amaro et al. 2020](#)). In countries like Madagascar, the gap widened from a 2 percent difference in ICT skills between boys and girls (girls lagging) to a 18 percent difference, when computers are present in the household ([Amaro et al. 2020](#)). These statistics highlight the pivotal impact of gender social norms on the development of digital skills for women and girls in Sub-Saharan Africa.

The effects of the poorly prepared education systems in Sub-Saharan Africa were especially disruptive to girls' education during the pandemic. After school closures took effect, an estimated 60 percent of girls did not have access to learning materials compared to 44 percent of boys in West and Central Africa ([World Bank 2022](#)). Additionally, girls were 1.12 times more likely to drop out of school than boys ([World Bank 2022](#)). In 2015, girls in Sub-Saharan Africa made up 56 percent of the out-of-school population, and this trend persists across education levels, with girls being 4.2 percent more likely to be out of school than boys ([Kuwonu 2015](#); [UNESCO 2022](#)). Consequently, their opportunity to acquire digital skills at the same rate and level as boys is compromised. Although a 2020 analysis from UNICEF shows that the effects of not attending school on ICT skills are stronger in boys than on girls in Sub-Saharan Africa ([Amaro et al. 2020](#)). Leveraging technology to deliver education to out-of-school youth through programs like clubs and camps at community centers can help to level the playing field ([Voufo, 2024](#); [Amegah et al. 2024](#); [Hammond et al. 2020](#); [UNESCO 2022](#)).

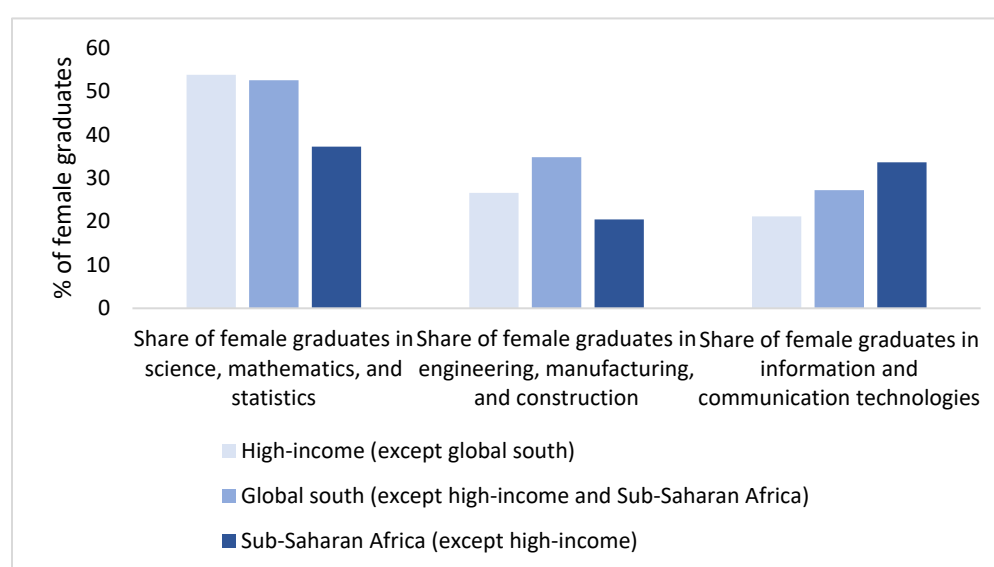
In Sub-Saharan Africa, girls have a low participation rate in ICT programs, making up 33 percent of ICT graduates (median value reported) ([World Bank Gender Data Portal 2010–18](#)). Although low, the share of female ICT graduates in Sub-Saharan Africa is the highest observed in the global south, where the median value of female ICT graduates in South Asia is 32 percent and 27 percent in Latin America and the Caribbean ([World Bank Gender Data Portal 2010–18](#)). This disparity starts early. According to a report by the Organisation for Economic Co-operation and Development (OECD), by the age of 15 only 0.5 percent of girls dream of becoming ICT professionals, compared to 5 percent of boys ([OECD 2018](#)). Similarly, a measurement of the median net enrollment rate for lower and upper secondary schools, by gender, across 11 countries in Sub-Saharan Africa, namely Burkina Faso, Cameroon, Côte d'Ivoire, Djibouti, Ethiopia, The Gambia, Madagascar, Mozambique, Niger, Senegal, and the Seychelles showed an enrollment gap of 57 percent in favor of girls in lower secondary school, and 31 in upper secondary schools in favor of boys (UNESCO Institute of Statistics, 2022). Given that most students chose a specialization in upper secondary school, this enrollment gap could be contributing to the lack of girls' participation in ICT.

This lack of girls' participation is not an indication of their competence, but rather of their belief in their own competence, or self-efficacy. An assessment of student achievement in computer and information literacy was conducted across 14 countries, outside of Africa, by the International Computer and Information Literacy Study and found that on average, girls scored 18 points higher than boys ([UNESCO 2017](#)). Although girls performed better than boys, their self-evaluation on their efficacy showed that they did not believe it, with self-efficacy scores 3 points lower than the boys' scores ([UNESCO 2017](#)). This highlights the capacity girls have for excelling in ICT subjects and underscores the importance of improving their individual agency so that they may do so. The lack of girls' agency for pursuing ICT and other science, technology, engineering, and mathematics (STEM) subjects continues into tertiary education.

STEM is often thought of and referred to as a collection of subjects that are taught separately; however, it is important to remember that these subjects depend on one another. For example, a scientist working on creating a new type of plant by combining two plants with two variants of the same

gene, would need to calculate the probability of one variant prevailing over another and how often this could occur. Additionally, understanding human physiology requires a basic understanding of the laws of physics as well as a mastery of mathematical subjects like arithmetic and algebra. This interdependence of STEM subjects unfortunately means that the trend of girls' under-participation is seen across STEM subjects (Figure 2.1). An overview of the overall participation of girls in STEM across regions in the global south shows that Sub-Saharan Africa lags South Asia as well as Latin America and the Caribbean, with a median value of female STEM graduates of 29 percent, 31 percent, and 39 percent%, respectively ([World Bank Gender Data Portal 2010–18](#)). The lack of girls' participation in STEM, and more specifically in ICT, has great implications for their earning potential and employability.

Figure 2.1: Share of Female Graduates in STEM by Field of Study, 2010–19



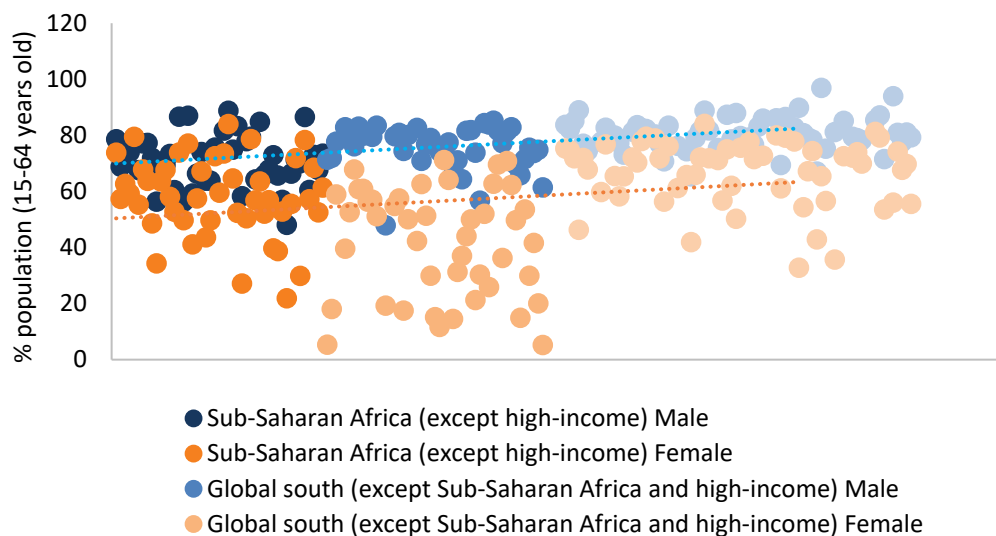
Source: Original figure for this paper. Based on data from World Bank Gender Data Portal, 2010–19.

Note: Median values reported.

2.1.2 Labor Market

Sub-Saharan Africa grapples with complex labor market disparities that encompass gender differences, educational gaps, and sectoral variations. Although global advancements have improved female access to education and healthcare, recent trends show stagnation or decline in female labor force participation rates in Sub-Saharan Africa (ILO 2021). Though the median female labor force participation rate in Sub-Saharan Africa surpasses the rest of the global south, it is still lower than male participation rates, indicating a persistent gender gap (Figure 2.2).

Figure 2.2: Gender Gap in Labor Force Participation Rate (percent)



Source: Original figure for this paper. Based on data from World Development Indicators database, 2022.

Note: Estimates are based on data obtained from the International Labour Organization and United Nations Population Division, last updated March 28, 2024. HI = high-income; SSA = Sub-Saharan Africa.

This makes women particularly vulnerable to job loss due to automation and to being left behind during the digital transformation. However, African women defy these challenges by leading globally as entrepreneurs and business owners. Approximately 30 percent of businesses across the region are owned by women, showcasing their entrepreneurial prowess ([UNU-Wider 2022](#)). For instance, Ghana stands out with 46.4 percent of businesses being owned by women, indicating intraregional variations in female business ownership ([UNU-Wider 2022](#)).

Unfortunately, in the rapidly expanding digital economy, women are underrepresented and marginalized as tech entrepreneurs and often receive less funding compared to males, a phenomenon not unique to Africa. Globally, women's participation in tech sectors remains disproportionately low, with gender discrimination being a focal point in leading tech hubs like Silicon Valley. Despite record rates of women's entrepreneurship in other sectors, their involvement in the tech industry significantly lags. For instance, only 9 percent of African tech start-ups are led by women, according to a 2016 report by Venture Capital for Africa ([Porfido and Marks 2020](#)). Moreover, McKinsey's 2016 estimation reveals that women hold just one-third of leadership positions in the telecommunications, media, and technology sectors ([Porfido and Marks 2020](#)). Additionally, women as consumers of technology face exclusion in Africa, where disparities in internet access are particularly pronounced. In Sub-Saharan Africa, women are 36 percent less likely to use mobile internet and 28 percent less likely than men to own a smartphone, with the result that only 30 percent of women use mobile banking services, compared to 36 percent of men (GSMA, 2023; [Ferrer, Perrin, and Jacolin 2023](#)). These challenges exacerbate gender disparities in the African labor market, particularly in emerging sectors like the digital economy, where the growth potential is high.

The ICT sector in Africa has grown from US\$95.4 billion in 2020 to an estimated US\$104.2 billion in 2023 ([African Development Bank 2023](#)). In the United States alone, between the years 2020 and 2021, there was more than 6 percent growth in average tech salaries, reaching US\$104,566 ([Dice 2021](#)). This dramatic increase in wages was due to an increased demand for a digitally literate workforce. In Sub-Saharan Africa, the lack of girls' and young women's interest and participation in ICT could cost countries like Rwanda, Côte D'Ivoire, Nigeria, Kenya, and Mozambique the 4 million to 28 million digitally literate workers needed to meet the growing demand by 2030 ([World Bank, IFC, and DDP 2021](#)). In Europe, this lack of female participation in ICT is estimated to cost €16 billion in annual GDP, and US\$1.8 billion in annual GDP in Australia ([United Nations Press 2023](#)). Meeting these labor market demands will require the reskilling and upskilling of women across the globe.

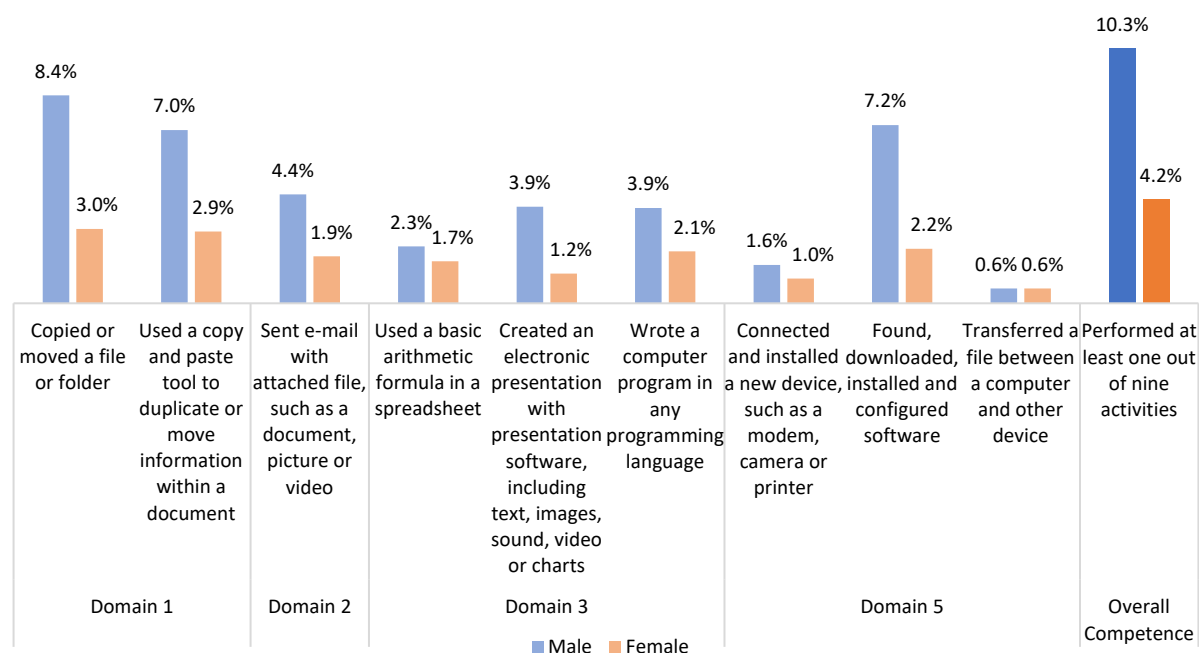
The artificial intelligence (AI) workforce presents an opportunity to increase women's participation. AI is rapidly being integrated into both workplace and domestic settings, bringing about significant changes in the world of work. Encouraging more women to pursue careers in AI and technological development is pivotal to ensuring that they do not get left behind, especially when demand for AI professionals is increasing. However, despite this growing demand, women remain significantly underrepresented; only 10 percent of technology start-ups in G20 countries were founded by women (OECD 2018). The disparity goes beyond the labor market and extends into academia, where 80 percent of AI professors are men, and women make up only 18 percent of AI authors at conferences (UNESCO, OECD, and IDB, 2022). Addressing this gender gap in female representation in the AI workforce has great implications for ensuring the creation of AI technologies that do not perpetuate gender biases (UNESCO, OECD, and IDB 2022). Virtual personal assistants and other AI technologies may promote certain gender stereotypes, shaping the roles of women at work and in their unpaid and unequally distributed domestic and care responsibilities. Addressing these stereotypes is essential for creating equal work environments for women and ensuring that gender biases are not built into future technological systems (Collett, Gomes, and Neff 2022). Efforts to address this gap in Sub-Saharan Africa have been made through the implementation of programs like Ghana's Women in Tech Africa, Women in Machine Learning, and African Girls Can Code (UNESCO, OECD, and IDB 2022). Supporting the education of women and girls in STEM education, particularly in AI, can also help close the gender gap in these fields and ensure that women have equal opportunities in the rapidly evolving technology sector.

3. The current state of the gender digital skills divide in Sub-Saharan Africa

A 2021 World Bank report assessing the demand for digital skills in the labor market in five economies in Sub-Saharan Africa, namely Côte D'Ivoire, Kenya, Mozambique, Nigeria, and Rwanda, found that foundational digital skills – like web research and e-communication – are expected to account for 70 percent of all digital skills demand in Sub-Saharan Africa ([World Bank, IFC, and DDP 2021](#)). This underscores the importance of assessing the current level of digital skills of youth within the region; moreover, disaggregating by gender will be paramount to ensure an equitable labor market where both female and male workers are thriving.

The availability of quality data on individual proficiency levels across each of the five domains is scant, but from what is available we see a clear gender gap in digital skills for youth 15–24 years old in Sub-Saharan Africa (Figure 3.1). Data were available for all domains except domain 4, safety. Overall digital competence—here measured as the percentage of youth who can carry out at least one of nine ICT tasks, (see Box 1.1 for more details)—shows a gender gap of 60 percent, meaning that men are 60 percent more likely than women to be able to perform at least one ICT-related task.

Figure 3.1: Percentage of Youth Aged 15–24 with Digital Skills Corresponding to DigComp2.2 Framework Domains, 2017–20 (MICS)

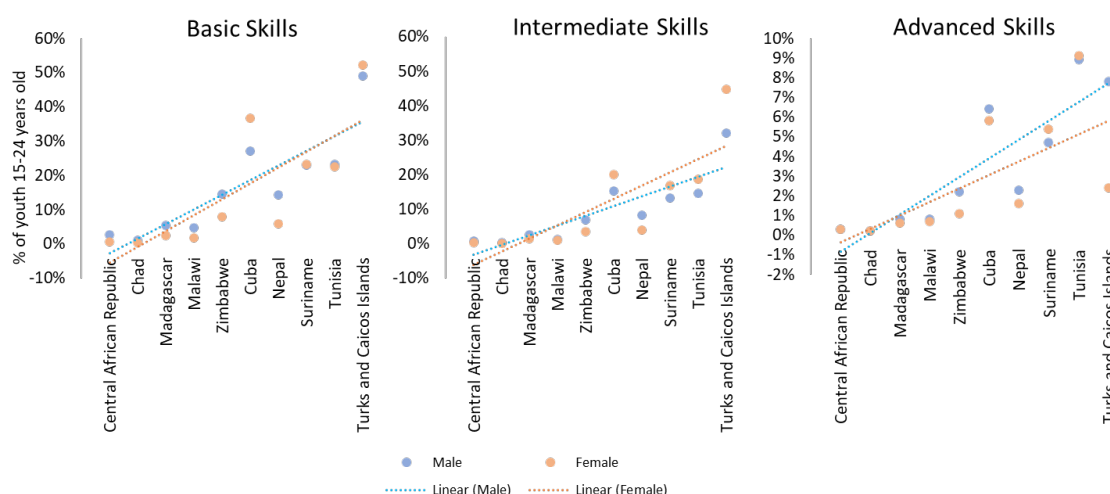


Source: Original figure for this paper. Based on data from UNICEF ICT Skills 2022.

Note: the reported values are based on the calculated median for each task for both male and females, across 8 SSA countries (Central African Republic, Chad, Democratic Republic of Congo, The Gambia, Guinea-Bissau, Malawi, Madagascar, and Zimbabwe).

Although the data are limited, the presence of a gender digital skills gap in Sub-Saharan Africa is evident. Furthermore, comparing the percentage of youth with digital skills within the region to the percentage outside the region shows that significantly fewer youth in Sub-Saharan Africa possess digital skills. Organizing the data by ITU skill level shows that the gender gap in digital skills gets smaller as the level of skill advances; this is especially true in Sub-Saharan Africa (Figure 3.2). An analysis of five Sub-Saharan African countries (Central African Republic, Chad, Madagascar, Malawi, and Zimbabwe), four countries outside the region (Cuba, Nepal, Suriname, and Tunisia), and one British Overseas Territory (Turks and Caicos Islands) shows that as the level of skills advances the gender gap in digital skills narrows in Sub-Saharan Africa, with girls lagging boys. Outside of Sub-Saharan Africa, the opposite is true, with boys lagging girls but only for basic and intermediate skills. In the Turks and Caicos Islands, for example, we see the gender gap widen as the skill levels advance with girls ahead of boys, but once we get to advanced skills, we see boys ahead of girls.

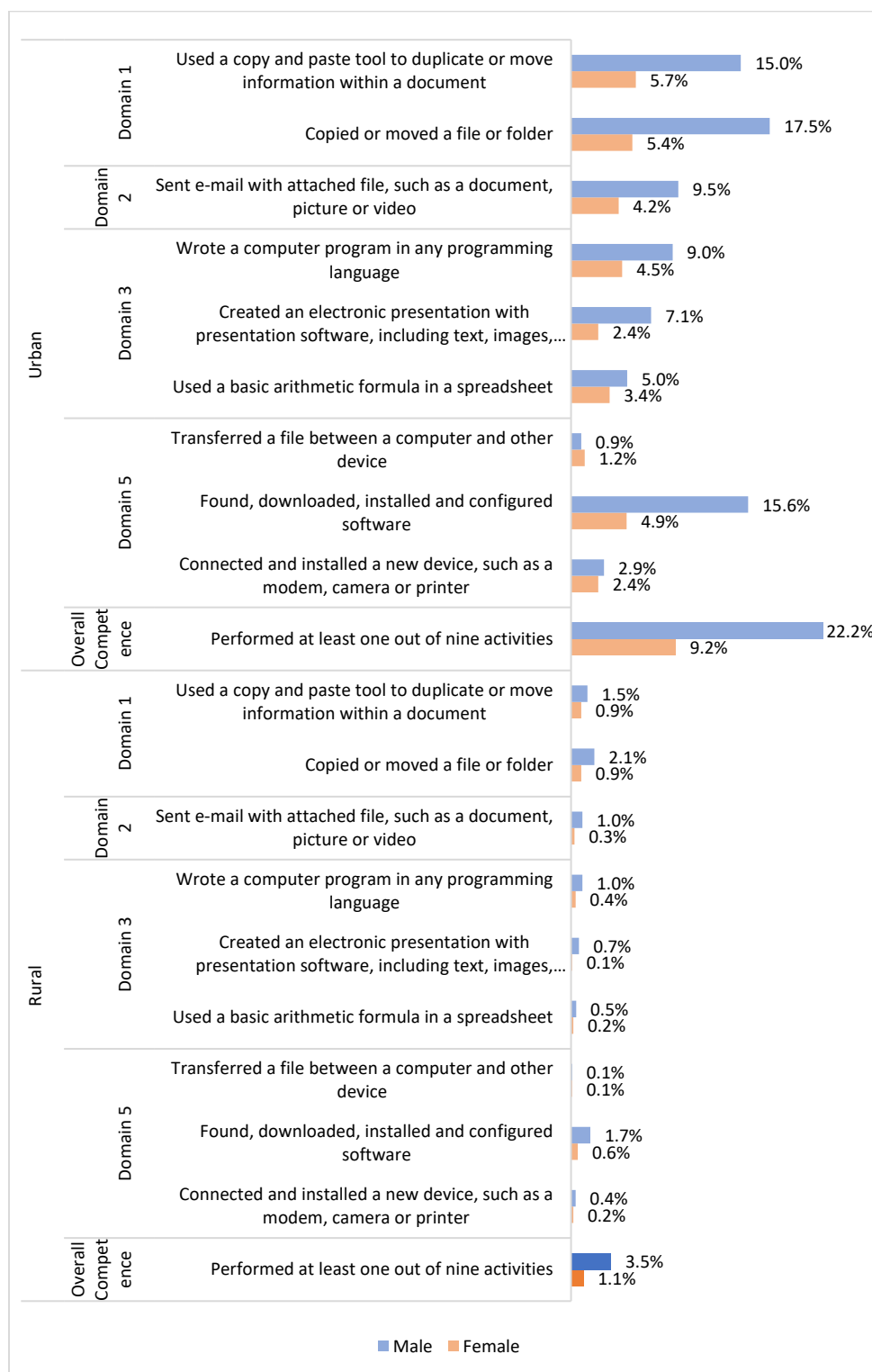
Figure 3.2: The Gender Digital Skills Gap across Economies, by Skill Level, 2017–20 (MICS)



Source: Original figure for this paper. Based on data from UNICEF ICT Skills 2022.

The gender digital skills divide is a complex and multifaceted challenge, and one aspect of it that needs to be addressed is how it fares along the urban/rural divide. The lack of digital infrastructure in rural areas presents an important constraint to the development of digital skills for both genders. However, the gender disparity in internet use, with men in Sub-Saharan Africa using the internet more than women, could lead to a widening of the gender digital skills divide in rural areas. Disaggregation of the UNICEF ICT skills data by rural vs urban areas, reveals a gender gap in digital skills of 69 percent in rural settings and 59 percent in urban settings (Figure 3.3). This suggests that in rural places, where access to digital infrastructure and devices is present, men are still more likely than women to use them. The percentage of total youth with digital skills in urban settings is much greater than that observed in rural settings and is another indicator that access to reliable digital infrastructure is important for the development of digital skills for both genders. However, improving access to digital infrastructure alone does not close the gender gap entirely; other factors also contribute to the gender digital skills divide.

Figure 3.3: Percentage of youth aged 15-24 with digital skills corresponding to DigComp2.2 Framework Domains, Urban vs Rural, 2017–20 (MICS)



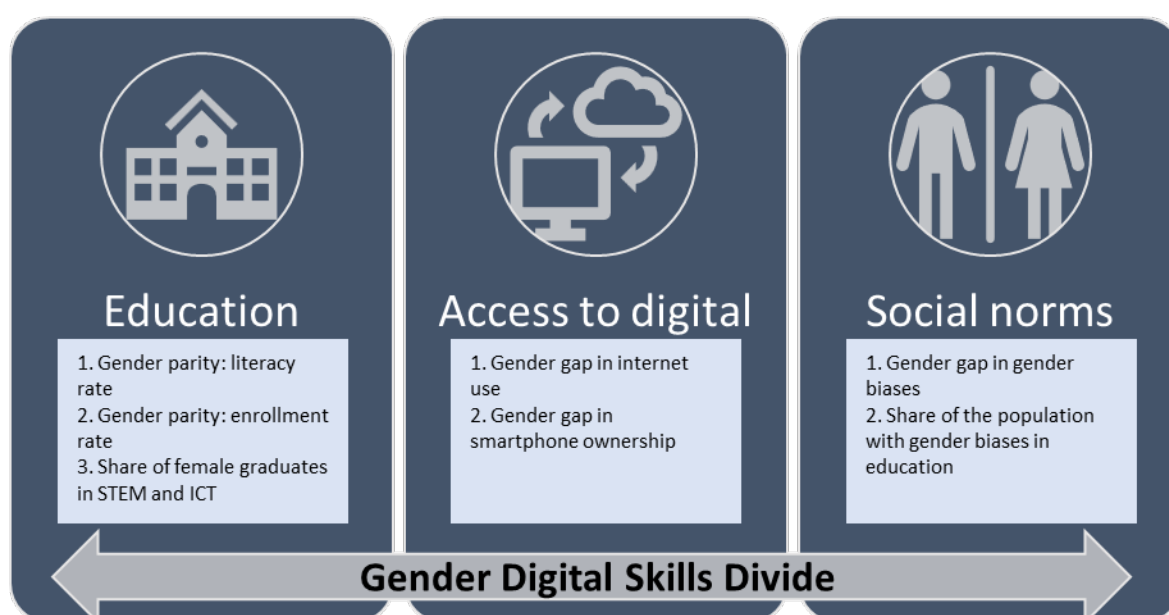
Source: Original figure for this paper. Based on data from UNICEF ICT skills 2022.

Note: Using median for each male and female value across variables.

4. Contributing factors to the gender digital skills divide

Several factors contribute to the gender digital skills divide in Sub-Saharan Africa. This report considers seven of these factors, organizing them around three pillars (Figure 4.1). Due to data limitations, it was not feasible to use regressions and correlations to determine the relationship between the identified factors and the gender digital skills divide. Instead, the report relies on the difference in percentage increases in likelihood across economies, specifically comparing Sub-Saharan Africa with both the Global South and high-income countries. This approach served as a proxy to explain the gender digital skills divide in Sub-Saharan Africa, especially the low attainment of basic digital skills of young women in Sub-Saharan Africa.

Figure 4.1: Factors Contributing to the Gender Digital Skills Divide



Source: Based on the authors' own observations and data analysis.

An assessment of the three factors under the education pillar revealed that educational attainment, specifically the share of female graduates in STEM, could be an important contributing factor to the gender digital skills divide in Sub-Saharan Africa. A recent report by UNICEF states that foundational skills like literacy and numeracy are not great indicators of digital skills in girls, even in countries where girls are outperforming boys (UNICEF 2023). To determine whether this was the case for the gender digital skills divide, an analysis of the gender parity index in literacy rates across 47 countries in Sub-Saharan Africa (except high-income countries), 37 countries in the Global South (outside of Sub-Saharan Africa and except for high-income countries), and 31 high-income countries outside the Global South, was conducted and compared to the gender digital skills gap calculated for countries listed in Figure 3.2. Plotting the gender parity index in literacy rate alone shows that it is the lowest in economies within Sub-

Saharan Africa compared to economies in the two other economic categories analyzed, with median gender parity indices in the Global South and high-income countries being only 1.01 times (1.3 percent more likely to be) and 1.03 times (1.2 percent more likely to be) higher than that observed for Sub-Saharan Africa, respectively (Figure 4.2.A). Although this trend is similar to the overall percentage of youth with digital skills across economies, it is not enough to account for the observed digital skills gap that persists across economies. Nor does it account for the gender parity index in enrollment, where the difference across economies is even lower (41 countries in Sub-Saharan Africa, 42 countries in the Global South, and 67 high-income countries), with median gender parity indices in the Global South and high-income countries only 1.02 times (1.6 percent more likely to be) and 1.01 times (1.1 percent more likely to be) higher than that observed for Sub-Saharan Africa, respectively (Figure 4.2.B).

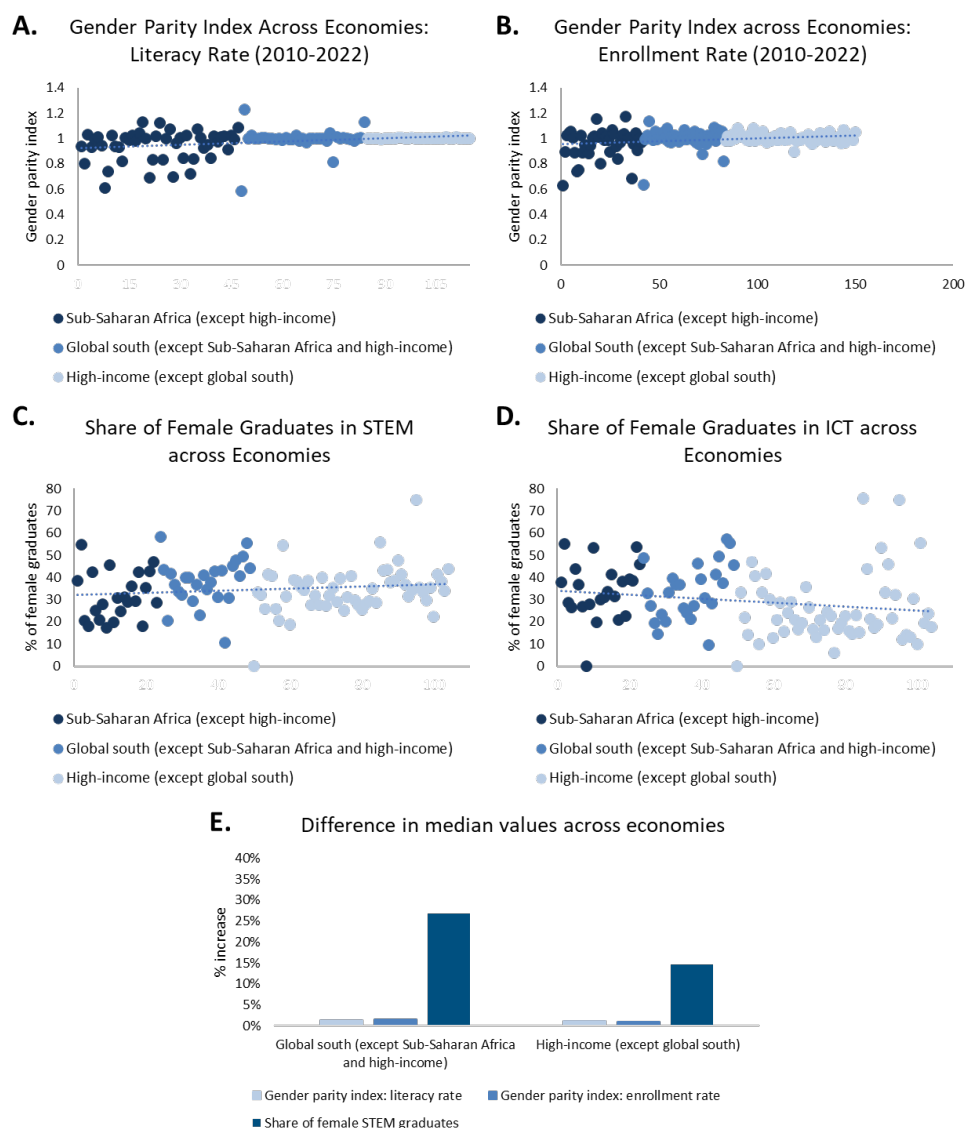
Looking at the share of female graduates in STEM and ICT across economies showed that Sub-Saharan Africa had the highest share of female graduates in ICT, but the lowest in STEM (Figure 4.2.C, 4.2.D).

The higher share of female ICT graduates in Sub-Saharan Africa is incongruent with the trends observed in the gender digital skills gap within the region and across other economies, which was not the case for the share of female STEM graduates. The share of STEM female graduates in the rest of the Global South was 1.36 times (26.7 percent more likely to be) greater than that observed in Sub-Saharan Africa, while the share of female STEM graduates in high income countries was 1.16 times (14.6 percent more likely to be) greater (measurements based on median values), and the share of females outside of Sub-Saharan Africa (as listed in Figure 3.2) with digital skills was 11.5 times higher than that observed in Sub-Saharan Africa. Although the difference in the share of female STEM graduates across economies does not fully explain the disparity in female attainment of basic digital skills in Sub-Saharan Africa compared to other economies, the wider difference observed compared to the other two education factors, could partially explain this disparity (Figure 4.2.E).

Compared to the factors under the education pillar, both factors assessed under the access to digital pillar appear to be important in the gender digital skills divide, specifically in the low share of females with basic digital skills in Sub-Saharan Africa. Looking at the share of the male and female population using the internet in Sub-Saharan Africa (10 countries), the Global South (other than Sub-Saharan Africa and high-income countries—26 countries), and high-income countries outside the Global South (44 countries) revealed a significant gap between the two genders that was the widest in Sub-Saharan Africa (Figure 4.3.A). Additionally, the shares of women using the internet in the Global South and high-income countries were 2.9 times (66% more likely to be) and 3.7 times (73% more likely to be) higher than the share observed in Sub-Saharan Africa. When looking at the share of the male and female population that own a smartphone in Sub-Saharan Africa (16 countries), the Global South outside of Sub-Saharan Africa and high-income countries (19 countries), and high-income countries outside the Global South (31 countries), the 2023 UNICEF study reported a significant gap between the two genders that was the widest in Sub-Saharan Africa (Figure 4.3.B). Additionally, the shares of women who own smartphones in the Global South and high-income countries were 1.4 times (30 percent more likely to be) and 1.7 times (40.6 percent more likely to be) higher than was observed in Sub-Saharan Africa. Both the difference in the share of women who use the internet and own a smartphone across economies could explain the

disparity in female attainment of basic digital skills in Sub-Saharan Africa, compared to other economies, with the share of women using the internet contributing the most (Figure 4.3.C).

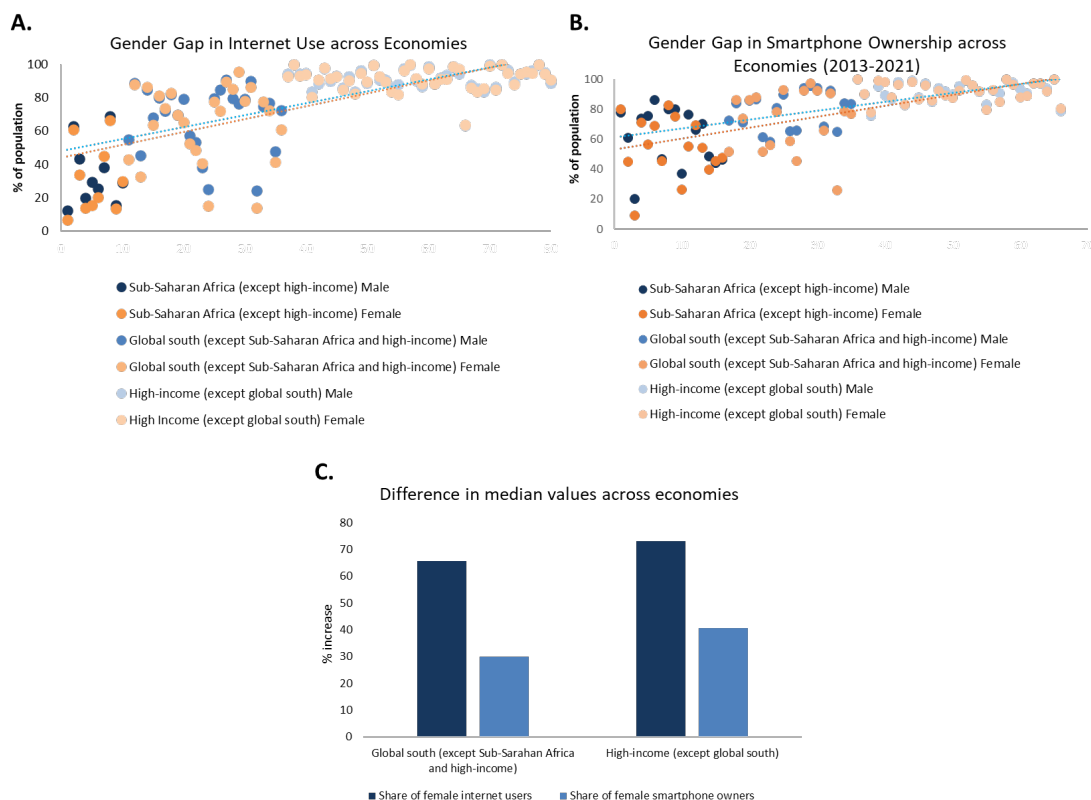
Figure 4.2: Factors Contributing to the Gender Digital Skills Divide, Education



Source: Original figure for this paper. Based on data from the World Bank gender data portal, 2010–22.

Note: Percentage increase refers to how much more likely the share of women in the global south and high-income countries outside of the global south is to have graduate with a STEM degree compared to the share of women in Sub-Saharan Africa. Additionally, it also refers to how much more likely the global south and high-income countries outside of the global south are to have gender parity in literacy and enrollment rates compared Sub-Saharan Africa.

Figure 4.3: Factors Contributing to the Gender Digital Skills Divide, Access to Digital



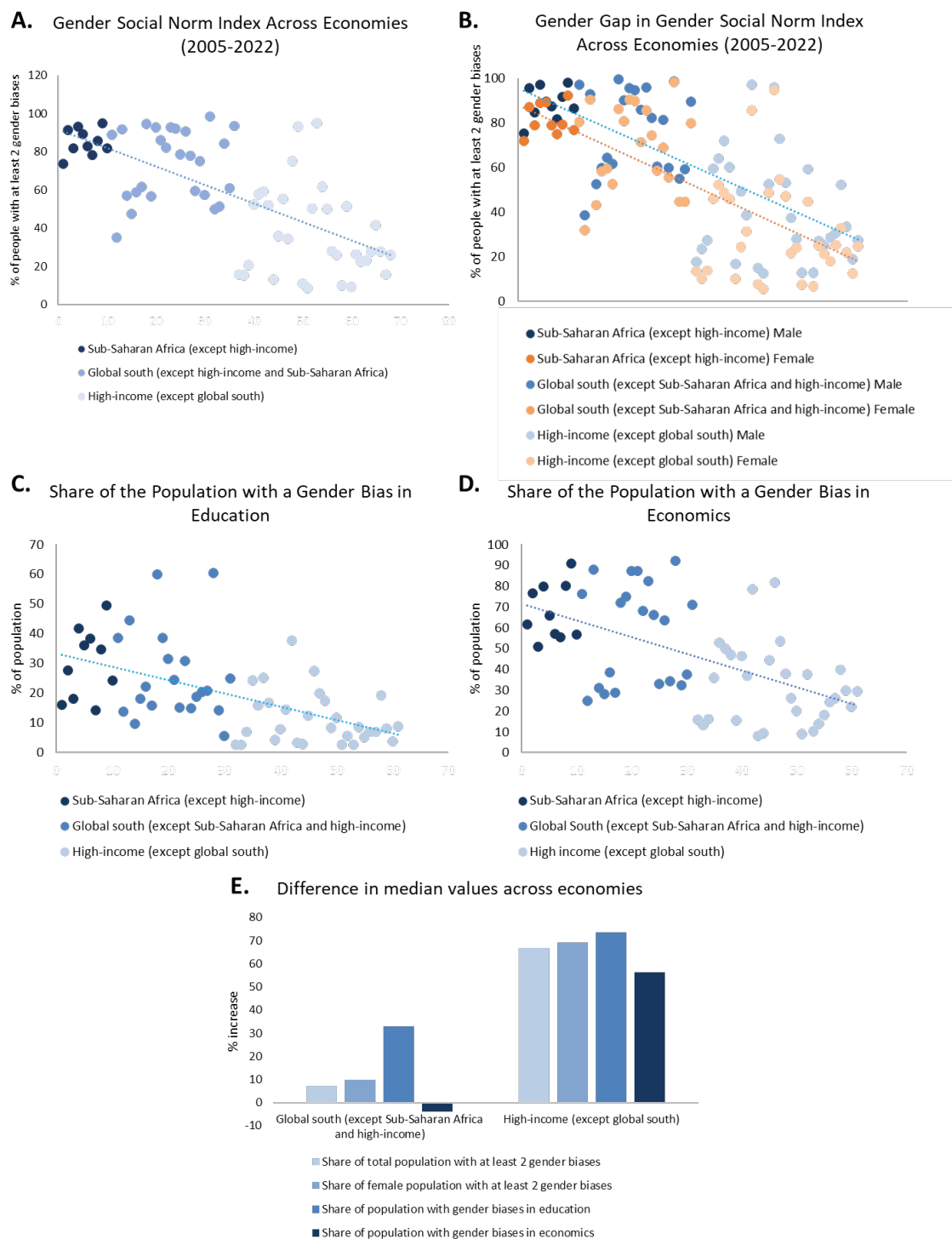
Sources: Original figure for this paper. Based on data from United Nations Statistics 2013–21; ITU 2018–22.

Note: Percentage increase refers to how much more likely the share of women in the global south and high-income countries outside of the global south is to use the internet or own a smartphone compared to the share of women in Sub-Saharan Africa.

Social norms have been reported to be a critical contributing factor to the gender digital skill divide observed across economies (UNICEF, 2023; Equalsintech, 2023; Brookings, 2018; UNESCO, 2022).

However, it is unclear whether social norms—especially as these relate to gender—contribute to the disparity in women’s attainment of basic digital skills in Sub-Saharan Africa as compared to other economies. An analysis of data on the overall gender social norm index from the United Nations Development Programme in Sub-Saharan Africa (10 countries), the Global South outside of Sub-Saharan Africa and high-income countries (26 countries), and high-income countries outside the Global South (32 countries), revealed that a higher share of the population in Sub-Saharan Africa has at least two gender biases (Figure 4.4.A). Specifically, the share of the population with at least two gender biases in Sub-Saharan Africa was 1.1 times (7.3 percent more likely to be to be) higher than that observed in the rest of the Global South, and 3 times (66.8 percent more likely to be to be) higher than that observed in high-income countries (Figure 4.4.E). Disaggregating data by gender showed a gender gap that was consistent across economies, with a greater share of men with at least two gender biases (Figure 4.4.B).

Figure 4.4: Contributing Factors to the Gender Digital Skills Divide, Access to Digital



Source: Original figure for this paper. Based on data from United Nations Development Programme, 2005–22.

Note: Percentage increase refers to how much more likely the share of the population in Sub-Saharan Africa is to have varying degrees of gender bias compared to the rest of the global south and high-income countries outside of the global south.

More women in Sub-Saharan Africa have at least two gender biases than women in the rest of the Global South and high-income countries outside the Global South (Figure 4.4.B). This finding supports the idea that women’s internalized gender biases, or the low rating of their own self-efficacy (as mentioned in section 2, prevents them from participating in courses and occupations that are typically male dominated ([UNESCO 2023](#)). The share of women in Sub-Saharan Africa with at least two gender biases was 1.1 times (9.7 percent more likely to be to be) higher than that observed in the rest of the Global South, and 3.2 times (69.1 percent more likely to be to be) higher than that observed in high-income countries (Figure 4.4.E). Further disaggregating data by the education and economic dimensions, the study found that gender biases in economic participation/performance are higher in Sub-Saharan Africa compared to gender biases in education (Figures 4.4.C and 4.4.D). However, the share of the population in the Global South with gender biases in economic participation/performance was 1.03 times (3.7 percent more likely to be) higher than that observed in Sub-Saharan Africa, while the share of the population in Sub-Saharan Africa with gender biases in economic participation/performance was 2.3 times (56.4 percent more likely to be) higher than that observed in high-income countries (Figure 4.4.E). Additionally, the share of the population in Sub-Saharan Africa with a gender bias in education was 1.5 times (32.8 percent more likely to be) higher than that observed in the rest of the global south, and 3.8 times (73.7 percent more likely to be to be) higher than that observed in high-income countries (Figure 4.4.E). These results suggest that the high prevalence of gender biases in education and economic outcomes held both by men and women in Sub-Saharan Africa could be important contributors to the gender digital skills divide, especially to the low attainment of basic digital skills for young women in the region.

5. Key Takeaways

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The gender digital skills divide in Sub-Saharan Africa is influenced by educational, labor market, and societal factors. Educationally, the underrepresentation of girls in STEM fields and the inadequacy of basic literacy and numeracy as sole indicators of digital proficiency highlight the need for targeted digital education strategies. Labor market disparities are evident in the lower participation rates of women, their concentration in low-income jobs, and their underrepresentation in tech sectors, despite their high entrepreneurial activity. The current state of the divide shows that although the gender gap narrows with higher skill levels, significant disparities persist, particularly in rural areas with limited digital infrastructure. Contributing factors include substantial barriers to internet access and smartphone ownership for women; and deeply ingrained social norms and gender biases that limit women's educational and economic opportunities. Key statistics underscore the urgency of addressing these issues, with Sub-Saharan Africa showing the highest share of female ICT graduates but the lowest in STEM, and a higher prevalence of gender biases compared to other regions. Addressing these challenges is crucial for ensuring an inclusive digital future and harnessing the full economic potential of the region.

1. Understanding the Gender Digital Skills Divide: Education

- STEM subjects are interconnected, and girls' under-participation is a common trend.
- Sub-Saharan Africa has fewer female STEM graduates compared to other regions, which affects their earning potential and employability.
- The share of female STEM graduates is crucial to addressing the digital skills divide.
- Basic literacy and numeracy are insufficient indicators of digital skills for girls.
- Educational attainment, particularly the share of female graduates in STEM, is a key factor contributing to the gender digital skills divide.

2. Understanding the Gender Digital Skills Divide: Labor Market

- The region faces gender, educational, and sectoral disparities in the labor market.
- Female labor force participation is lower than male participation.
- Women are often in low-income jobs but show high entrepreneurial activity.
- Women are underrepresented in tech and face access disparities to technology.

3. Current State of the Gender Digital Skills Divide in Sub-Saharan Africa

- The gender gap in digital skills decreases with higher skill levels in Sub-Saharan Africa.
- Rural areas show a pronounced gender disparity in internet use.
- Access to digital infrastructure is key, but it is not the sole factor in the gender gap.
- The ICT sector's growth in Africa is significant, with rising demand for digital skills.
- The lack of female interest and participation in ICT could hinder economic growth.

4. **Contributing Factors to the Gender Digital Skills Divide**

- Internet access and smartphone ownership are significant barriers for women, with the widest gaps observed in Sub-Saharan Africa.
- Social norms and gender biases in education and economic participation hinder progress.
- These biases are deeply ingrained and are more prevalent in Sub-Saharan Africa than in other regions, potentially impeding women's attainment of basic digital skills and their participation in the digital economy.

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ABSTRACT

This paper examines the current state of the gender digital skills divide in Sub-Saharan Africa (SSA), drawing on a broad set of data sources to assess disparities between men and women across key dimensions of digital readiness. The analysis explores differences in educational attainment, digital skills levels, access to digital infrastructure and devices, labor force participation, and representation in STEM and ICT fields. It also investigates the influence of gender norms—including both societal attitudes and internalized perceptions among women—on digital engagement and skills development. To contextualize regional findings, the paper compares SSA with other regions in the Global South and with High-Income Countries, highlighting both shared patterns and region-specific challenges. The assessment reveals that women and girls in SSA face persistent barriers to developing and applying digital skills, with particularly pronounced gaps in access to internet-enabled devices, digital learning opportunities, and advanced training in STEM-related fields. These disparities are further compounded by prevailing gender norms and limited exposure to female role models in the digital economy. Across most indicators, SSA lags both comparator regions and global averages, underscoring the urgency of narrowing the divide. This paper contributes to the evidence base needed to understand the scope and drivers of the gender digital skills gap in SSA and serves as a foundational input for future policy design and programmatic action.

The team acknowledges the financial support received from the Mastercard Foundation.

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