

EXECUTIVE SUMMARY

Digital Skills in Sub-Saharan Africa

Spotlight on Ghana

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ABOUT IFC

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ABOUT REPORT

This publication, *Digital Skills in Sub-Saharan Africa: Spotlight on Ghana*, was produced by the Manufacturing Agribusiness and Services department of the International Finance Corporation, in cooperation with the Global Education practice at L.E.K. Consulting. It was developed under the overall guidance of Tomasz Telma (Senior Director, MAS), Mary-Jean Moyo (Director, MAS, Middle-East and Africa), Elena Sterlin (Senior Manager, Global Health and Education, MAS) and Olaf Schmidt (Manager, Services, MAS, Sub-Saharan Africa).

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The report would not have been possible without the support of many IFC colleagues who provided valuable insights and perspectives, including, among many others, Ronke-Amoni Ogunsulire, Biju Mohandas, Kevin Sofiane Berkane, Mohammed Ali Khan, Juliana Guaqueta, Simon Andrews, Sean Petersen, Wale Ayeni, Joseph Akwasi Kuma and Doreen Oppan. The work benefited from valuable contributions from Victor Mulas (Disruptive Technology Initiative Core Team, President's Office, World Bank Group) and Alexandria Valerio (Global Lead, Skills Global Solutions Group, World Bank).

Research and writing underpinning the report was conducted by the L.E.K. Global Education practice. The L.E.K. team was led by Ashwin Assomull, Maryanna Abdo, and Ridhi Gupta, including writing by Maryanna Abdo, Priyanka Thapar, and Jaisal Kapoor and research contributions by Neil Aneja, Shrrinesh Balasubramanian, Patrick Desmond, Ridhi Gupta, Jaisal Kapoor, Rohan Sur, and Priyanka Thapar. Sudeep Laad provided valuable insights on the Ghana market landscape and opportunity sizing.

L.E.K. is a global management consulting firm that uses deep industry expertise and rigorous analysis to help business leaders achieve practical results with real impact. The Global Education practice is a specialist international team based in Singapore serving a global client base from China to Chile.

ACKNOWLEDGMENTS

The report would not have been possible without the participation of leadership and alumni from eight case study organizations, including:

Andela: Lara Kok, Executive Coordinator; **Anudip:** Dipak Basu, CEO; **Developers in Vogue:** Ivy Barley, Co-Founder and Abigail Edwin, alumna; **Digital House:** Sebastian Mackinlay, COO and Founder, and Carlos Najun Dubos, alumnus; **Good Things Foundation:** Roger Wilson, COO; **MEST:** Aaron Fu, Managing Director, Africa, Tobi Lafinhan, Recruitment Manager, and John Muchiri, alumnus; **Microsoft4Africa:** Wanja Gitonga, Communications and PR Lead; **Udacity:** Stuart Frye, VP of Business Development.

We are grateful for the valuable insights of sector experts who participated in interviews for this report.

Appreciations are also extended to Jessica Meyers, who edited the document, and the IFC Communications team, including Elizabeth Price, who provided overall guidance on IFC style guidelines and requirements, and Irina Sarchenko, who provided invaluable support and advice on the design of the report. Also, to the design and printing team at Groff Creative, including Jay Groff and Tanaquil Baker. All these contributions were critical in producing this report.

Cover Photo: Mbarak Mbiggo helps his colleagues who are software developers at Andela, in Nairobi, Kenya. Photo © Dominic Chavez/IFC.

Executive Summary

Technology is transforming the global economy, and more change is coming. More than half of the global population will have access to technology in 2019, compared to 30 percent in 2010. Nearly 65 percent will have access to mobile phones.¹ This shift is reshaping the skills people will need to access markets, operate factories, or run their own businesses. While researchers have made numerous estimates about the impact of this skills shift, few have examined the dramatic effect on Sub-Saharan Africa. This report shines a light on the crucial need for digital skills in Sub-Saharan Africa with a particular focus on Ghana. It identifies why and how demand for digital skills is expected to evolve, the scale of and opportunity presented by that demand, and how different stakeholders —particularly the private sector—can play a role.

THE IMPORTANCE OF DIGITAL SKILLS TO SUB-SAHARAN AFRICA

Human capital is an end in itself, offering intrinsic value in terms of knowledge, experiences, health, and other factors, but this capital also equips the workforce for enhanced productivity. Investments in human capital development are critical because without them economies will fall behind. The shifting frontier for skills is essential context for the current discussion on human capital. There are two key issues: the influence of technology and automation means the future of work will look very different than the present and require a changing set of skills; but countries are faced with an unprecedented challenge of updating education systems built for another era. They must confront this reality to prepare the next generation of learners for an evolving landscape with new kinds of jobs. There is an urgent demand for skills, including digital skills and socio-behavioral skills.

KEY FINDINGS

This study finds the labor market for digital skills is already highly developed in Sub-Saharan Africa, with respondents to the digital skills survey estimating about half of jobs require some digital skills. Demand for digital skills is expected to grow at a faster rate in the region than in other global markets.

However, a significant gap in supply and demand exists across all levels of digital skills in the region, with a lower availability of skills than in other markets and significant gaps in supply of intermediate and advanced skills. The supply of digitally-skilled labor in Sub-Saharan Africa and Ghana must increase to meet anticipated labor market needs or Africa's economies will falter. Companies already are turning to talent abroad, and while governments have taken steps to integrate information and communication technology in education, the policy response has not been sufficient.

Demand for digital skills in Sub-Saharan Africa and Ghana is powered both by latent economic growth and the digitization and automation of agriculture, manufacturing, and services. The study finds that over 230 million jobs in Sub-Saharan Africa will require digital skills by 2030, resulting in almost 650 million training opportunities. An estimated \$130 billion opportunity exists to provide digital skills across Sub-Saharan Africa until 2030, with nearly \$4 billion of this in Ghana.² The largest opportunities are in business-to-business and business-to-government training for basic and intermediate skills, although there are significant opportunities in business-to-consumer training focused on intermediate and advanced skills.

Private providers, governments, and investors must consider how to tap into this demand and advance the digital skills agenda in Sub-Saharan Africa. This report's case studies demonstrate that new ways of operating are required to access this opportunity. Short courses are ideal, typically three to 12 months long, with a mix of instructional methods geared toward practical learning rather than theoretical understanding. A focus on graduate employability is absolutely critical for digital skills courses. Offerings should align with market demand and employer requirements to ensure students gain the technical and soft skills required by industry.

- **A transition in the global economy is underway that will disrupt the landscape for jobs and work.**

About 65 percent of children entering primary school today, according to one estimate, will end up working in a job that doesn't yet exist.³ The World Bank Group's Human Capital Project emphasizes the need for economies to invest in human capital—particularly digital skills—or risk falling behind in the rapidly changing landscape for jobs and skills. Automation is challenging the traditional boundaries of firms and expanding global supply chains, which may enable rural clusters to emerge that connect small and medium-sized enterprises to opportunities worldwide. Online platforms are enabling entirely new industries and redefining interactions with customers and employees. Automation is changing the demand for labor as technological advancement makes it possible for machines to do the jobs once performed by people. Technology is expected to raise the demand for labor, but the expansion of new jobs and contraction of old jobs is likely to look different across sectors. This period of change is often referred to as the Fourth Industrial Revolution, and it will have both positive and negative effects. Both low- and high-skilled workers already feel the effect, and emerging economies with a majority of low-productivity jobs are at the highest risk of disruption.

- **That makes learning new skills imperative. Different skill sets are needed for the future, with socio-behavioral skills and digital skills the most critical for success.**

Employers anticipate more than 40 percent of skills required for the workforce will change before 2022, with more than half of employees needing to learn different or more advanced skills.⁴ This will include shifts in the types of skills valued and the emergence of new skills sets, as well as a greater focus on existing skills sets that increase in importance.

The study's survey respondents named socio-behavioral skills as the most important. Many key skills for the future are related to how people work and adapt to new ways of working, rather than what they know. Researchers estimate demand for social and emotional skills, such as leadership and managing others, will grow nearly 25 percent through 2030. Employers consider a lack of these

They should also offer networking, mentorship and career advice to students that would help them transition into jobs. Both for-profit and not-for-profit models can operate in this space. Business models will vary depending on the needs of the payer, from students in business-to-consumer set-ups, to government, donors, or companies looking to build technology ecosystems or develop a talent pipeline.

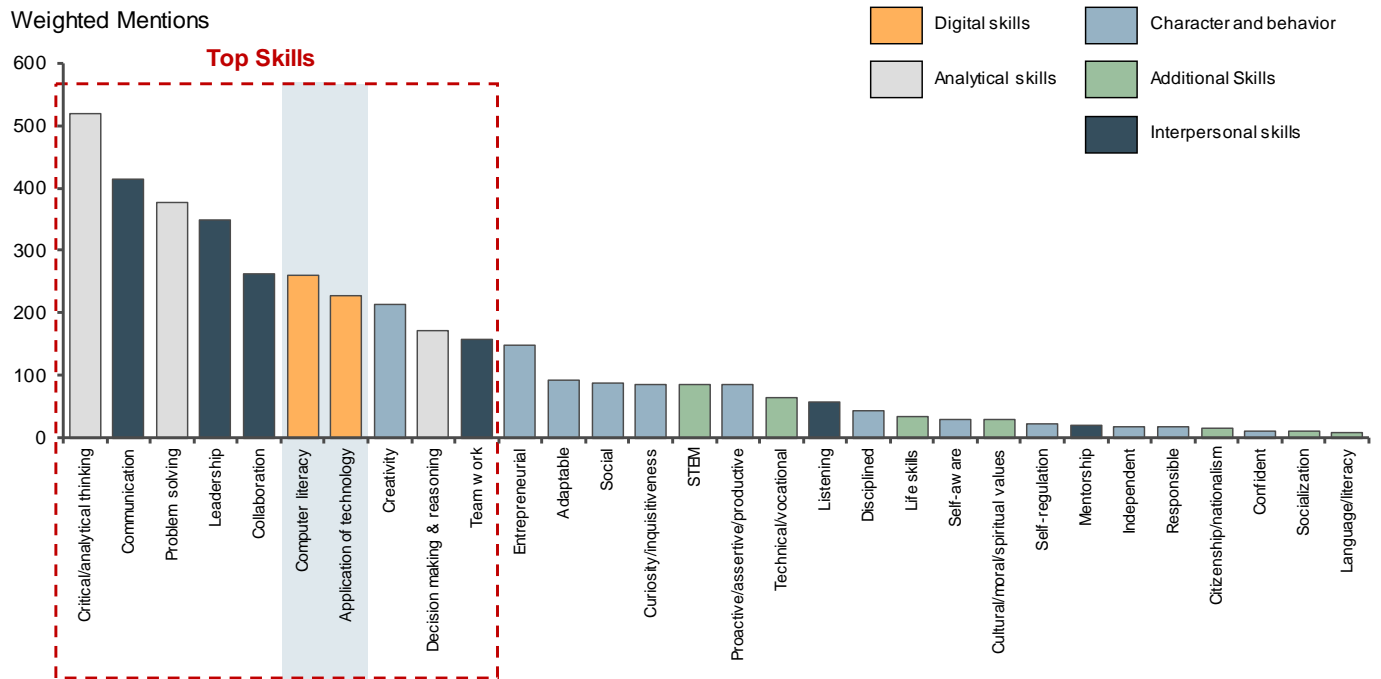
Demand is great. It will be met by education providers who see the potential of digital skills for an entire generation, current digital skills providers in Africa, education companies considering expansion in Africa, and technology companies hungry for talented workers. All of these must ensure new or expanded digital skills training is aligned to industry needs and weigh cultural contexts in different regions.

The study concludes with a call to action: the private sector must play a role in addressing the challenge in digital skills—both because of the magnitude and pace of change required, and because private sector models are likely more nimble and innovate in this rapidly-evolving area of skills. Stakeholders can meet this challenge by looking to proven models described in the report, with detailed examples of everything from recruitment approaches to job placements. The report underscores the need for these new skills to be integrated into the curriculum at an early age so the topic becomes as ingrained as reading and math.

Just as important, the future work force must cultivate twenty-first century skills: critical thinking, decision-making, teamwork... These are skills that machines cannot replicate, ones that will ensure humans can adapt and transform in a digitally-enabled future. It is essential that education systems develop curricula to teach these skills. While the private sector can play a role, the appropriate stewards to meet this challenge are public sector education systems.

The digital skills challenge in Sub-Saharan Africa is significant, but it is addressable. Whether Ghana and other Sub-Saharan African countries can take advantage of the digital opportunity to become more competitive and prosperous will depend on whether their human capital—their populations' health, skills, knowledge, experience, and habits—keeps up with this workforce transformation. Digital skills are an essential part of that human capital development and paramount to future success.

Figure 1: Skills Required for the Future Workforce, All Markets



skills as problematic, if not more, as a dearth of technical skills. Some studies show the job market already is rewarding professions that put a high premium on social skills.

Employers, according to the study, consider digital skills among the top seven skills required for the future workforce (see figure 1). Other studies built off employer interviews also note a sharp increase in demand for technological competencies.⁵ The share of jobs requiring few digital skills has fallen while the digital requirements for most jobs has increased.⁶

Observers agree on the skill types required for the future workforce and insist the current labor force lacks a sufficient supply of these skills. Demand significantly exceeds supply for almost all key skills, according to this study, with this gap more severe in Sub-Saharan Africa and Ghana, particularly in skills of critical and analytical thinking, problem-solving, and the application of technology.

This is a serious challenge given that the most important consideration for companies exploring job locations is the presence of skilled local talent. Employers view this as even more crucial than cost.⁷

- **Education systems need to change what, how, and when people learn.** Analysts agree education systems are not prepared for the pace or scale of change required to address the current technological shifts. Investments in human capital are essential, but how those investments are made will be as important as the capital deployed. These systems need to reform or risk failing to provide skills for the future. Foundational lessons should include digital skills and begin early in life. There are shifts required in three areas:
 - What people learn—to bring knowledge in line with technological changes. There is a gap between what skills education systems offer versus what economies need. Only 50 percent of countries in Africa have computer skills in the curriculum, compared with 85 percent globally.⁸

There are shifts required in what, how, and when people learn.

- *How* people learn – given that traditional pedagogical methods and infrastructure are not geared toward twenty-first century skills. Schools tend to teach digital skills by focusing on specific subjects, so digital skills are often taught in a computer course rather than embedded in the wider curriculum.
- *When* people learn – with lifelong lessons required instead of the current model of education at the start of a career. Workers need to upgrade their skills on an ongoing basis, but there are few options for doing so. Education providers still focus on traditional age groups rather than adapting to the learning styles and requirements of adults.

Sub-Saharan Africa must take on these education shifts, even as countries struggle to ensure children are learning in school. The region faces three key challenges. First, there is poor acquisition of foundational skills, with primary school learning outcomes the lowest in the world. Second, schools have limited resources, including classroom teachers and access to technology-based learning materials. Third, there is a mismatch of skills taught and those in demand; employers across Sub-Saharan Africa report that lack of access to workers with appropriate skills “is a constraint to their growth and productivity.”⁹ Stakeholders in the region will need to consider these issues as they determine the most effective way to prepare for the digital future.

The World Bank Group’s 2019 World Development Report has referred to human capital investments as a “no regrets” policy that brings potential returns to individuals, economies, and societies. Immediate action is needed to help people develop the digital skills required for the future workforce, and not just from governments but from firms as well.

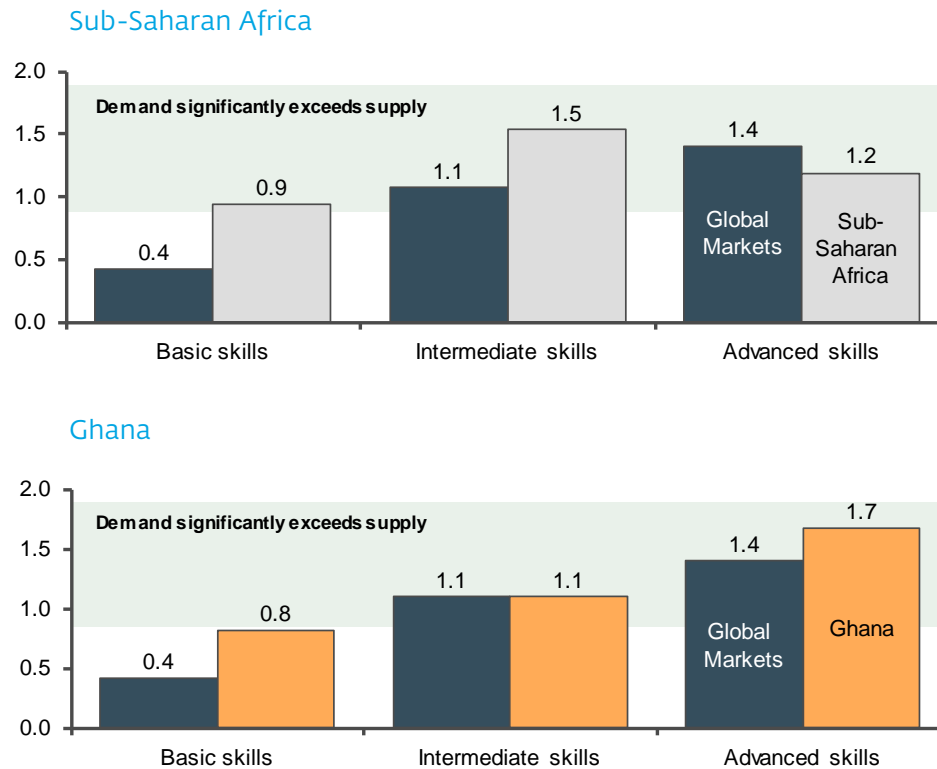
THE DIGITAL SKILLS REQUIRED FOR GROWTH IN SUB-SAHARAN AFRICA

Digital skills are central to questions about preparing children and young people for an evolving workforce. The concept of twenty-first century skills has gained traction over the past decades and denotes a range of skills, abilities, behaviors, and attitudes that are required for success in the twenty-first century. Digital skills are core to most twenty-first century frameworks and, in this study, refer to skills related to the use of technology. The report’s researchers sought to understand the demand for specific types of digital skills, the balance of supply and demand in those skills, the anticipated change in demand over time, and the market implications of any imbalance in demand and supply of skills. Key findings include:

- **Digital skills are essential to the future workforce in Africa, with basic skills most critical.** The labor market for digital skills in Sub-Saharan Africa, and specifically Ghana, is already highly developed, and demand is expected to grow. Survey respondents across all markets—including Sub-Saharan Africa—said basic digital skills, such as email communication, web research, and online transactions, are essential to the future workforce. These skills are more likely to help mobilize the growing middle class in Sub-Saharan Africa. Nearly 65 percent of individuals recruited for jobs at the African companies surveyed require at least a basic level of digital skills. Basic skills are essential, but competitiveness also will rely on the ability of Ghana’s burgeoning services sector to leverage intermediate digital skills, such as using professional software and managing data. This is reflected in the survey, since some intermediate and advanced skills, such as data analytics and artificial intelligence/machine learning, are identified among the top required skills for the future workforce. The share of employees needing more advanced digital skills will likely increase as sectors become more digitally enabled.

A demand-supply gap¹⁰ exists across all digital skill levels, but intermediate skills are of most concern in Sub-Saharan Africa (see figure 2). These are the critical career

Figure 2: Demand-Supply Gap in Digital Skills by Skill Level



skills that enable workers to undertake tasks, such as using spreadsheets, making presentations, and doing digital research and marketing. Ghana has a greater shortage of advanced skills, and the study respondents said jobs there will require more intermediate and advanced skills than those in Sub-Saharan Africa. This is because the digital needs of Ghana’s economy have progressed at a faster pace than those in the rest of the region.

- **Without growth in digital skills, Africa’s economies will falter.** Limited access to digital talent despite an anticipated increase in demand for digital skills would have serious consequences for Africa’s employers, especially with an existing supply gap. Employers in Ghana cited a range of obstacles when recruiting, including an undersupply of digital talent, a lack of relevant skills even in recruits who have had digital training, and a lack of information and communications technology equipment.

Nearly 20 percent of Ghanaian companies surveyed recruit only internationally for digital skills, largely because they cannot find skilled local talent. Informal sector companies, which comprise a majority of African employers, are even more likely to struggle to hire qualified workers, as they typically do not have the option of looking overseas. They might fail to keep pace with technology, compromising their viability and productivity. Industry participants confirm concerns that without adequate digital skills, countries in Sub-Saharan Africa, including Ghana, will fail to remain competitive. Some 80 percent of Ghanaian industry participants interviewed believe that an undersupply in digital skills would hamper expected economic growth in Ghana.

- **The policy response has not been sufficient.** While many countries in Sub-Saharan Africa recognize the importance of harnessing information and communications technology to drive competitiveness—

whether in attracting technology start-ups or bringing the power of digital technologies to established businesses—fewer have translated this into a clear-cut agenda. Ghana has been “nimble” in addressing the opportunity that digital presents, according to market participants,¹¹ and it has implemented these technologies in education policies. While these are seen as moving in the right direction, not enough is being done to invest in human capital for the digital economy.

People in Sub-Saharan Africa and Ghana need digital skills training programs to bridge the demand-supply gap and ensure employers can hire locally, find suitable training for employees, and help workers keep pace with new technology in their industries.

THE SCALE OF OPPORTUNITY IN SUB-SAHARAN AFRICA AND GHANA

There is strong demand for digital skills in Sub-Saharan Africa and Ghana. This is driven both by latent economic growth as well as the digitization and automation of agriculture, manufacturing, and services. L.E.K. undertook an extensive modeling exercise that provided a broad sizing for digital skills demand and market opportunity in Sub-Saharan Africa and a granular, detailed sizing for digital skills in Ghana. These are the key findings:

- **There will be 230 million “digital jobs” in Sub-Saharan Africa by 2030.** This will translate to nearly 650 million training opportunities by 2030, including required retraining.¹² The drivers of demand for digital skills vary across sectors and in the formal and informal economy. Digital technology allows farmers to get better information, including from the government, which can improve agricultural productivity. They also need digital skills to access insurance, savings programs, and credit to buy farm tools. Demand for digital skills also is likely to increase in industrial sectors because technology can help mitigate the dangers of physical jobs, and tools such as online videos and text messaging can support training and communication on the job. The services industry has the highest anticipated levels of digital skills requirements.

Changes in customer demand and behavior drive market competition, from expectations that hotels will have websites to demand for easier shopping and faster parcel delivery.

- **The largest need for Sub-Saharan Africa digital skill is in business-to-business and business-to-government training.** Educational products and services are typically provided in one of three ways: business-to-business, business-to-government, or business-to-consumer. Business-to-business models involve the sale of products or services to institutions, such as schools, corporate entities, or education providers. Business-to-government models involve the sale of products or services to local or national governments, while education business-to-consumer models are intended for consumers, with products typically purchased by students and parents.

Most of the region's digital skills need is in basic and intermediate digital skills training to get people job-ready and retrain them over time. Basic digital skills training programs are unlikely to be viable for business-to-consumer models, though, as people are unlikely to pay for courses. A majority of survey respondents believe digital skills are core lessons that should be taught in school, so basic skills training programs are unlikely to make money by charging consumers. By contrast, advanced skills courses have a strong incentive for the consumer: increased wages. Nearly 50 percent of survey respondents believe pre-employment training and post-secondary education are the best avenues for acquiring intermediate and advanced digital skills. The implication is business-to-consumer opportunities are available for providers offering advanced and some intermediate skilling, while business-to-business and business-to-government models will dominate basic and most intermediate skills.

- **The revenue opportunity size across Sub-Saharan Africa in digital skills is \$130 billion through 2030.** Potential business-to-business and business-to-government opportunities in Sub-Saharan Africa will

encompass about 625 million people who require digital skills by 2030 and result in nearly \$120 billion in revenue. Business-to-consumer opportunities will comprise about 25 million people in need of digital skills through 2030 and \$11 billion in revenue.

- **Ghana alone will offer 9 million digital jobs and nearly \$4 billion in revenue potential through 2030.**

Numerous sources are confident there is “substantial scope”¹³ for the information and communication technology sector to grow amid continued demand for digital skills in the labor force. Nine million jobs requiring digital skills in 2030 will translate to nearly 20 million training opportunities through 2030. That will mean business-to-consumer opportunities for about 700,000 people who need digital skills through 2030 and \$320 million in revenue. Ghana could have business-to-business and business-to-government opportunities that reach about 18 million people who require digital skills through 2030 and nearly \$3.5 billion in revenue.

The market for digital skills across Sub-Saharan Africa and Ghana over the coming decade is significant. While transformation will come more quickly to the formal economy, the informal economy is also rapidly influenced by technology and citizens will feel the impact across agriculture, industry, and services. Private sector training providers—whether universities, skills providers, boot-camps, or business-to-business curriculum providers—have the chance to develop offerings that tap into the growing demand for digital skills. There is a large market opportunity for business-to-business models, particularly focused on basic skills. Investors and operators in Sub-Saharan Africa and Ghana also have a compelling reason to embrace business-to-consumer digital skills, focused mainly on intermediate and advanced skills.

TRAINING MODELS FOR DIGITAL SKILLS

Stakeholders, including investors and employers, can take a variety of actions to manage the demand-supply imbalance in digital skills in Sub-Saharan Africa and, specifically, Ghana. Some of these interventions will take the form of training,

There will be 230 million “digital jobs” in Sub-Saharan Africa by 2030.

while other actions will include ecosystem-building that contributes to broader development. The urgency of the digital skills gap in Africa’s labor markets makes it critical to ensure providers implement effective digital skills training programs. Traditional models are failing the world’s young people; almost two-thirds of youth employment programs have no impact.¹⁴ How can digital skills be effectively taught, and what business models are available? Researchers conducted in-depth studies of eight global and regional programs to understand how to best design and deliver such courses. These case studies reveal important aspects about the fundamentals of operation, student selection, quality and relevance of training, funding models, and scale. Key case study findings include:

1. **Transformation of lives and employment prospects is the animating mission for most organizations.** The organizations assessed see the learning of digital skills as a transformative process with the potential to improve individual lives and communities. Many cite the need to meet a skills gap as a major driver for setting up the program and identify this as an issue for both job-seekers and employers.
2. **Reach is tied to delivery mode and type of skills taught.** Prospective digital skills providers should consider their impact and revenue objectives when planning for reach. Anudip provides basic skills lessons and has taught nearly 85,000 participants since 2007. Good Things Foundation leverages a network of Online Centres to teach basic digital skills and has reached 2 million people. Udacity has 70,000 annual participants in its four to six-month industry-aligned Nanodegree programs, which are delivered online.

Table 1: The Digital Skills in Sub-Saharan Africa Case Studies

This report demonstrates how digital skills providers can develop sustainable business models at basic, intermediate, and advanced levels across emerging and developed markets. They vary in scale and stage of development, but each provides insights on models that drive access to digital skills. These companies include:

Organization	Skills imparted	Geographies covered
ANDELA	Advanced	Kenya, Nigeria, Uganda, with administrative offices in the United States
ANUDIP	Basic, Intermediate, some Advanced	India
DEVELOPERS IN VOGUE	Intermediate, Advanced	Ghana
DIGITAL HOUSE	Intermediate, Advanced	Argentina, Brazil
GOOD THINGS FOUNDATION	Basic	Australia, Kenya, United Kingdom
MEST	Advanced	Across Africa with particular focus on Ghana, Nigeria, Kenya, South Africa and Côte d'Ivoire
MICROSOFT 4AFRIKA	Intermediate, Advanced	Across Africa with on-the-ground presence in Nigeria, Ghana, South Africa, Egypt, Uganda, Kenya, Rwanda, Mauritius, Malawi and Ethiopia
UDACITY	Intermediate, Advanced	190 countries

3. Programs are typically shorter than most degrees.

Program lengths tend to vary, although average digital skills training lasts less than a year. Intermediate and advanced training courses typically range from three to 12 months, with additional time for internships or job placements. Post-secondary degrees, in comparison, usually cover 36 months or more of training. In the industries with the highest demand for digital skills, students and employers prefer on-the-job training and programs that have a rapid route to employment. Prospective digital skills providers in Sub-Saharan Africa should plan for courses that fit within a one-year timeframe or less.

4. Selectivity increases with the level of skills offered.

Basic skills courses are open to everyone, while advanced courses have barriers to entry and, in some cases, an acceptance rate as low as 1 percent. They use a multi-pronged selection process that can include an application form, online assessment, group interview, or one-on-one interview. Prospective digital skills providers in Sub-Saharan Africa should look to match the selection process with their goal for the program. Those targeting an elite corps of developers will require rigorous, lengthy and highly selective approaches, while those looking for less experienced, but enthusiastic, participants will require approaches that focus more on personal commitment and fit. Basic skills providers may offer open admissions

without an application process. This sometimes reflects the lower marginal cost of additional participants and often is part of the organization's mission.

Programs also focus on ensuring a strong representation of people from diverse backgrounds—especially ones underrepresented in technology—with a focus on gender, economic, and geographic diversity, and inclusion of socially marginalized groups.

- 5. Soft skills are core to most programs.** Many courses teach broader career skills and emphasize the importance of soft skills in finding jobs, an effective complement to more specific digital skills training. These lessons prove an essential ingredient of most digital skills courses in Sub-Saharan Africa, particularly at the intermediate and advanced level. Non-technical skills taught include interview preparation, interpersonal skills, and character traits. Developers in Vogue focuses on teaching students public speaking skills, presentation, and networking skills essential for the interview process. Interpersonal skills involve communication, leadership, collaboration, and teamwork and are taught through interactive group projects, peer-to-peer learning, and simulated workplace scenarios. Andela judges its fellows by six parameters, four of these—initiative, communication, professionalism, and integration—are interpersonal or team skills. Anudip has a separate team of staff that focuses on providing soft skills training, a testament to the importance placed on interpersonal skills. These programs consider character traits such as creativity, entrepreneurship, proactivity, adaptability, and curiosity as valuable qualities in the digital workplace. Digital House focuses on teaching creativity as one of its twenty-first century skills, while the Meltwater Entrepreneurial School of Technology seeks to develop leadership skills in its cohort.
- 6. Delivery models vary in approach depending on the skill level taught.** Prospective providers should consider what configuration of instructional methods aids learning goals, ensures retention, and optimizes costs. Online instruction is used across most programs, alongside classroom teaching. Digital House students who

participate in its blended courses have a flipped classroom experience where they learn theory at home online. Classroom instruction usually serves as the foundation of most advanced skills programs as it allows for a greater transfer of knowledge. Project-based learning is a widely used method, particularly in intermediate and advanced courses, that allows students to apply their lessons and “learn by doing.” 4Afrika's AppFactory students gain real-world experience by working with senior software engineers on a project for a partner organization. Similarly, Udacity's Nanodegree students receive feedback from industry participants and work on projects designed by experts. Self-led learning offers students an opportunity to develop proactive habits and independent thinking, while peer learning is used by programs to reinforce lessons and encourage interpersonal skills.

In-person training is the predominant method for teaching advanced digital skills. This is because face-to-face, practical instruction is often required to convey complex ideas: 70 percent of the case studies that offered in-person training taught advanced skills, while only 30 percent taught basic skills.

- 7. Scale is driven by three key factors: delivery efficiency, partner networks, and employment orientation.** Delivery efficiency implies lower costs to serve each participant. This decreases the investment required to expand reach and can draw a larger audience. Udacity's wholly online platform maintains a low cost-per-student while also extending its reach globally. Partner networks help to decrease the time and resources required by programs. They can help provide organizations with support on curriculum development, physical resources and hardware, trainers and mentors, and potential employment opportunities for students. 4Afrika taps into Microsoft's large partner network to expand its AppFactory program and find trainers. Good Things Foundation has developed training content, including the online Learn My Way platform, which can be easily distributed across a wide range of partner centers. A clear employment orientation that provides students with up-to-date, market-aligned training is critical in

helping graduates find jobs. It also boosts the organization's reputation and increases funding opportunities. Challenges for scaling include finding suitable participants, securing skilled faculty, building industry partner networks, and maintaining programs' market alignment.

8. **Program success is tied to the practicality and industry-alignment of programs.** Students cited three key factors that drive program success: hands-on training that accelerates learning, staff with practical experience who can teach by example, and current links to industry.
 - a. **Hands-on experience:** Organizations used multiple methods to simulate business activities and give students a hands-on experience. Developers in Vogue students work on hackathons to test their coding skills under pressure, while MEST students develop and build a business idea that they pitch to investors at the end of the program.
 - b. **Faculty with practical experience:** Digital skills are inherently practical, and staff who can teach by example and understand business applications for these skills can ensure their relevance to market needs. Digital House instructors bring deep experience in professional, entrepreneurial, and research fields.
 - c. **Alignment and links to industry:** Programs can provide ties to industry through curriculum that ensures the skills taught match demand, guest lecturers who help connect the classroom to the broader industry, campus visits, and networking events that help students put their learning in context. Anudip leverages its industry ties by asking potential employers to design program curriculum and conduct the training program.
9. **Employability is a core focus for most programs.** The most common ways to support student links to the job market are industry networking and partner placements. Microsoft's network of around 1,200 partner organizations in Africa provides internship opportunities that are beneficial for participants and placement organizations.

These partner organizations host interns and offer successful students permanent roles in their companies. Andela's program has employability embedded in the model given that, after a six-month training period, fellows are staffed as full-time team members at one of Andela's offices. Digital House students and graduates have access to an online jobs board that includes full-time and part-time opportunities in technology fields with more than 1,000 companies posting their job needs. Employability-focused training programs also use industry mentorship as a way to support learners when the program ends. Many programs cultivate more than one mentor relationship to offer different benefits to students.

10. **Operators should start with the needs of potential payers when considering business models for digital skills training.** Programs observed include private for-profits, not-for-profits, and corporate supported programs. Payers are made up of individuals, corporations, a corporate and government mix, or a blend of government and donors. Each of these stakeholders has unique needs, and potential interventions vary based on those requirements. Providers keen to offer business-to-consumer training must ensure they are boosting an individual's employment prospects, typically in the form of payback on training investments. Andela, for instance, provides free training to its students in return for a 3.5-year employment commitment with the company. Programs working with government or donors may need to demonstrate either economic impact or social and economic inclusion outcomes, or both. Prior to founding Anudip, Dipak Basu conducted a study that demonstrated increasing local employment can significantly enhance the lives of marginalized people. The organization has grown with the support of institutional donor funding.

RECOMMENDATIONS FOR STAKEHOLDERS

Government, donors, and investors have key roles to play, along with those who would like to directly offer digital

Teaching digital skills is not only a business opportunity, but a chance to reconceive the future of work across the continent.

skills. Businesses can also partner with existing training providers to meet their training needs. Doing so is not only a business opportunity, but a chance to reconceive the future of work across the continent.

- African education providers that currently offer digital skills can expand to take advantage of the opportunity in the region. Proven business-to-consumer providers should look to the business-to-business and business-to-government opportunity, which has potential for growth. If the provider wants to support marginalized or underrepresented groups, it has a greater likelihood of impact-investing finance and donor or government support.
- African education providers that do not currently offer digital skills should consider developing new course offerings with different modes and duration of courses. Existing vocational and higher education providers are well positioned to expand into digital skills but should understand the need to move from theoretical to practical training approaches and to create shorter courses that lead to jobs. Institutions should ask prospective employers about the skills they need and the number of people to do them before embarking on program designs, and then partner with these employers to create job placements and help with course design. Providers should consider how to integrate digital skills throughout their curriculum. Education providers without digital skills expertise should think about acquiring some as technical knowledge and industry insight will shape the success of new programs.

- Digital skills providers outside of Sub-Saharan Africa who seek to enter the continent's markets should identify those with a strong unmet demand for digital skills and a reasonably high ease of doing business. Joint ventures with local technology or education companies would be a sensible route to market entry. Overseas providers should also consider modifying business models to accommodate local students, such as adjustments to course configurations to match student payback periods, and adjustment of course timings or a mix of remote and in-person learning to match student preferences around pace and place of learning.
- Technology companies have a role to play in supporting the development of the ecosystem and aligning public and private sector digital skills with the latest industry standards. They also can play a role as direct digital skills providers through expansion of online courses and certification opportunities.

LOOKING AHEAD

The report makes three main observations. First, urgent action is required to address the challenge in digital skills and the private sector must play a role. Investments in human capital can help economies to weather these transitions and to ensure their competitiveness in the future. The market opportunity for private sector education is significant. In expanding these offerings, private providers will be able to secure not only healthy financial returns, but also improve the competitiveness of Sub-Saharan Africa and the life chances of its people.

Second, stakeholders can address this challenge with proven models that can be replicated and scaled. There are successful models for digital skilling, both in Sub-Saharan Africa and beyond, with potential to offer lessons for providers who want to enter the market. Many programs assessed for the study are actively seeking investment or opportunities to partner. There is a need for a consortia of providers and investors to support models that have strong potential for impact and growth, those that can go from 100 students to 1,000 and eventually to 100,000.

Finally, foundational skills taught in school must include basic digital skills at a minimum. Digital skills are now considered as essential for the future of work as reading and writing. While the private sector can play a role, the appropriate stewards to meet this challenge are public sector education systems that are equipping this new digital generation and investing in their countries' human capital.

The digital skills challenge in Sub-Saharan Africa is significant, but it is not insurmountable. Ghana reveals the potential that exists, particularly for the private sector. Ghana, and other Sub-Saharan African countries, must take advantage of the digital opportunity to increase competitiveness, prosperity, and inclusion. This will help ensure they not only keep up but thrive in a new era of work.



Employees of Africa's Talking working at their desks in Nairobi, Kenya. Photo © Dominic Chavez/IFC

End Notes

- 1 Internet World Stats, retrieved November 2018.
- 2 Estimates of digital skills demand were undertaken by L.E.K.with the guidance of IFC. The methodology is detailed in Appendix B.
- 3 World Economic Forum, 2018, The Future of Jobs Report.
- 4 World Economic Forum, 2018, The Future of Jobs Report.
- 5 World Economic Forum, 2018, The Future of Jobs Report.
- 6 McKinsey Global Institute, 2018, Skill Shift Automation and the Future of the Workforce.
- 7 World Economic Forum, 2018. The Future of Jobs Report.
- 8 World Bank Group, 2018, Learning to Realize Education's Promise, World Development Report 2018.
- 9 World Bank Group, 2017, Africa's Pulse, Volume 16.
- 10 Methodology for demand-supply index: A positive value on the index indicates that demand exceeds supply and a negative value indicates the opposite. The magnitude of the index reflects the extent of the demand-supply gap. For the gap index, the responses have been weighted as per the rank assigned to them with the following weights: $D \gg S = 2$, $D > S = 1$, $D = S = 0$, $D < S = -1$, $D \ll S = -2$, and then normalized for each geography to account for difference in the number of responses
- 11 L.E.K.interview with Titi Akinsanmi, Policy and Government Relations Lead, West and Francophone Africa, Google.
- 12 Estimates of digital skills demand were undertaken by L.E.K. with the guidance of IFC. The methodology is detailed in Appendix B.
- 13 Oxford Business Group, 2018, The rapid rise of ICT in Ghana attracts international interests.
- 14 The World Bank, 2018, September, Digital Jobs for Youth: Young Women in the Digital Economy.



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