

Regulation will also be crucial to building trust as mobile banking expands, and it will need to keep up with the rapid innovations that are under way in financial services and ICT. Service providers can address this by engaging regulatory authorities proactively. Governments can also play a role by driving the digitisation of their own payment flows, as well as providing incentives to digitise broader flows such as B2P, P2G, and B2G.

Education

As Africa's economies have grown, they have made tangible strides in educational enrolment and attainment. Yet the goal of delivering a high-quality education to every child in Africa remains an unfinished agenda (Exhibit 13). Primary school enrolment is 79 percent, nearing the rate in other regions, but there is a high dropout rate; in 2010, enrolment in secondary school was only 34 percent—and a mere 7 percent made it to tertiary institutions. The quality of classroom instruction is a concern, and student-teacher ratios are high (in fact, Africa's student-teacher ratio is double that of Asia and the Americas and more than triple that of Europe).

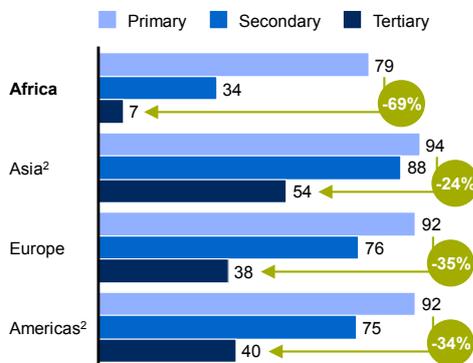
Exhibit 13 Africa lags behind other regions in education

INDICATOR Access

METRIC

Enrolment rates¹

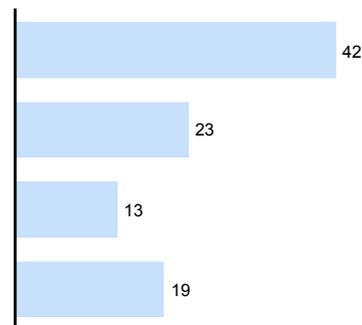
Enrolment rates in primary (net), secondary (net) and tertiary (gross) education



Quality

Student-teacher ratio¹

Average number of students per teacher (in primary education)



1 Enrolment data from 2010; student-teacher ratio data from 2010.

2 Asia includes Middle East and Oceanic countries; Americas includes North America, South America, and the Caribbean.

SOURCE: World Bank; McKinsey Global Institute analysis

Today new digital tools have the potential to deliver rapid gains in access to education, teacher training, and learning outcomes. Much of this promise rests with the ability of the Internet to greatly broaden access to high-quality content and learning aids. In many regions, classrooms have limited access to up-to-date textbooks and learning materials. Students have started to gain the benefits of the world's best and most cutting-edge learning tools, delivered via mobile phones, tablets, or e-books. If the challenges of power and battery capacity can be overcome, these solutions could be scaled up. Tablets may become a cheaper option for supplying students with the materials they need, potentially reducing textbook costs. Mobile learning aids will also help students learn in bite-sized chunks while on the move, enabling them to use pockets of dead time. In addition, online teaching solutions create the possibility of scaling up the number of students that can have access to the best teachers, extending their reach beyond their immediate classroom via the Internet.

Some striking innovations are already under way. ReKindle Learning, a South African startup, is based on the premise that mobile devices are particularly well-suited to reinforcing content presented in the classroom through additional drill questions that students can follow at their own pace. It is piloting the use of these tools for various settings, including corporate training, financial literacy programmes for low-income communities, and the classroom. Also in South Africa, Yoza Cellphone Stories creates short, interactive stories that can be accessed through a feature phone; this has led to a 400 percent increase in the number of books read in beneficiary schools over four years, strengthening literacy efforts. Worldreader provides Kindle tablets with pre-loaded content in nine African countries (including Ghana, Kenya, Rwanda, South Africa, and Tanzania), leading to significant gains in standardised reading comprehension scores for primary students. Dr. Math connects South African tenth graders with a social network of tutors and fellow students, providing math exercises and tests that can be accessed on a basic mobile phone; it has increased users' math competency by 14 percent.

Greater connectivity also opens the doors to using the learning tools developed anywhere around the globe, such as the library of instructional videos and interactive exercises available through Khan Academy, a US-based non-profit whose mission is to provide "a free world-class education for anyone anywhere." Its modules, which are particularly strong in math, are gradually being translated into a wide range of languages. The Asante Africa Foundation, SAP, and Globalize Networks, for example, have partnered to translate 1,000 video lessons in math and science into Kiswahili and make them available by download to students in Kenya and Tanzania.

Major advances can also be made by strengthening the quality of classroom instruction. This can be achieved by creating widespread access to online training and qualification tools and by providing educators with supplementary materials to improve their teaching. The UNESCO and Nokia "English Teacher" programme, for example, provides primary school teachers in Nigeria with training and instructions on how to deliver content, as well as applications and tools to assist in classroom presentations. The programme combines in-person seminars with a service that sends teachers educational content and daily messages with pedagogical advice via their mobile phones; the messages are organised into thematic modules and include images and exercises.

Another key opportunity for improvement lies in strengthening learning management systems and assessment. Online tools will allow school systems and their non-profit partners to create transparency around performance, while online testing will support standardisation and monitoring. Khan Academy, for instance, is revolutionising assessment and monitoring; as students complete exercises, teachers receive real-time data on their performance and areas of difficulty.

Technology is also enabling innovations to deliver more affordable private schooling. Kenya's Bridge International Academies, for example, is a fast-growing chain of more than 100 nursery and primary schools with a mission to provide "knowledge for all" at an average cost per pupil of just \$5 per month. Its model is based on a data-driven, technology-enabled "Academy-in-a-Box" that automates the vast majority of non-instructional activities in each school through a smartphone application. It then delivers well-honed curriculum and teacher

training material through a proprietary tablet application. Lastly, technology makes it possible for both public and private school systems to improve school management and reduce costs by standardising and automating fee collection, expense management, payroll, and admissions.

In order to realise significant educational gains across the continent, governments, non-profits, and the private sector will need to work together to provide the necessary resources and sustain momentum. Several major challenges will have to be overcome:

- **Infrastructure.** Many parts of Africa lack electricity or Internet connectivity, creating a real barrier to the penetration of digital learning tools. Solar power offers one viable solution for many locations, and new technologies have the potential to bring the Internet to Africa's rural schools and villages. But to reach African students and teachers at scale, SMS-based learning tools will have to be designed in the short term.
- **Access to devices.** The cost of smart devices remains beyond the reach of the vast majority of Africans. Rolling out education initiatives at scale will depend on the development of lower-cost devices. Partnerships involving private-sector technology companies, governments, non-profits, and donors can provide affordable laptops and tablets with greater capabilities. The Kenyan government, for example, has announced a plan to provide a simple laptop to every student entering primary school. Similarly, the Rwandan government has partnered with the One Laptop Per Child project; to date, it has distributed more than 100,000 laptops to students in more than 400 primary schools. In Nigeria, Veda has teamed up with other corporate partners to provide students and youth corps members with low-cost, locally manufactured laptops.
- **Buy-in from teachers and parents.** The human challenges are perhaps as great as the technological ones. Teachers could feel supplanted by technology and resist making full use of it unless they feel empowered as part of any shift toward digital learning, with their input informing its design and implementation. In Kenya, for example, the government is training 60,000 teachers on how to use technology and integrate digital learning into the classroom before it begins providing primary school students with laptops. Parents, too, may well be skeptical of educational technology and must be explicitly involved and engaged.

These challenges can all be surmounted if the right conditions are in place. One of the most crucial elements is the presence of ICT reform champions as part of transparent and competent leadership in the education sector. Scaling up digital learning initiatives and ensuring their effectiveness will require clear vision, strong coordination, measurable milestones, and ongoing monitoring, as well as a long-term plan for the continued use and upgrading of technology.

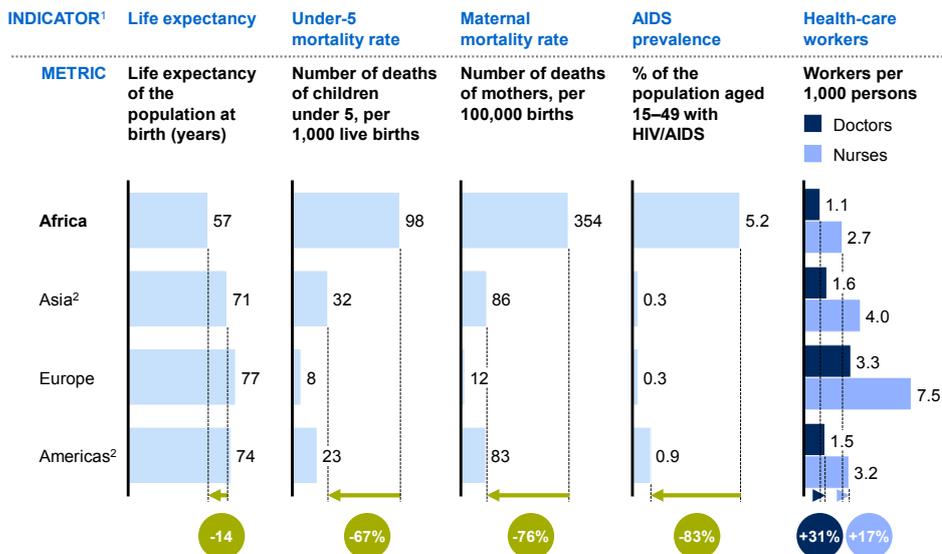
If existing "e-education" initiatives and experiments across the continent can be brought to scale, Africa could potentially close the educational enrolment and attainment gap with other emerging regions in just over a decade. Education spending accounts for a sizeable portion of most government budgets, and now Web-based school management systems and online testing can support standardisation and monitoring of school performance that will make this public

investment more effective. The technology-related productivity gains in education could reach \$30 billion to almost \$70 billion—enabling governments to achieve more with their education budgets and providing millions of students with the foundation for a better future.

Health

Africa has made considerable progress in improving health outcomes over the past two decades, but its indicators continue to lag behind those of other regions. While the continent's under-5 mortality rate has dropped substantially, it remains sharply higher than the rate in Asia or the Americas (Exhibit 14). And the continent continues to face a heavy burden from HIV/AIDS, malaria, and tuberculosis, despite intensive efforts over the past decade to tackle these diseases. In many regions, there is an acute shortage of doctors and other health-care workers. Millions of Africans lack access to medical care, whether because they cannot afford to pay for services or because they must travel long distances to reach the nearest clinic or hospital.

Exhibit 14
Africa lags behind other regions on key health indicators



1 Life expectancy data from 2010, under-5 mortality data from 2010, maternal mortality data from 2008, AIDS prevalence data from 2010.
2 Asia includes Middle East and Oceanic countries; Americas includes North America, South America, and the Caribbean.
SOURCE: World Bank; World Health Organization; McKinsey Global Institute analysis

The Internet could provide solutions to these challenges by enabling greater use of remote diagnosis, treatment, and education. There are major opportunities for progress in three main areas, where exciting innovations are emerging.

The first is telemedicine. The use of ICT to provide remote diagnosis, advice, treatment, and health education could address 80 percent of the health issues of patients in rural clinics, which are typically the most poorly staffed. This would revolutionise health care for large populations. It would simultaneously improve the efficiency of health spending, reducing the cost of treating chronic disease by 10 to 20 percent and saving an hour a day of nurses' time.