

# The Fourth Industrial Revolution: Will Africa be ready?

*By Edward K. Brown*

As the world enters the Fourth Industrial Revolution of artificial intelligence, robotics and the internet of things, the challenge for Africa is providing its youth with the knowledge and skills needed for the emerging world of work. The continent has one-fifth of the world's population aged under 25 and a working-age population that could reach 600m by 2030 - the largest in the world and the youth will form 37 per cent of that population (a bigger proportion than in China). With the right education, training and job-creating policies, this fast-growing population could be a great asset for socio-economic transformation.

**B**ut to harness this potential demographic dividend, Sub-Saharan Africa (SSA) must make rapid progress in seizing opportunities and overcoming challenges. At the dawn of a 4th Industrial Revolution (4IR) that will feature artificial intelligence, robotics, 3-D printing and the "internet-of-things" (IoT), Africa is far from being ready for the new challenge. This revolution will affect jobs in all sectors, but in phases and to different degrees. Africa is not going to become automated suddenly, but the coming global impact of 4IR makes more urgent the economic transformation SSA already needs in order to maximise its advantages and realise its potential.

The basic policies for transformation include diversification, export competitiveness, higher productivity and technological upgrading. Progress will depend on committed governance, stronger institutions, and how quickly SSA can produce a much better educated and skilled workforce and create decent jobs that keep pace with workforce growth. All this has to be achieved in the new context of climate change and in some parts of the continent an actual climate emergency, demanding policy attention and public investment to sustain progress in all areas of socio-economic activity.

## Challenges and opportunities

Africa's approach to the future of work has to begin with current realities. These include "jobless growth", infrastructure deficits, limited use of modern technology and a workforce that is over 80 percent active in the informal sector, with women overrepresented. Agriculture remains dominant in many countries. In others, services take the biggest share of gross domestic product (GDP). Missing from the usual structural transition is the non-extractive industry, especially manufacturing, which in SSA provides only 6.5 percent of total jobs and in many countries, less than 10 percent of GDP.

Workforce quality is another issue – less than a third of adults have finished primary school (compared with nearly all adults in industrialised countries). While around 30 percent of lower secondary school age children enroll, just 35 percent of them complete it (and these averages mask big differences between middle-, low-income and conflict-affected countries). In the school system, there is low proficiency in reading and mathematics, low enrolment in science, technology, engineering and maths (STEM) and a low proportion

of university students per population.

Students are among the 10-12 million youth who enter the SSA workforce each year, yet only three million formal jobs are created (AfDB, 2017). For those who get a job these days, there is often a mismatch between their skillsets and employers' current needs. In future, this mismatch will get worse, with more job-seekers even less prepared for jobs, which, with technological change, require high levels of critical thinking, writing and other soft skills.

The list of Africa's challenges is long. The focus, therefore, must be on the strategies, planning and implementation that will transform economies and create decent jobs. Agriculture may be the easiest path to industrialisation through agro-processing, with the abundance of low-wage labour and land. Modernising agriculture means boosting productivity and strengthening linkages with other sectors to improve food security, reduce food imports and increase exports. Modernising agriculture also stimulates production and service activities along the value chain, providing jobs for young people and higher incomes across the economy.

The advent of the African Continental Free Trade Area (AfCFTA) should spur SSA to capitalise quickly on its opportunities. The continent may have a decade to boost manufacturing before the cost of robots falls enough to replace human labour in some sectors. Even then, SSA will need to grow and maintain labour-intensive production into the future. With the value of SSA food and beverage markets projected to reach US\$1 trillion by 2030, countries can already make inroads into lucrative regional markets by raising production and productivity with upgraded labour-force skills, technology and infrastructure. Basic conditions for the above include better access to land, security of land rights and access to credit and technology.

Besides agro-processing, there is growing opportunity in wood products, garments and leather for labour-intensive local and regional market-focused manufacturing as AfCFTA develops. Automation will come faster in the automobile, electronics, extractives and construction sub-sectors. These are capital intensive but can create indirect jobs through stronger links to other sectors and promotion of local content and value addition. For example, manufacturing can provide inputs for the extractives sector and spur entrepreneurship and job creation.

Services may benefit most from 4IR. Already the fastest-growing sector for job creation in most African economies, it could grow by 3.8 percent each year to 2030. But the sector needs modernisation, with upgraded skills and infrastructure to promote 4IR-induced and ICT-based job opportunities, from

mobile payments and vending to customer service, sales and human resourcing jobs. 4IR may also hasten formalisation. Fast-growing mobile banking opens up opportunities for self-employed workers and makes it easier for them to access credit and make payments, including of taxes. ICT platforms can also help develop business models amenable to increased youth participation. Examples include linking farmers to markets and service providers (rental of tractors and other equipment) and assuring the packaging and food safety standards that enable access to lucrative international markets.

## Keys to the Future for Africa's Youth

The key to unlocking Africa's potential is a better educated and more highly-skilled workforce. This requires systemic changes from kindergarten onwards. The essential ingredients include: greater access to early-childhood education; an emphasis on ICT skills and critical thinking from primary level onwards; much higher participation in STEM; much higher participation in upgraded technical and vocational education and training (TVET); and investing in well-paid teachers trained to work with modified curricula to prepare students for the new world of work. Teachers also need training to provide gender-sensitive pedagogy to keep girls in schools.

Countries need to work towards the African Union Agenda 2063 target of 70 percent of high-school graduates entering tertiary education, with 70 percent of them graduating in science and technology-related subjects (compared with the current SSA average of 8 percent). This means raising the quality of early STEM teaching and the number of teachers, and expanding access to cost-effective online learning where ICT can deliver STEM subjects through virtual laboratories and simulations, instead of resource-intensive, on-site labs.

TVET reform is also critically important, not as a standalone, but as part of a wider economic strategy that focuses on priority sectors and needs, with clear implementation plans that include monitoring and evaluation. Efforts are underway to improve TVET in SSA in terms of modern facilities, better pedagogical skills and more practical experience among TVET trainers. Private sector engagement in designing and delivering TVET is crucial for quality and relevance. TVET must be demand-driven and responsive to market situations. Besides industrial attachments and apprenticeships, students need entrepreneurship training and business literacy. Governments are also looking to the private sector to help fund TVET costs through taxes and levies. The goal is to prepare better-educated youth for productive, formal and informal self-employment, especially along the agribusiness value chain.

SSA has been advised to attain universal lower secondary education, then prioritise the quality and relevance of upper secondary and TVET, before gradually expanding uptake to meet labour demand. It is also recommended that trade-offs must be identified and adapted to specific country circumstances.

Africa's youth are both an asset and a time bomb. At current trends, nearly half of these vibrant young people will be unemployed, discouraged, or economically inactive by 2025. A well-publicised fraction is migrating, often by dangerous routes, to search for jobs. More disturbingly, some 40 percent of youth joining rebel and terror groups reportedly cite the lack of economic opportunity as the key motivation.

The lessons for SSA are clear. The demographic dividend is not automatic; it requires strong institutions, policies to create productive jobs and a workforce with appropriate skills. SSA needs to create about 20 million jobs each year until 2035, double the number created in the last five years. It will also need to boost female education and higher labour force participation by women in formal sector jobs as these help lower fertility rates and spur the demographic transition. Currently females are overrepresented among youth not in education, employment or training.

Africa must prepare for two game-changers: climate crisis and technological revolution. Overcoming the challenges and taking advantage of the opportunities will demand new and higher levels of clarity and commitment from national and regional leadership.

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