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Harnessing technology to respond to millennial SDGs

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In August 2020 and February this year, the Alliance for Accelerating Excellence in Science in Africa, which is a funding, agenda-setting, scientific prioritisation and programme management initiative created through a partnership between the African Academy of Sciences (AAS) and the African Union Development Agency (AUDA-NEPAD), organised webinars on the fourth industrial revolution in Africa. The webinar was organised through the African Science, Technology and Innovation Priorities (ASP) programme, a five-year programme which is engaging Africa's leaders in science, policy stakeholders, and partners to identify top scientific priorities that, if addressed, offer the highest return on investment for Africa's sustainable development. The webinars will enable ASP to produce an outcome report and a policy paper on 4IR priorities for Africa. Davies Mbela, Communications Assistant who supports ASP explains what 4IR is and why AESA is undertaking a prioritisation exercise in this field.

What is the fourth industrial revolution?

Klaus Schwab, the founder of the World Economic Forum defines [The Fourth Industrial Revolution](#) "as a world in which virtual and physical systems of manufacturing cooperate with each other in a flexible manner at the global level." and relate to one another. It is enabled by quantum leaps in technology that transform the way we live, work and relate to one another.

The industrial revolution began in the 18th century and has continued as followed:

- First industrial revolution: Steam-powered factories marked mechanical production.
- Second industrial revolution: Application of science, and in particular electricity generation boosted mass production creating exponential growth in the industrial

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- Third industrial revolution: Set the stage for digitisation and automation of production
- Fourth industrial revolution: Is building on the 3IR to boost already existing technologies to make them safer, faster, efficient, and easily accessible in addressing global challenges. Examples are artificial intelligence, genome editing, augmented reality, robotics, and 3-D printing.

How is Africa benefitting from the fourth industrial revolution?

According to the [Foresight Africa Report 2020](#) Africa report 2020, 4IR's transformative potential for Africa is quite significant. In the ICT sector, mobile technologies generated direct employment to 1.7 million youth in Africa alone which was both directly and indirectly, creating a \$144 billion economic value that equates to 8.5% of the Sub-Saharan Africa GDP.

Digitisation of services also increased efficiency, accountability and ensured delivery of financial services to underserved communities. For example, M-Pesa in Kenya, which is a mobile money service, enables access to formal financial services to anyone with a mobile phone and a sim card, in turn reaching the marginalised groups, such as the farmers in the village and women who are key drivers to sustainable eradication of poverty. Such a service helps low earning households to grow their asset base reducing the cycle of generational poverty.

Digitised agricultural information has contributed to increased production and sustainability for both farmers and consumers. In Ghana [Farmerline](#) and [Agrocenta](#) are companies that offer agricultural advice and share weather information and financial tips to farmers via their mobile phones, which has helped farmers to increase their productivity. In East Africa, [Mkulima Young](#) provides planting tips and information on weather patterns and markets to young farmers.

Artificial intelligence is enhancing data-gathering opportunities that provide accurate analyses and enable targeted poverty eradication strategies. An example is the [Sophie Bot](#) — which was developed by a Kenyan startup is a free platform providing information on sexual and reproductive health on several messaging apps including Messenger and Twitter.

What are the gaps that need to be addressed in 4IR in Africa?

Strong education systems and a reduction in poverty are needed to encourage the adoption of modern technology. A recent article [How can Africa succeed in the Fourth Industrial Revolution?](#) points at the dropout rates in Africa is at a high of 30% , which is more than twice the global average of 13% while cognitive and non-repetitive skills that account for better pay, higher wages over time and greater work satisfaction are grossly underexploited with less than 4% of the continent's population having a university degree. Furthermore, the academic concentration is around social sciences and humanities with a notable lag on STEM (science, technology, engineering, and math) a crucial builder for harnessing 4IR technology.

What is AESA's contribution to the fourth industrial revolution?

AESA convened a group of experts from the African scientific community to identify priorities to advance 4IR research and development. These priorities will drive advocacy for investments to achieve the targets of the AU Science, Technology and Innovation Strategy for Africa 2024 (STISA 2024), Sustainable Development Goals (SDGs) and Agenda 2063.

The first experts meeting that was held on 14 August 2020 covered four main areas: Leveraging 4IR for Africa's Agenda 2063 and SDGs; Connectivity and the 4th Industrial Revolution; Making the 4IR work for Africa's inclusive and sustainable food and health systems; and Global trends and overview of African initiatives in 4IR: Key lessons and priorities for Africa.

The second consultative roundtable took place on 25 February 2021 themed: A dialogue on policy perspectives and investment options. The two meetings informed an outcome report and will set the stage for the drafting of the policy paper and policy brief.

What priorities emerged from the expert meetings?

4IR R&D priorities include:

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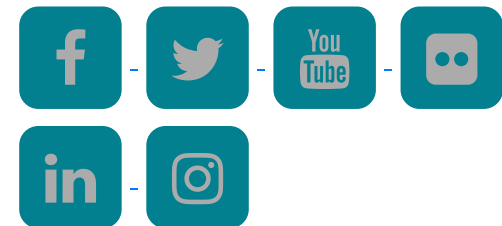
- Investment in infrastructure mainly in ICT and digital technologies, such as satellite, internet connectivity, internet costs, internet speed, digital education which has been key during the global pandemic, precision health and internet fibre access.
- Agri-food systems will benefit from the digitisation of financial systems to pay farmworkers and mechanised farming methods will, in turn, increase outputs over short periods, boost farmer literacy on climate-smart farming, reduce food waste and promote the use of cost-effective communication in remote areas and renewable energy in agriculture.
- Health systems through point of care health (whereby patient testing allows physicians and medical staff to accurately achieve real-time, lab-quality diagnostic results within minutes rather than hours with the help of advanced diagnostic tools), health policies on universal data sharing, and streamlining drug manufacturing to eliminate counterfeits.

What are the next steps?

The steering committee will draft a policy paper to inform evidence-based policymaking by governments and funding strategies by entities that fund science on the continent.



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