

It's time to foster Africa's science revolution

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Accelerating the knowledge-led development of Africa through science driven policy and investments is important for boosting long-term growth and well-being.

Africa is a continent with a growing consumer base, entrepreneurial ambitions and home-grown innovation. With more than 300 technology hubs spread across 93 of the continent's cities, entrepreneurs are innovating in every sector from education and health to agriculture and energy. Africa is becoming a generator of knowledge, innovation, creativity and technology, rather than being simply an adapter of trends produced elsewhere in the world. There is no doubt that African government policy can accelerate this process. The knowledge-based development model is new territory for Africa. It should define our collective

aims. Having a creative, skilled and educated young African population combined with the implementation of science and evidence-based pan-African and national public policies and investments can lead to large-scale social transformation and improved well-being.

The knowledge-based development model in Africa has been accelerated by the arrival of western and Asian innovators and knowledge creators. These innovators have been attracted by Africa's flexible regulatory environment. This has enabled Africa to welcome early versions of newly developed technology. Drone technology used for the delivery of medical goods as a transcendental solution to the medical infrastructure deficiency in Africa is a prime example.

This has demonstrated that knowledge and science-driven development is key to the following success equation:

Innovation -> job creation -> socio-economic inclusion -> progress of society -> gains for the whole population of a country

To fulfil the above equation for success, African governments must first take concrete, specific actions to produce and disseminate knowledge around the continent. Deliberate strategies should be centred on three main challenges: (1) How to improve countries' regulatory frameworks to enable knowledge-led societies, most specifically in the two policy areas of industry and science; (2) How to foster the relevant skills and capacity for a scientific and creative culture to take root in Africa; and (3) How to design efficient partnerships and structured financing to build the first two pillars.

Take the low-carbon circular economy, for instance. In Africa, the rapid growth of the industrial economy brings with it an opportunity to leapfrog the classical linear economy and jump straight into more environmentally sensitive circular models, reaping the benefits of integrating social, environmental and economic factors into the balance. By looking at the environmental footprint of industrial processes from a life-cycle perspective, we have the opportunity not only to reduce their negative impacts, but to identify new opportunities for innovation and wealth creation. This can be done by using renewable materials and energy, designing and producing low-impact, repairable and upgradable products, and reusing constituent materials at the end of their life.

To support a rapid transition to the circular economy in Africa, policymakers, academia, the business community and civil society must work together to create an enabling environment for research and development towards a low-impact, low carbon economy. Ways to do this include using bio-based material and energy resources rather than petro-based ones; designing products composed of renewable resources, which minimise energy consumption; producing goods locally using local renewable resources; and supporting efforts to recover waste as a resource for new industrial processes, etc. In essence, this means focusing on

the use of the renewable resources that surround us, and preventing them from going to waste.

In addition, African stakeholders need to focus on energy independence. The Fukushima nuclear catastrophe has been pivotal in driving the energy transition in Europe through the rapid development of renewable energy systems, a resource particularly abundant in Africa. The continent's economic and social fabric could be transformed in coming years. Nevertheless, there are major challenges to be overcome before achieving both universal energy access and energy independence. Despite rapid advances in the capture, storage and management of renewable energy, colossal investments are required to support infrastructures and systems that are both financially viable and technically feasible. This will necessitate strong political backing through incentives and regulation to support public and private investments, as well as partnerships to achieve technological advances. These are needed in energy storage, for example, to counter the intermittent nature of renewable energy.

The preferred route to renewable energy storage for the continent should be the production of synthetic gaseous or liquid fuels, as opposed to batteries. Through our Next Einstein Forum Roundtables, we continue to investigate other innovation pathways to prosperity. Besides its involvement in scientific and industrial policy, the African Institute for Mathematical Sciences (AIMS) is active in many academic and research areas including climate change, financial and pure mathematics, big data and machine intelligence.

AIMS strongly believes that a culture of open innovation built on partnerships along the education value chain is key both for commercialising Africa's expanding knowledge base and climbing the global value chain. This is where international co-operation could have long-term impact.

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