



THE AFRICAN CAPACITY BUILDING FOUNDATION | FONDATION POUR LE RENFORCEMENT DES CAPACITES EN AFRIQUE  
Securing Africa's future through capacity development

# Africa Capacity

No 14

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**THE FUTURE OF  
AFRICA LIES  
IN SCIENCE,  
TECHNOLOGY,  
ENGINEERING &  
MATHEMATICS**

**Creating jobs  
for 450 million  
future school  
leavers**

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## How ACBF is making a difference in African innovation and why your support counts

On 3 December 1967, the first successful human heart transplant was performed on the African continent, precisely in Cape Town, South Africa, by Prof Christiaan Neethling Barnard, supported by a team of medical personnel.

In 2014, five decades later, between several other world firsts in science and technology, a 24-year-old African invented the Cardiopad, a touch screen medical gadget that makes it possible to collect the parameters of heart patients in remote areas and send them instantly for analysis and prescription by specialists in urban hubs. He is a Cameroonian engineer, Marc Arthur Zang. In Nigeria, the rapidly expanding Innoson Vehicle Manufacturing (IVM) company, built by ingenious entrepreneur, Innocent Chukwuma, has produced over 10,000 quality, durable fit-for-the-terrain and fuel-economic cars in Nigeria.

Prof Emmanuel Nnadozie, ACBF Executive Secretary

Such positive stories of Africa's contribution to science, technology and innovation abound but are rarely told with the frequency and prominence they deserve in the pervasive global spaces of today's information and knowledge society. Instead, story-tellers seem to vigorously compete to pick and blow up stories of hardship and other phenomena that paint Africa far bleaker than it would ever be.

If stories of bleakness on Africa still pervade even spaces where providing content has become highly democratic and easy to do (think of all the social media networks and unprecedented-

ed access by Africans to smart phones and internet connectivity), it is maybe because African States, institutions, the private sector and other stakeholders are yet to fully take advantage of the inventions and propositions of the continent's creative minds.

Often, due to the lack of support or an enabling environment, the creative and innovative minds in question simply flee into other continents and use their ingenuity there to the benefit of those continents but to the chagrin of Africa.

The lack of capacity retention and utilization strategies are well to blame for this constant brain drain, although some would argue that brain drain does not necessarily need to lead to brain loss or negative consequences. But more importantly, the insufficient attention to creating capacity to innovate in the critical areas of science, technology, engineering and mathematics (STEM) on a massive scale, stifles systematic, consistent and wide scale innovation of like-minded skilled persons. So, developing human and institutional capacity in these critical skills, at a revolutionary pace, is urgent for Africa.

With its unrivalled knowledge of the capacity needs of African countries, its huge networks of think tanks and researchers across the continent, and its impeccable track-record of complex program and fund management for initiatives to boost human capital and institutional capacity in STEM and

development management, ACBF has been scoring goals to plug the gaps.

For instance, the Foundation has been working with the African University of Science and Technology (AUST) in Abuja, which is one of the Nelson Mandela research centers of excellence on science and technology in Africa, to mold Africa's inventors and technopreneurs of tomorrow.

Since 2012, ACBF has invested over US\$3.6 million to boost productivity in research at the university and to sponsor the brightest young minds from across Africa to acquire high-level skills in the areas of petroleum engineering, material science, pure and applied mathematics, computer engineering, theoretical and applied, and other fields.

The results are fantastic. Only recently, Ms. Blessing Ugwoke, who completed a Masters Degree in Petroleum Engineering in 2016 with full funding from ACBF, clinched the prestigious ENI Award for Excellence in Energy research in the Debut in Research: Young Talents from Africa category, based on her MSc thesis titled "A Study on Spherical Cap Bubble Transition Boundary for Bubbly to Slug flow." The award was formally presented to her on 5 October 2017 by the President of Italy in his official residence.

Other graduates with ACBF support have excelled and received various scholarships to further their research in PhD studies and are fostering scientific and techno-

logical innovations in Africa. Those in industry are becoming leaders of their sectors. This is the case of Ms. Joy Ugonma Olayiwola, an ACBF-scholarship beneficiary who graduated as a computer science engineer from AUST and is a highly valued leader of the ICT team of Geo Apps Plus – an arm of the Nigerian Space Agency.

Our goal is to increase the number of such innovative skilled scientists and engineers, women in particular, across Africa in order to produce momentous results and have them multiply their skills across the continent.

It is about a revolution which will see Africa producing many of the likes of Prof Christian Neethling Barnard, the pioneer heart transplant surgeon, Marc Arthur Zang, the inventor of the cardiopad, and Innocent Chukwuma, the innovative entrepreneur, to continue honing Africa's scientific, technological and economic transformation. This will not only be good for Africa but great for the rest of the world.

We therefore count on both our African and non-African partners and other stakeholders worldwide, to support our efforts through funding and partnerships in stirring the innovative revolution which Africa needs for its sustainable development. We know the exact points to touch and are grounded in results-based program management, to the extent that you would be very gratified for having partnered with us. Enjoy the rest of the read. ●

ACBF-trained engineer to help electrify rural Africa, after winning world energy prize



## Dossier: "The future of Africa lies in Science, Technology, Engineering & Mathematics".

How an ACBF-sponsored engineer plans to boost Africa's rural electrification

An ACBF-sponsored engineering researcher, who won the 2017 ENI Award for Excellence in Energy in Africa, Ms. Blessing Ugwoke, says she is working to ultimately provide a rural electrification improvement template to governments and communities in Sub-Saharan Africa that do not have access to electricity – a critical factor for the continent's transformation.

Ms. Ugwoke made the remarks recently while thanking ACBF for contributing squarely to her emergence as the winner of the 2017 prestigious Debut in Research: Young Talents from Africa Prize, one of the six categories of the ENI annual awards, commonly referred to as the 'Nobel Prize for Energy.' The Italian energy and engineering giant instituted the awards to promote and reward research and technological innovation in the fields of energy and the environment.

Ms. Ugwoke received her award from President Sergio Mattarella of Italy at the close of 2017, following her brilliant Master of Science thesis obtained from the African University of Science and Technology (AUST), Abuja, where she had studied under a full schol-

arship from ACBF.

As part of the award clenched by Ms. Ugwoke, the reputable Italian energy and engineering firm, ENI, is now funding her PhD Studies at the Polytechnic University of Turin, where she is developing her template to help Africa develop its off-grid renewable energy solutions in rural areas. She says this is materializing because ACBF built a solid foundation for her.

"The ACBF study grant for me is a harbinger of great things," Ms. Ugwoke said. "It paved the way forward for me with respect to advancing my academic career. It is a platform on which other success rides and has indeed paved the way for others that have benefited from it, not just me. This grant, honestly, is a wonderful initiative from ACBF and it is forever changing lives."

She affirms being highly equipped with skills acquired from AUST to proffer not just solutions to energy access in the rural areas of Sub-Saharan Africa, but also to help Africa address issues of climate change related to energy use.

Since 2012 ACBF has partnered with AUST, one of the Nelson Mandela Research Institutes for excellence on science and technology in Africa, in training the next

generation of innovative scientists, engineers and mathematicians to drive Africa's transformation.

The Foundation has funded teaching and research at the world class science and technology university to the tune of over US\$2 million, helping to produce about 60 (with focus on young women) scarce-skills persons from across Africa, with PhD and Master's degrees in the critical areas of science, technology, engineering and mathematics (STEM) needed to push the continent's transformation agenda.

The success of the Foundation's scholarship beneficiaries and the innovations they are now injecting in useful academic/policy research and in the industry, is a clear pointer to the need for far more substantial support to the Foundation in its quest to spearhead an African Skills Revolution.

Donors, member States, and the private sector should take advantage of ACBF's unrivalled experience in dissecting continental and country capacity needs for development as well as its networks in identifying game changers to help plug the gaps and quicken the implementation of the continent's transformation agenda. ●



## ACBF's role in mentoring more African innovators

The African Capacity Building Foundation (ACBF) recently exhorted 12 more young African women scientists and engineers whom it sponsored to obtain Master's Degrees in the fields of science, technology, engineering and mathematics (STEM) to apply their skills in earnest for the transformation of Africa.

Dr. Coffi Noumon, Special Advisor in the Office of the ACBF Executive Secretary, made the call in Abuja, Nigeria, during the 7th Commencement ceremony of

the African University of Science and Technology (AUST) where the beneficiaries of ACBF scholarships received their Master of Science degrees. They were among 102 MSc graduates of that pan-African institution who majored in the fields of petroleum engineering, pure and applied mathematics, computer science, material science and engineering, and theoretical and applied physics.

"We of ACBF are very proud of our contribution to excellence in Science, Technology, Engineering and mathematics (STEM) in

Africa, especially through our partnership with the Nelson Mandela Institute Centers (AIST Arusha, 2iE Ouagadougou, and AUST Abuja) since 2012," Dr. Noumon told the press during the commencement ceremony. "With AUST we have fully funded courses of 54 persons leading to Master of Science degrees and 15 leading to Doctorates, most of whom are excelling in the academic world and in industry where they are making innovative contributions to Africa's transformation.

Ms. Lois Okereke Chinwendu, an ACBF-sponsored candidate in Pure and Applied Mathematics

"We believe that our support to the training of highly skilled scientists and engineers at AUST as well as our funding of the training of thousands of agricultural Economists, Economic Policy Analysts, economists and public sector managers is proving very useful for Africa at this crucial period when the continent is implementing Agenda 2063 as well as sub-regional and national transformation plans," Dr Noumon added, while stating that the Foundation was calling on more partners and African member States to support its programs for a skills revolution in Africa which would accelerate the continent's sustainable development.

Ms. Lois Okereke Chinwendu, an ACBF-sponsored candidate

who emerged as the best graduate in Pure and Applied Mathematics, expressed gratitude to the Foundation and said targeted support of the kind given by ACBF would help make a difference in the pursuit of Africa's development. She expressed the hope that ACBF would continue to acquire the resources needed to keep supporting excellence in science and engineering, especially among African women to help look for lasting solutions to issues affecting the continent's development.

The President of AUST, Prof. Kingston Nyamapfene, remarked that "with major support from our partners such as the African Capacity Building Foundation (ACBF), we have been able to

attract top notch faculty as well as some of the brightest students on the continent, many of whom would not have had the opportunity to receive high quality post-graduate education, without the type of financial support which ACBF has provided in the form of scholarships."

Referring to ACBF's support that specifically targeted competent young women to encourage the increased participation of women in Science and Engineering fields, Prof. Nyamapfene added that "already, we see evidence of how those young women are becoming the vanguard of a generation that will make science and technology the cornerstone for Africa's transformation."

Another ACBF-sponsored graduate from AUST, Ms. Joy Ugonma Olayiwola, who heads the ICT unit of Geo Apps Plus, the marketing arm of the Nigerian Space Agency, credited her success to the timely intervention of ACBF. She said she was at the forefront of a team that was working on advanced computer programming to further the work of Nigeria's Space Agency, while she uses her spare time to volunteer in mentoring girls in Nigeria's government schools to pursue studies in Science, Technology, Engineering and Mathematics (STEM) as a way of multiplying the efforts of ACBF and AUST in that regard. ●



Ms. Joy Ugonma Olayiwola, heads the ICT unit of Geo Apps Plus – the marketing arm of the Nigerian Space Agency.

## SNIPPETS FROM THE MENTORS



Prof. Emmanuel Nnadozie, Executive Secretary – ACBF

“African countries need to develop the critical skills needed for economic transformation by paying particular attention to science, technology, engineering and mathematics as well as technical and vocational capacities. These skills are critical for promoting agricultural development and to add value to natural resources or to be able to really propel the kind of manufacturing jobs that are needed to create a massive number of jobs for young people on the continent.”

Prof. Kingston Nyamapfene, President – AUST

“The percentage of scientists and engineers in the population of a country is now a widely used indicator of a country’s potential for innovation and development. In that regard, Sub-Saharan Africa seriously lags behind the rest of the world, with fewer than 83 scientists and engineers per million people, compared to, for instance the average for Asia at 783 per million in Asia. This dire situation is a major reason that institutions such as AUST were created and are working hard to help plug the gaps as quickly as possible.

“With major support from our partners such as the African Capacity Building Foundation (ACBF), we have been able to attract top notch faculty as well as some of the brightest students on the continent, many of whom would not have had the opportunity to receive high quality post-graduate education, without the type of financial support which ACBF has provided in the form of scholarships.

“ACBF also specifically targeted competent young women to encourage the increased participation of women in science and engineering fields. Already, we see evidence of how those young women are becoming the vanguard of a generation that will make science and technology the cornerstone for Africa’s transformation.”



Dr. Abdulkadir Mukhtar, AUST Lecturer and Supervisor of ENI Award Winner Blessing Ugwoke

“Rigor is the watchword that drives both lecturers and students at AUST. Ms. Ugwoke’s ENI award testifies to this and motivates us to work harder with incoming students who will leave this place as skilled solution providers to Africa development issues.” ●



## How Africa can create jobs for 450 million future school leavers

If Africa must guarantee jobs for its 450 million or so school leavers by 2030, its countries must urgently address the mismatch between educational qualifications and the needs of the job market through massive investments in Critical Technical Skills (CTS) that will produce railway engineers, civil engineers, mechanical engineers, quantity surveyors, construction project managers, infrastructure

specialists, land surveyors, architects, electrical engineers, regional integration specialists, macro-economists/development planners and financial investment specialists, among others.

This was the message from the Executive Secretary of ACBF, Prof Emmanuel Nnadozie, to hundreds of delegates attending the ‘Africa Talks Jobs’ forum in Addis Ababa, Ethiopia, from 30 October to 1

November 2017.

The Head of ACBF’s Secretariat reiterated this point during a plenary session on “Harnessing the demographic dividend – creating perspectives for youth in Africa through skills development and employment promotion” of the event, organized by EU and African Union partners to address the now worrying issue of how to make the continent’s young people employ-

able after they leave school.

Africa has the world's youngest population, with almost 200 million people aged between 15 and 24 years. A huge proportion of the continent's population is also under 65 years, meaning if Africa slowed down new births and capitalized on the productivity of this vibrant work force, there would be rapid growth and development. This would amount to what experts refer to as the Demographic Dividend.

But Africa is hardly enjoying such a demographic dividend given that youth unemployment is the continent's number one challenge, Prof Nnadozie intimated. What Africa is witnessing at this stage is a "youth bulge, which if not urgently turned into a demographic dividend, it could become a demographic time bomb or demographic nightmare for the continent," he lamented.

The vexing issue is that "skills are in high demand in Africa, but their development is compromised by the Ivory Tower Syndrome, stemming from the disconnect between what educational institutions equip students with, and what the real economy needs," Prof Nnadozie explained.

The statistics of adverse trends in education in critical technical skills for Africa's school-goers are sombre when one looks at what they currently study. The Head of ACBF's Secretariat said 95% of African students study Social Science and Business and Law, while only 4% study Engineering, Manufacturing and Construction. Worse still, only 2% study Agricul-

ture even though agriculture contributes 32% of the GDP of their own very continent.

As if these underlying problems of skills acquisition were not enough, Africa, according to Prof Nnadozie, grapples with obstacles to growth and expansion of the labor market as seen in its current one-digit growth rate instead of a two-digit growth. It is compounded by the continent's excessive dependence on primary commodity exports (which has continuously led to jobless growth) and a weak and underdeveloped private sector.

"Youth unemployment is structural and therefore requires structural solution," the Head of ACBF proffered while calling to mind opportunities in sectors that are within reach for the continent. These are in consumer product industries, including light manufacturing; the construction sector, especially infrastructure development; the ICTs sector and the green jobs sector (which is already witnessing promising take-off in South Africa).

Prof Nnadozie said a "Skills Revolution" program which targets the above CTS learning areas should also entail that states develop serious reform of their educational systems, invest heavily in science, technology, engineering and mathematics (STEM) as well as in all the other critical technical skills areas; revamp Technical and Vocational Education and Training (TVET) with proper levels of apprenticeship; mobilize human and financial capital from Africa's diaspora in support of the youths back on the continent;

convene regular tripartite education dialogue between policy-makers, private sector and training institutions; and adopt good strategies on capacity building, capacity retention, capacity harmonization, and capacity utilization.

#### How ACBF is contributing to the skills revolution

ACBF has already spearheaded concrete initiatives to set the pace for the skills revolution it preaches. These include: (a) The identification of critical technical skills needed to implement the first 10 year-plan of Agenda 2063. (b) The establishment of centers of excellence in science and technology in some African countries. (c) Support for "Training for Employment & Entrepreneurship (T4EE)" in Malawi to make graduates more prepared for the workplace, and equip them with entrepreneurship skills. (d) Support for a "Youth Trade" project in Nigeria which has adopted a unique approach in improving youth entrepreneurship by starting where most projects and programs end.

The Foundation will continue to coordinate capacity development interventions for youth employment and entrepreneurship in Africa; support countries in crafting national policies, including the conduct of comprehensive assessments of the needs of the public and private sectors, as well as those of higher education institutions; support Technical and Vocational Education and Training (TVET), entrepreneur-programs for students and academic staff; and share its knowledge on strategic issues, best practices and lessons learnt. ●



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# The 5<sup>th</sup> Africa ThinkTank Summit

## Tackling Africa's Youth Unemployment Challenge: Innovative Solutions from the Think Tanks

The 2018 Africa Think Tank Summit aims at proposing strategies and actionable recommendations for think tanks to meaningfully contribute to the promotion of job creation while sharing knowledge and good practices and developing solutions to effectively tackle youth unemployment issues in support of Africa's vision as reflected in Agenda 2063 and the Sustainable Development Goals (SDGs).

5-7 April 2018  
Accra, Ghana

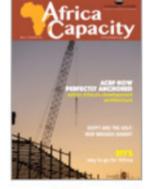
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Africa Capacity No. 11



This edition of the Africa Capacity by ACBF features articles on Egypt and the Gulf: New inroads sought for Africa's capacity and development; ACBF-Afreximbank partnership to support Africa; Off the press: ACBF's Reports on STI, Agenda 2063, Trilogy on Africa's Capacity Imperatives for achieving Agenda 2063 and Tribute to Prof. Callisto Enias Madavo

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