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Bimonthly August 2023 | newafricanscientist.com

BASIC RESEARCH IS NOT A LUXURY

Research that answer fundamental questions are the catalysts for 4IR

DIGITAL HEALTH REEVOLUTION

Is Africa ready for digital transformation?

EDUCATING THE MOST VULNERABLE

Why sending street children to school must be prioritized

PLUS WHAT ARE THE DRIVERS OF FOOD INSECURITY?

Science & Technology Propaganda

The promise of science, technology and innovation (STI) is loudly echoed across the corridors of power from Cape to Cairo. STI is heralded as Shaka's assegai, which vanquishes the enemy with a slight daze breaking the sweat of victory and economic ululations.

As with so many economic silver bullets, it is not so much the politicians frothing the glimpses of hope in erudite speeches and the scientists and engineers, the actual practitioners standing aghast looking at the absent yet dwindling national research and development purse. Promises and projections on STI abound, yet the research practitioners are confronted with excuses and blame.

Africa, oh Africa, when will the giant awaken? When will the unparalleled brains that brought to the world amazing architecture that modern people rather ascribe to aliens than accept a black person designed and built it? I am talking about the Great Zimbabwe or the Pyramids, unmatched in its elegance and unbelievable in its civil engineering yet still standing centuries later.

Should we look to the West or the East for our STI salvation? While ordinary researchers in African labs are shouting at the top of their lungs, "Look inside, Africa." Our scientists are our citizens, yet 16 African leaders made a beeline to St. Petersburg to make a mind-boggling request.

"We in Africa need access to science, technology, innovation and invention from the Russian Federation." These were the words a sitting African President spoke during a plenary session chaired by Vladimir Putin during the 2nd Russia-Africa Summit. This makes one wonder, does Africa need to keep begging for access to science and technology from Russia, China, North America, or Europe?

Let's explore this question and more in this Issue.

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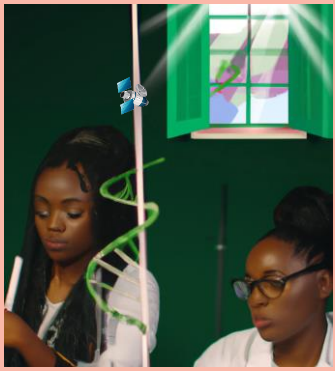
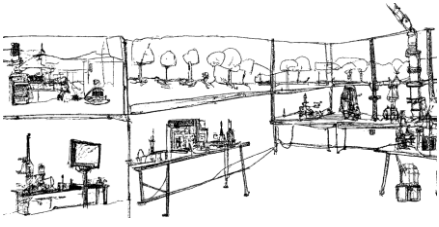


Cover: A painting generated by Dall-E depicting a team of researchers working under a baobab tree. The sun shining in the background offers light to the researchers highlighting the role of living heritage in conducting research that benefits the society. Basic research is often viewed as elitist and unnecessary luxury in countries that are low resourced – is this view warranted? (p18)



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AGRICULTURE

From the Land of a Thousand Hills, A Horse of a Different Color

Rwanda has welcomed Volkswagen's electric tractors onto its fertile terrains. This e-tractor is poised to boost large-scale farming following the success of a pilot scheme. Volkswagen partnered the University of Rwanda and others for the project in 2021. Now, the e-tractors, fitted with swappable batteries, are lined up for large-scale production in 2024. One hopes other Africans will manufacture their own e-tractors rather than just assemble parts made in Europe and China.

CLIMATE

Saudi Firms Buy Kenyan Carbon Credits In Auction

In a move that seems more like a performative stunt than a genuine commitment, Saudi firms snatched over 2.2 million tons of carbon credits in a Kenyan auction. The auction was organized by the Regional Voluntary Carbon Market Company (RVCMC), a Saudi entity. Companies, including Aramco and Saudi Electricity Company, paid $6.27 per metric ton of carbon credits. The polluters are buying redemption, but is it enough to absolve their environmental sins?

ENVIRONMENT

South African Cheetahs Sent to India Are Dying in Droves

India's bid to resurrect its extinct cheetahs by importing some from South Africa raises ethical alarms after several relocated cheetahs died. Experts argue that rewilding cheetahs is only noble if adequate care is taken to protect their welfare; otherwise, it is an expensive and cruel PR stunt. Removing animals from their native lands to fly across continents and release them in unfamiliar terrain seems a high-stress gamble. With the plan now faltering, India must refocus its approach to prioritize the cheetahs' wellbeing. Because true conservation demands compassionate science in service of all life - not just humankind.

Gambian Fish Processing Plant Causes Mass Fish Die-Off

In a damning exposé, the Outlaw Project has revealed the dark underbelly of Gambia's fish processing industry. A local fish processing plant owned by a Chinese company hailed as a symbol of economic progress is accused of killing thousands of fish on the Gambian coast. Gambia's marine life pays the price as the plant rakes in profits from sales to China and Norway. The revelation has sparked outrage among environmentalists and local communities demanding immediate action. Will the Gambian government reel in this rogue operation, or will it continue to ignore the ecological carnage?

UN Delegates Finally Wake Up to Marine Biodiversity Crisis

After nearly two decades of half-hearted dialogue, UN delegates have finally agreed to protect marine life in the high waters. UN Secretary-General António Guterres welcomed the move saying, "The ocean is the lifeblood of our planet, and today, you have pumped new life and hope to give the ocean a fighting chance." So, hats off to the delegates for their 'ambition, flexibility, and perseverance'. Better late than never, right? If we had time, we could talk about how the rich merchants of environmental doom are crafting new ways to circumvent this agreement right now, like they always do.

INNOVATION

Kenya Launches Speed Dating for Corporations and Students Innovators

Zimbabwean revolutionary Joshua Nkomo once said, “The country will never die; the young people will save it.” Kenya has made Nkomo’s prophecy a reality by partnering with the World Bank and a Dutch business school, Maastricht School of Management, to create ITATU. ITATU, your digital matchmaker, is here to stir some serious business love between big companies and bright college whizz kids. It’s like speed dating for innovation, helping corporations save a buck while tapping into student genius. The result? Students score real-world skills and work experience while businesses get shiny new products. It’s a win-win!

Will New Africa-Europe Innovation Deal Deliver for Africa?

The African and European Unions recently signed the AU-EU Innovation Agenda to facilitate socio-economic growth by strengthening innovation ecosystems. But some experts worry that the deal relies too much on European money. The program will be fraught with organizational amnesia on the AU side as its co-chair will change every two years while a technical expert will represent the EU. AU should focus on establishing its own research and innovation fund funded by its member states.

TECHNOLOGY

South African Man Makes a Bugatti From Recycled Materials

Without a formal degree but armed with determination and a dream to own a Bugatti Veyron, South Africa’s Thembelani Zondo built a car from scratch. This self-taught inventor, who pieced together his dream ride from recycled materials and government benefits over a year, recently made a robotic hand. Zondo’s ingenuity is echoed across Africa, like William Kamkwamba, the Malawian who used a self-made windmill to supply water to his village. However, many other inventors like him has sunk into oblivion. Such stories spark a crucial debate: Should Africa depend on Western philanthropy to harness its homegrown talent?

South Africa’s Dream to Leapfrog into 4th Industrial Revolution

A Chinese electronic behemoth sanctioned in 2019 by the USA out of Western insecurity or is it fear of being spied on, Huawei, has opened an innovation hub in South Africa. South African president Cyril Ramaphosa believes adopting Huawei’s technologies would help Africa, not just South Africa, to “leapfrog into the Fourth Industrial Revolution.” South Africa’s ESKOM already launched its 5G networks that run on Huawei technology.

Rated Ridiculous

Mukanya waGwazhi

He ndaa! *Mukanya waGwazhi* here, perched on my silo tree, just like old times, watching a spectacle only an animal used to jungle antics could make sense of.

I see the sun is setting and the sky is turning a fiery orange, a motley group of farmhands, having toiled all day under the scorching heat, trudge towards the weighing station. Baskets brim with a colorful array of nature's bounty – tomatoes, groundnuts, millets, tobacco, corn, and cotton – on their bundled backs.

It's that time of the fast.

These hardworking souls, spent the day in different fields harvesting different crops. Now they're queueing up to get their bounty weighed. And the chap with the most harvest that could be ground into corn flour gets the gold star. It's a farce, right?

But that's just the corn bread in the circus of academia where researchers are measured by the number of their publications and the corn field, I mean impact factor of the journal they published in, and not by the nourishing value of their intellectual crop.

I see a colonizer coming with a new scale. They are saying this scale is not like any other scale. It's a scale for African farms and not the farmhands. The colonizer is a sweet talker, he is saying African farms that get weighed will become famous and other farms and business will want to partner with them.

Oh, it's the Times Higher Education Sub-Saharan Africa University Rankings!

Universities across Africa are scrambling to carve their names on the rockface of these ridiculous rankings. Educated people who spent years sharpening their brains are convinced a place on that list is the Holy Grail of higher education excellence. To them, it's better to be a small name on a big chart than a big name in a small world.

My cousins in South Africa are mastering the posturing, hiring on the strength of potential headlines instead of potential contributions to knowledge. It's almost as if they've taken to a form of academic theatre, auditioning headline-grabbers like "first cheetah with red spots to be a tractor operator". The purpose of education?

No, no. That's too passé. It's the era of the headline-hunters, *vhakololo navhaswana*.

Oh, and the Sub-Saharan Africa university rankings themselves! And who's doing the judging? Why, it's the farmhands and a few farmers who have worked at fewer farms than I've climbed trees in one lazy morning. And how are they judge? They've designed a roulette game with indicators that would have you rolling in the aisles. Student mental health counselling is suddenly an indicator of resources. Of the folly!

Our university lecturers, the diligent farmhands of the academic field, are caught in this absurd crossfire of rankings and metrics. What becomes of the diverse, vibrant landscape of knowledge when every crop is forced to be ground into just corn flour? Or when the harvest is no longer about the fruits of discovery but the sheer weight of the yield? And what's left for these knowledge cultivators?

Their arduous efforts are diminished to a game of who crosses the finish line most frequently, not who ran the most enlightening race. This relentless chase for higher rankings obscures the true essence of their roles: to explore, to discover, to enlighten. Their plight is a stark reminder to all of us: a university's value shouldn't be measured by its position in the rankings, but by its commitment to the pursuit of knowledge and its investment in those who deliver it.

A university's value shouldn't be measured by its position in the rankings, but by its commitment to the pursuit of knowledge and its investment in those who deliver it.

From Street to School – Educating the Most Vulnerable

Samson Mhizha

A growing number of children worldwide are forced to live on the streets. Global policy agendas, such as the Sustainable Development Goals (SDGs), emphasize the importance of quality education for all children, viewing schools as safe havens and education as a powerful tool to combat poverty. However, in Zimbabwe, policies aimed at helping street children have been inconsistent, slow, and often punitive.

Research on the effectiveness of education-based resilience building for these vulnerable children, such as those homeless or orphaned, is limited.

Furthermore, there is a noticeable gap in research and interventions from a psychological perspective. Family reunification programs in Zimbabwe have been disjointed, unsuccessful, and poorly designed, largely due to insufficient empirical evidence.

Policies that address the educational needs of children living and working on the streets in Zimbabwe are necessary. These policies should help establish national standards and outline the responsibilities of government ministries and civil service organizations providing children's services.

A good policy should provide a framework for gathering reliable statistics on the prevalence of homelessness among children and their associated drivers. This process should start with a common definition of 'street children', followed by systematic data collection.

A common definition and shared knowledge of drivers make coordinating efforts between government departments and private organizations easier.

Holistic Approach

Parents, guardians, and other stakeholders play a significant role in shaping children's futures. Their involvement in intervention plans is crucial for sustainable and comprehensive development. Legal measures should be taken to ensure that families protect their children from the dangers of street life and engage them in educational programs.

Education is key to helping these children transition from street life to a more stable future. However, it is not as simple as just sending them back to school. Many of these children have fallen behind academically. Placing them in a grade level matching their age can be counterproductive, as it can stigmatize the child and increase the likelihood of them dropping out.

We must develop teaching strategies, counselling services, financial support, and extracurricular activities that address these individual needs. Special classes offering remedial programs could help bring these children up to speed before integrating them into mainstream classes.

Integrating street children into Zimbabwe's education system is a complex task that challenges administrators and teachers. Government departments need to create a systematic action plan addressing these issues. School staff should receive targeted training to prepare them for this task. Recognizing these children as a special needs group is important, focusing on those whose education has been most disrupted.

Samson Mhizha is a Lecturer and Chair of the Department of Applied Psychology at the University of Zimbabwe. He is a post-doctoral fellow at the Future Africa Research Leadership Fellowship Programme with the University of Pretoria.

Education is key to helping these children transition from street life to a more stable future. However, it is not as simple as just sending them back to school.

Grasslands Recovery

Short duration overnight cattle ranching improves pastures

Cattle at Shangani Holistic Ranch placed in an overnight cattle kraal

Mbekezeli I. Dabengwa

Zimbabwean cattle ranchers can increase the nutrition status of their cattle with the use of an overnight ranching strategy confirms a study by NUST researchers who have been investigating the phenomenon at the Shangani Holistic Ranch (formerly known as Debshan Ranch) which is in Matebeleland South.

For Zimbabweans, cattle are an important socioeconomic and sociocultural asset, considered a form of wealth while also playing a part in cultural processes such as bride price and food security.

However, grazing pastures in most parts of the country are facing challenges such as the depletion of grasses due the effects of overgrazing and climate change.

Cattle travel long distances to forage for greener grasses potentially exposing them to risks such as stock theft or wandering away, as a result.

Although supplementary feeds may be used to improve cattle's nutrient status without relying on the grasses in the rangelands, this potentially exposes cattle to botulism, wherein the animal may eventually suffer weakness, paralysis or death.

"Overnight cattle ranching is the best solution to the problems of overgrazing since the hosted cattle improve the quality of the grasses they consume over time." Professor Alan Sebata, who is one of the authors, observed.

Overnight cattle ranching is based on a principle that cattle which stay overnight at a particular time use their hooves to dig the ground allowing for easy aeration, water penetration and germination success.

The dung and the urine passed by the animals then provide valuable nutrients that would be consumed by the soil and surrounding vegetation.

After the overnight stay, the cattle are rotated to another spot where they continue the above process.

"The difference between overnight cattle ranching and other strategies is the issue of time that the cattle stay in the pen or kraal"

"Some pens are permanent like the ones we see in our rural areas, some are used seasonally thus they are semi-permanent and then there are temporary ones like in our study, where cattle are kept for 7-14 days before moving to another penning area."

"The 7-14 days allows for adequate dung and urine to accumulate within the penning area and reduces disturbance on the vegetation."

"In this way, cattle are grazed by herd man during the day and penned/kraaled in a temporary site for the whole night. This site is then called a short duration overnight kraal." Dr. Huruba stated.

The overnight cattle ranching system can help to improve the dispersion of seeds of other grasses using the cattle dung.

"Short duration overnight cattle ranching is an effective way to improve grasses in the range lands because each animal's dung can contain seeds of other grasses which are not available on that particular spot."

Rangarirai Huruba found pastures could be improved through short overnight duration ranching.

"This allows the cattle to create nutrient hotspots where you can get at least 6 grass species that can reverse the decline in grass quality caused by overgrazing."

"You find that some grasses are perennial, yet some are annual, so this system helps to provide high nutrient grasses to cattle throughout the year." Commented Dr. Huruba.

The study entailed randomly selecting 350-400 cattle which were organized into five herds and placed for seven days in temporary kraals at selected parts of the rangelands within the Shangani ranch.

"In conducting this experiment, each kraals site was 70m X 100 m and representative of the surrounding vegetation". Professor Sebata explained.

During the experiment, cattle were monitored by herders to protect them from wild animals and rustlers.

Data was collected by Dr. Huruba, students and technicians between 2014-2021.

The researchers visited the site frequently for monitoring.

Huruba's study primarily relied on three methods to collect data, namely surveys of vegetation, soil sampling and analysis of cow dung.

The surveys of the vegetation were used to evaluate the quantity and variety of grasses in regions after the overnight cattle grazing.

Soil sampling was used to evaluate the nutritional content of the soil after overnight cattle grazing.

Analysis of cow dung to determine the seeds of the grasses and nutritional content.

"We found 23 grass species on the spots where the temporary kraals were set up and then organized each species as palatable, moderately palatable and low palatability." He narrated.

A key finding from is the study is that short duration kraaling creates nutrient hotspots and modified habitat in favor of use by wildlife.

"The sites exhibited high foliar phosphorous in summer and high protein in winter thus facilitating adapting foraging by wildlife."

"When this finding is applied to cattle, we found that this strategy significantly reduced the cost of the feed."

"Hence, these sites can act as in-situ mineral and protein supplements stations for both game and livestock." Dr. Huruba narrated.

Overnight cattle ranching can create nutrient hotspots that can improve livestock production and reduce supplemental costs.

It also increases the profit margins without being harmful to the land.

Cattle at Shangani Holistic Ranch placed in an overnight cattle kraal.

In the long term, Dr. Huruba and his research team see overnight cattle ranching as a holistic and sustainable strategy to regenerate rangelands in rural areas.

"In addition to the tools that we need to combat poverty and hunger, we need to develop sustainably as we thrive to towards our goal to feed the world. Africa will feed the world!". Dr. Huruba concluded.

There have been efforts to share this project with other Zimbabwean farmers.

Recently, the Government of Zimbabwe partnered with the Shangani Ranch to grow the national herd and teach animal husbandry practices including overnight cattle ranching to the small holder cattle farmers.

Israel Mbekezeli Dabengwa is a freelance writer. The information and views expressed in this article are for informational purposes and are not a reflection any of the stated institutions. Thorough investigations have been made on the accuracy of the information presented.

Africa's digital health space is readying for universal access


©National Cancer Institute

Edmond Sanganyado

Africa's healthcare system is ready for a shift to digital health.

That's the stark finding of a long, United Kingdom Research and Innovation-funded report published by Imperial College London in collaboration with the African Forum for Primary Health Care (AfroPHC) in May, which commended Africa's advances in the digital health terrain "highlighting potential but acknowledging challenges" in the sidelines of the Africa CDC Digital Transformation Strategy.

Mobile health (mHealth) innovations have expanded access to quality health services, it commends – and could "revolutionize healthcare delivery and address longstanding health system challenges, if developed and implemented across systems successfully."

Although mobile penetration in Sub-Saharan Africa is below 40%, more than 80% live in an area with a mobile broadband network, and this is set to exponentially increase as most African governments have invested heavily in expanding internet access in rural areas.

The Covid-19 pandemic spurred innovations in remote access to medical care as minimizing personal contact was a priority. Telemedicine took over and health practitioners interviewed in the report agreed that the practice needs to continue with little twerking to incorporate in-person care.

Another silver lining from the pandemic was the need for electronic health records, as governments wrestled with staying abreast with infection trends. Electronic health records go beyond reporting infection rates. They focus on digitizing patient records and connecting health institutions to improve efficiency in decision-making by doctors, nurses, pharmacists, and other health practitioners.

One of the countries that have embraced the digital transformative potential in health, Tanzania has adopted digital transformations in health through its initiative called the Data Use Partnership (DUP). The initiative spearheaded the creation of digital tools and applications such as the Afya Supportive Supervision (AfyaSS) system.

Dr Chrisogone German, a medical doctor who has found the AfyaSS system revolutionary, said, “Having the ability to view multiple health supervision checklists on one page through the AfyaSS system is a significant step toward improving the quality of supportive supervision, and we are proud of it.”

The potential of digital health in Africa is immense.

A recent McKinsey report found that expanding digital health tools could enable Africa to realize 15% efficiency gains by 2030. These gains can be reinvested to improve access and health outcomes.

Such gains have spurred exponential growth in the African digital health space. In 2021, 55 digital health startups in Africa secured more than US$123 million.

One such startup, Kasha which focuses on last-mile health access, raised US$20 million in July. The Rwandan startup is set to scale up its operations in Rwanda, Kenya, and South Africa.

Despite the high mobile penetration, access to digital health services remains low. There are several reasons for that; internet data costs are exorbitant in most African countries, lack of digital infrastructure, and shortage of professionals to implement, maintain, and upgrade digital health systems.

The potential gains of digital health remain rife despite the challenges. But Africa is prepared. Africa CDC launched a Digital Transformation Strategy in March.

“The digital transformation strategy represents a critical milestone in our mission to improve African public health. As Africa CDC spearheads the implementation of the New Africa Public Health Order, we are committed to leveraging technology to strengthen our response to public health emergencies and to build resilient health systems across the continent,” said Dr Ahmed Ogwell Ouma, Deputy Director General of Africa CDC.

Network Entanglement

As the Shona saying goes, there is no drinking well that doesn’t have frogs. End users are sometimes suspicious of digital services as they fear there is no direct accountability and a lack of personal touch, which can lead to misdiagnosis. Hence, citizen education to ensure patients trust the technology is imperative.

Edmond Sanganyado is an assistant professor at Northumbria University, and he was previously an associate professor at Shantou University. He is a member of the Global Young Academy and the current president of the Zimbabwe Young Academy of Sciences.

The Great Hall, University of the Witwatersrand, Johannesburg. © Jolame Chirwa

There is a growing emphasis in promoting international partnerships to increase research quality and improve university status. Is this a sustainable model for Africa?

Re|Shaping Partnerships in Higher Education

Recently, the African Research Universities Alliance (ARUA) and the Guild of European Research-Intensive Universities partnered to create 17 centres of excellence. ARUA has 17 member universities, six in South Africa and the rest in eight other African countries, while the Guild has 21 members.

Punita Lumb, a researcher at the University of Toronto, argued that these partnerships operate on a "deficit model" that views African universities as lacking the capacity to conduct world-class research. Such myopic models perpetuate colonial education systems, which reduce the African to a knowledge consumer rather than an innovative creator.

According to the deficit model, universities can improve their status by merely associating with a university that has a higher status.

It's like an unkempt poor kid hanging around well-dressed rich kids in the playground, thinking that will automatically make them well-groomed. The situation at home differs, and it is what matters.

A true center of excellence should prioritize the concerns and aspirations of local people. Sadly, addressing local issues does not usually attract big funding, numerous publications in so-called top journals, or coverage by international media. It contributes little to the international reputation of the university or its rankings.

True research excellence is not measured by the volume of research or patents produced or the amount of research funds garnered. Suppose African universities are serious about local development. In that case, they will focus on partnering with local players and other African universities that seek to address local challenges.

Of course, this is not to dismiss the potential benefits of partnerships with Global North universities. Such partnerships can offer African universities access to resources and expertise they would not otherwise have. But is that what Africa needs right now to meet Agenda 2063?

Navigating Africa's Diverse Food Security Challenges

Africa grapples with escalating food insecurity, a crisis that, upon closer inspection, reveals stark regional disparities in both prevalence and underlying causes. Southern Africa, home to 22% of the continent's acutely food-insecure population, is overshadowed by East Africa, where the same percentage equates to a staggering 56.85 million people across fewer countries. Despite a lower rate of 12%, West Africa and the Sahel region still account for 41.45 million food-insecure individuals.

Child malnutrition, a grim reflection of this crisis, is rampant. Southern Africa reports 3.26 million children under five suffering from wasting, including 1.05 million severe cases. The situation is direr in East Africa, with over three times as many affected children, totaling 12.23 million, nearly 3 million of whom are severely malnourished.

Read the report

However, West Africa and the Sahel top the list with 12.82 million wasted and 3.48 million severe child malnutrition cases.

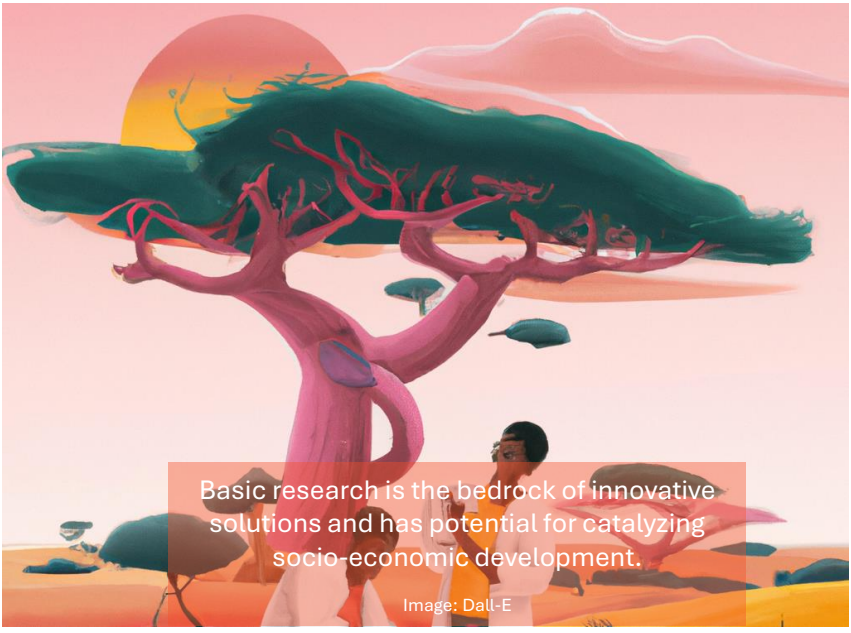
The root causes of these crises are multifaceted. Conflict and insecurity in Southern and Eastern Africa are primary culprits, particularly in the DRC, Mozambique, CAR, and throughout East Africa. The Sahel, however, is less affected by conflict, with climate shocks such as droughts and floods disrupting harvests and exacerbating food insecurity.

Economic shocks also play a significant role, primarily in Southern African countries like Lesotho, Eswatini, Namibia, and Zimbabwe. Here, rising prices and dwindling purchasing power have left millions unable to afford food. In contrast, East Africa is not grappling with a similar widespread economic crisis.

While localized climate impacts affect Southern Africa, the region has been spared the multi-year drought that has devastated the Horn of Africa, further compounding food insecurity in Ethiopia, Somalia, and Kenya.

While food insecurity is a continental issue, the situation in Africa is far from monolithic. The prevalence, causes, and impacts, such as child malnutrition, vary significantly across sub-regions. Southern Africa is beleaguered by conflict and economic crises, East Africa is more affected by climate shocks, and the Sahel experiences less conflict. Given this diversity, solutions must be tailored to local contexts - a one-size-fits-all approach is ineffective.

Cape to Cairo



Basic research is the bedrock of innovative solutions and has potential for catalyzing socio-economic development.

Image: Dall-E

With the Editor

As African Union Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024) ends in exactly one year, Zimbabwe, like most African nations, stands at a crucial crossroads. One path is the well-trodden adoption and adaptation of frontier technologies developed in Western countries.

But there is a road less travelled; it's murky and marred with uncertainty but bold and ambitious, leading to a future where Zimbabwe is not just a consumer but also a producer of scientific knowledge and technological innovation. Yet, the country seems to be at an impasse, unable to recognize the transformative power of the path less traveled by African nations, which can make all the difference.

Zimbabwe's approach to science, technology, and innovation is generally characterized by a 'consumerist paradigm.'

This paradigm places the country as a mere adopter and adapter of frontier technologies rather than a creator of new ones.

Adopting foreign technologies is not inherently detrimental; it can provide essential solutions to immediate challenges. For example, there is nothing wrong with adopting 5G networks for internet services or developing drones for last-mile deliveries of medicine or agricultural inputs.

However, when this becomes the country's primary mode of scientific and technological progress, it fosters a culture of dependency, stifles creativity, and hinders the development and adoption of local innovation capabilities.

The implications of this consumerist paradigm can be catastrophic as they do not only influence the activities of the scientific community at local universities but also society's perceptions of science and innovation.

Firstly, the consumerist paradigm narrows the scope of scientific endeavor by shifting the focus away from creating new knowledge, processes, and procedures. It values science and technology primarily for their immediate utility, often overlooking the long-term benefits of basic research.

Secondly, it fosters a perception that innovation is a mere commodity purchased from more technologically advanced nations rather than the fruits of a vibrant, local, and respected scientific community.

This article explores the current state of science and innovation in Zimbabwe, highlighting the limitations of the consumerist paradigm and the urgent need for a new approach that values and invests in basic research. As we will see, a shift in mindset and policy could open a world of possibilities for Zimbabwe, turning it into a hub of scientific inquiry and innovation that contributes to local and global knowledge.

Understanding Education 5.0 and Its Limitations

A key part of Zimbabwe's current approach to science and innovation is embodied in the policy known as Education 5.0. This initiative advocates augmenting traditional teaching, researching, and community service roles with a push towards innovation and industrialization by mandating educators to set the production of quality goods and services as the main mandate of higher education.

Shifting the production of goods and services from industry to academia, while laudable as it may ensure that graduates acquire skills critical for economic development, puts the private sector and academia at loggerheads as they now carry the same mandate and effectively become competitors.

Additionally, pushing aside teaching, research, and innovation suggest a misunderstanding of the innovation process.

To illustrate this, consider the analogy of a farmer who desires a bumper harvest.

The farmer invests heavily in state-of-the-art combine harvesters and builds magnificent silos, hoping this equipment and infrastructure will bring prosperity. However, the farmer neglects the fundamental elements that make a harvest possible in the first place: the soil quality, the choice of crops suited to the local climate, the understanding of farming techniques that optimize yield, and the actual planting and tending of the crops.

Similarly, Education 5.0 focuses on the end products of the innovation process – the combined harvesters and silos, if you will – without giving due attention to the basic research that underpins all technological advancement. The farmer might have the most fertile soil on earth, but if they do not plant the crop and tend to the weeds, they will never harvest anything.

Basic research is the preparation of the land and the planting of the crops, managing the weeds and adding fertilizers or spraying pesticides is the applied research, and harvesting, storage, and processing of the crops is developmental research.

Education 5.0 ignores basic and applied research and focuses on developmental research, the last hurdle of the innovation process.

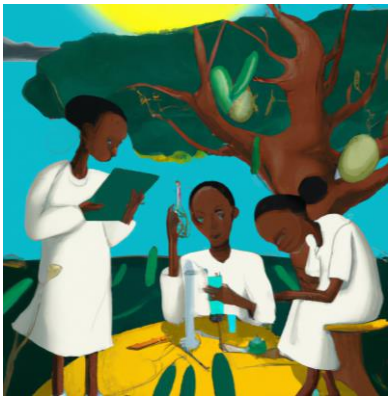
Perhaps most importantly, Education 5.0 sends a troubling message about the value of basic and applied research. Assigning product and service development to researchers at higher education institutions suggests that creating new knowledge, processes, and procedures is irrelevant in the innovation cycle.

This profoundly affects the scientific community by discouraging researchers from pursuing basic and applied research essential for the development of a vibrant research culture within the country. Thus, while Education 5.0 may be well-intentioned, its vision of science and innovation risks perpetuating a consumerist paradigm that does not serve Zimbabwe's long-term interests.

To truly foster innovation and industrialization, Zimbabwe must not only adopt and adapt foreign technologies but also invest in the creation of its own scientific knowledge and technological capabilities.

The Devaluation of Basic Research in Zimbabwe

In Zimbabwe, basic research – the cornerstone of all frontier technologies and a catalyst for innovation – is often perceived as an elitist endeavor, divorced from the reality of everyday life. This perception is deeply ingrained in our institutions, policies, and public discourse. It poses a significant obstacle to developing a robust scientific culture in the country.



Basic research, by its nature, seeks to expand our understanding of the world, often without immediate practical application. However, its value extends far beyond the mere satisfaction of intellectual curiosity. It provides the foundation for building new technologies, processes, and procedures, driving long-term economic growth, societal progress, and environmental sustainability. Yet, in Zimbabwe, these long-term benefits are frequently overshadowed by a myopic focus on immediate utility and short-term gains.

This devaluation of basic research is institutional and has permeated public opinion. Researchers are often vilified as being out of touch with real-world problems, their work deemed as academic exercises that serve no tangible societal, economic, or environmental benefit. The silence of the fourth estate amplifies this public sentiment; they rarely cover the research conducted by Zimbabwean scientists based in local universities.

Instead of being celebrated as the nation's intellectual wealth, these researchers are largely invisible in public discourse. Researchers face an uphill battle in securing funding, gaining recognition for their work, and translating their research findings into impactful solutions.

The result is a scientific community that struggles to fulfill its potential and a nation that misses out on the transformative power of basic research.

The repercussions of this devaluation of basic research are not just confined to the scientific community. It also hampers Zimbabwe's ability to become a producer of scientific knowledge and technological innovation. Instead of creating its own solutions tailored to its unique challenges and opportunities, Zimbabwe remains dependent on foreign technologies, becoming a consumer rather than a creator.

Lessons from Other Countries

Investing in basic research has been a hallmark strategy for several countries, often proving to be a crucial factor in their economic and technological growth.

South Korea is a prime example of a nation that has reaped substantial benefits from prioritizing basic research.

South Korea invests significantly in research and development (R&D), with its 2022 expenditures reaching an impressive $105 billion, which equals 5% of its GDP. This commitment to R&D has secured South Korea's position as one of the world's most innovative nations, as evidenced by its rank in Bloomberg's 2020 Innovation Index and the Global Innovation Index published by Cornell University, INSEAD, and the World Intellectual Property Organization.

South Korea's success is largely attributed to its intense focus on R&D, fostered through strong collaboration between government, industry, and academia.

The government has consistently played a pivotal role in this ecosystem since President Park Chung-hee's era, where strong support for R&D was a cornerstone of his economic development plan. Large industrial groups, known as chaebols, including LG, Lotte, and Samsung, were encouraged to invest heavily in R&D, leading to advancements in sectors such as petrochemicals, car manufacturing, shipbuilding, and consumer electronics2.

This strategic focus on R&D and innovation continued with Park's successors, with the government shifting its attention to high-tech industries like semiconductor design and manufacturing by the mid-1980s and early 1990s.

Israel's story provides another example of how basic research can stimulate economic growth and technological advancement.

In 2022, Israel dedicated $17.6 billion to R&D, which accounted for 5.9% of its GDP. However, a key challenge for Israel is that Israeli companies own fewer than half of the patents obtained by inventors from the country. Regardless, the nation has emphasized the development of Industry 4.0, with the government investing heavily in AI, big data science, smart mobility, and e-governance. Israeli universities have set up educational programs and research centers in cutting-edge fields like machine learning and artificial intelligence to bolster this initiative.

Israel's focus on innovation and technology has also been integrated into its industrial policy. The government's National Strategic Plan for Advanced Manufacturing in Industry, launched in 2018, outlines a framework for investment, skills development, infrastructure reinforcement, and greater access to knowledge, particularly for small and medium-sized enterprises. A vibrant auto-tech sector has emerged over the past decade, backed by the Fuel Choices and Smart Mobility Initiative launched in 2010. There are now 25 research centers dedicated to the automotive sector in Israel.

Zimbabwe's current approach to science and innovation is inadequate. The nation's investment in basic research is insufficient, and its attempts to cultivate innovation have been largely fruitless. This condition hampers the creation of a productive scientific and technological ecosystem, a necessary foundation for Zimbabwe to flourish in the global economy.

Basic research can benefit Zimbabwe's scientific, economic, and societal future. By supporting basic research, Zimbabwe could build the basis for developing novel technologies, products, and services that drive economic growth and enhance the quality of life for its citizens. Additionally, bolstering basic research could nurture a culture of innovation and creativity within Zimbabwe's scientific and academic communities.

The idea that Zimbabwe should focus on creating innovation hubs instead of investing in basic research warrants closer scrutiny. While innovation hubs can be instrumental in promoting entrepreneurship and technological advancement, they rely on an underlying knowledge base primarily generated through basic and applied research. In other words, innovation hubs are typically geared towards development research, where existing knowledge is systematically applied to create or improve products and processes.

Promoting basic research could nurture a culture of innovation in Zimbabwe's scientific communities.

Take the example of China, a nation that invested heavily in development research and emerged as a global innovation leader despite the skepticism of experts who doubted the efficacy of their model due to its unique governmental structure. China's success can be largely attributed to its vast population, which is highly adaptive and not resistant to change. Zak Dychtwald argued that China's innovation leadership arises from having "a vast population that has lived through unprecedented amounts of change and, consequently, has developed an astonishing propensity for adopting and adapting to innovations, at a speed and scale that is unmatched elsewhere on earth."

China's innovation matrix had the public as a key player, ready to celebrate its innovations. This is a challenge for Zimbabwe, where the public is frequently exposed to narratives that belittle the country's potential innovators, creating a pervasive sentiment that nothing good can come out of Zimbabwe. No "Buy Zimbabwe" campaign can rectify this situation. It requires a profound cultural shift that can only be achieved by investing in structures that recognize, promote, and celebrate basic and applied research.

Zimbabwe must substantially increase its investment in basic and applied research and foster a culture of scientific curiosity and creativity. Only through these measures will Zimbabwe be able to unlock the full benefits of scientific and technological advancement.

Recommendations for Zimbabwe's Scientific Future

Recognizing the foundation of a strong scientific future for Zimbabwe requires acknowledging the existing research infrastructure in the country. It is home to various higher education institutions and state-owned research centers, which, while functional, have the potential to significantly expand their capacity and impact with enhanced support and investment. These institutions face challenges often lacking the necessary tools and equipment for cutting-edge research.

One solution to this resource gap could be found by looking at successful examples in other parts of the world. For instance, the Hong Kong University of Science and Technology (HKUST) provides a compelling model. When HKUST was established, it did not have the extensive research infrastructure it boasts today. Instead, the university equipped its labs through donations from private businesses.

This partnership between private businesses and the university has helped the university become a global leader in innovation. It only required the private businesses to buy into the university's vision while confident that its mandate did not compete with their interests. Education 5.0 struggles to offer that assurance to the private sector.

If universities are now creating products and services, why would the private sector want to partner with their competitors?

To adopt HKUST's approach, Zimbabwe must foster stronger partnerships between its research institutions and the private sector. By aligning the goals of these institutions with the development research trajectories of businesses, a mutually beneficial relationship could be formed. But this requires the universities to step back from developmental research and focus on basic and applied research. Businesses would see their investment materialize into substantive knowledge to improve their products, processes, and practices. In the process, research institutions would gain the much-needed funding to support and enhance their research capabilities. This collaborative ecosystem would elevate the standard of research in Zimbabwe, benefiting the entire nation.

Policies that encourage and fund basic and applied research in Zimbabwe are essential. The government should create funding mechanisms, such as competitive research grants, to support various basic and applied research projects. These policies should also encourage collaboration among researchers as well as between academia, industry, and government to ensure that basic and applied research results are effectively translated into practical applications.

Furthermore, intellectual property laws should be strengthened to protect the rights of researchers and foster a conducive environment for innovation.

Public discourse needs to evolve to recognize and appreciate the role of researchers in society. This includes fostering a cultural shift where scientists and researchers are valued for their contributions to the nation's development and prosperity. Public recognition of researchers and their work can inspire young people to pursue careers in science and research, further strengthening Zimbabwe's scientific capacity. As the fourth estate, the media has a vital role in promoting scientific research. Journalists should be encouraged to cover and celebrate local researchers and their findings, bringing their work into the public spotlight. This can enhance the visibility of Zimbabwean science and create a more informed public that appreciates the value of research.

The transformative power of basic research cannot be overstated. It is the cornerstone of scientific and technological innovation, driving societal progress and economic growth. For Zimbabwe to build a prosperous future, it must embrace the importance of basic research and foster an environment where scientific curiosity and creativity are celebrated and nurtured. Zimbabwe can unlock its full potential and chart a brighter future through this commitment to science and innovation.

Till next time,

Edmond Sanganyado

Fresh Steps

A trip from Cape to Cairo exploring new research findings by african researchers and their implications to everyday life.

ENVIRONMENT

South African Scientists Discover New Marine Species

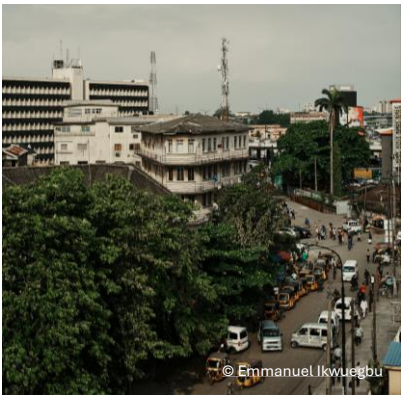
Researchers from the North-West University have discovered a new species of marine cryptofauna, *Gnathia jimmybuffetti*, in the Florida Keys. This tiny crustacean has a unique life cycle, feeding on fish blood as a juvenile and living hidden on the ocean floor as an adult. The species, named after musician Jimmy Buffett, is the first of its kind discovered in a century. However, its survival is threatened by rising marine temperatures, hence the need for more marine biodiversity exploration and conservation.

DOI: 10.5343/bms.2023.0040

Dehorning black rhinos is making them less brave

South African and Swiss researchers has discovered that dehorning black rhinos, a measure to deter poaching significantly alters their behavior. The study, involving over 15 years of data from 10 South African reserves, found that dehorned rhinos reduced their home range by an average of 11.7 km^2 (45.5%) and were 37% less likely to socialize. The behavioral changes could have serious effects impacts. This research highlights the complex trade-offs in wildlife conservation efforts.

DOI: 10.1073/pnas.2301727120



HEALTH

How Can We Reduce Malaria Readmissions in African Children?

A recent study published in Nature Communications found that post-discharge malaria chemoprevention (PDMC) with dihydroartemisinin-piperaquine can significantly reduce the risk of readmission and death in children recovering from severe malarial anaemia (SMA) in Africa. Using a mathematical model, researchers estimated that PDMC could prevent up to 38,600 malaria-associated readmissions annually in moderate-to-high transmission areas. Despite some limitations, including assumptions of 100% coverage and potential side effects, the study underscores the potential of PDMC in reducing the malaria burden and provides crucial insights for healthcare policy and implementation.

DOI: 10.1038/s41467-023-35939-w

Living in Cities is No Longer Better for Children's Growth

An NCD Risk Factor Collaboration study revealed that the developmental benefits of living in urban areas for children and adolescents have diminished. The study analyzed findings involving 71 million participants across 200 countries and found that the urban height advantage has decreased or even reversed. However, in sub-Saharan Africa, the urban-rural gap in height has widened, particularly among boys. Differences in body mass index (BMI) between urban and rural children were relatively small but slightly higher in urban areas. The findings underscore the need for targeted interventions to address these disparities.

DOI: 10.1038/s41586-023-05772-8

AI Unmasked Patient's Race In Medical Imaging Raising Bias Concerns

A study by Judy Wawira Gichoya, a Kenyan researcher at Emory University, found AI deep learning models predicted patients' race from medical images. This ability was consistent across various imaging types and resilient to image alterations. The discovery raises concerns about unintentional racial biases in AI applications in medical imaging, emphasizing the need for scrutiny and further research to mitigate potential risks.

DOI: 10.1016/S2589-7500(22)00063-2

Mark Your Calendar

Scholarships

Germany Academic Exchange Services (DAAD scholarship) – daad.de
Erasmus Mundus Joint Masters scholarships - https://erasmus-plus.ec.europa.eu/
Rhodes Scholarship for postgraduate degrees in UK – https://www.rhodeshouse.ox.ac.uk/scholarships/
Chinese Government Scholarship for Africans – campuschina.org

Meetings & Trainings

African Economic Conference (16-18 November 2023) – https://www.uneca.org/eca-events/aec2023
SETAC Africa 11th Biennial Conference (8 – 11 October 2023) – submit an abstract
Science Communication Online Course (7 Aug – 30 Nov) – Stellenbosch University
S4D4C European Science Diplomacy Online Course – free, on demand

Grants

British Ecological Society (opens 5 Jul) – up to £8,000 for ecologists in Africa
Wellcome Research Awards – for early career (closes 5 Oct) researchers from any discipline
PAGES Inter-Africa Mobility Research Fellowship Program (23 Aug) – early-career African scientist
Royal Society – University Research Fellow for outstanding scientists who are in the early stages (closing 7 Sep)

New African Scientist
Innovating Africa