

»» NEWSLETTER ««

TECHNOPOLICY AFRICA

The Official Newsletter of the African Technology Policy Studies Network (ATPS)



COVER ARTICLES

AFRICAN CONTINENTAL FREE TRADE AREA TO RURAL FARMERS BY USING WHATSAPP OR AN APP

By Mamadou Youssouf Thiam

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The African Continental Free Trade Area (AfCFTA) is a big deal. It's not just another bureaucratic initiative but a groundbreaking effort to create a unified market for goods and services across Africa....**pg 5**

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Achieving net-zero emissions is a critical objective for the global community, and Africa is no exception. As the continent experiences rapid economic growth and urbanization...**pg 19**

THE ROLE OF INSTITUTIONS IN ACHIEVING NET-ZERO EMISSIONS IN AFRICA

By Dr. Kingsley Ukoba

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ATPS Vision:

To use Science, Technology, and Innovation (STI) as a means for achieving sustainable development in Africa

ATPS Mission :

To improve the quality of Science, Technology, and Innovation (STI) systems research, policy, and practice by strengthening the capacity for STI knowledge generation, dissemination, and use for sustainable development in Africa

Overall Objective:

To build Africa's capability in Science, Technology, and Innovation for sustainable development

ATPS Motto:

Building Africa's capabilities in Science, Technology, and Innovation policy research, policymaking, and policy implementation for sustainable development.

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Chairman's Message



**Prof. Crispus Kiamba,
Chairman, ATPS Board of Directors**

As we conclude the first half of a momentous 2024, I am honoured to address you as the Chair of the ATPS Board of Directors. This year began with a resounding start. Our dedicated ATPS team, fuelled by an unwavering commitment to fostering science, technology, and innovation (STI) for Africa's sustainable development, has hit the ground running with series of events, programmatic activities, administration, and management. These efforts involve ongoing collaboration with diverse stakeholders across the continent.

On a particularly bright note, I am thrilled to applaud Prof. Nicholas Ozor, the Executive Director at ATPS for his visionary leadership and dedication, which have been instrumental in propelling ATPS to new heights. Under his exemplary guidance, the organization has not only thrived but achieved remarkable milestones and garnered international recognitions.

This recognition extends beyond Prof. Ozor to the entire ATPS team, whose unwavering commitment has fostered a dynamic and collaborative environment.

Together, we've cultivated ground-breaking research and evidence-based policies that yield meaningful contributions to Africa's socio-economic development and transformations.

The success of our projects, our expanding network of global partners, and the international recognition garnered by our researchers and innovators all underscore the positive impact ATPS is making. These achievements are a testament to the tireless dedication of each member of our team and network.

As we embark on the second half of the year, brimming with new possibilities, let us reaffirm our commitment to leveraging STI to address Africa's pressing challenges. Our collective efforts can shape policies that propel us towards a more sustainable, inclusive, and technologically advanced future.

While we celebrate our successes, let us not lose sight of the work ahead. Together, we will continue to be a driving force for positive change, making significant contributions to the advancement of STI in Africa.



**Prof. Nicholas Ozor,
Executive Director, ATPS**

As we enter the third quarter of 2024, I am thrilled to reflect on the significant achievements of the African Technology Policy Studies Network (ATPS) during the initial months of this year. This period has been characterized by unwavering dedication to science, technology, and innovation (STI) research, policy, and practice, resulting in remarkable transformations across critical sectors at individual, institutional, and systemic levels in our society.

One of the key highlights from the first half of the year was the development and publication of our ATPS Phase IX Strategic Plan, 2023 – 2028. This roadmap sets the course for our activities and initiatives. It guides our efforts toward realizing our vision of a more technologically advanced and sustainable Africa. We are excited about the transformative impact this plan will have on the continent's technological landscape. The key thematic priority areas for the Plan include:

Sector Priority 1: Agriculture, Food and Nutrition

Sector Priority 2: Climate Change and Environment

Sector Priority 3: Energy

Sector Priority 4: Health

Sector Priority 5: Digital Economy & ICT

Sector Priority 6: Creative Industries & Entrepreneurship

Sector Priority 7: Education and Technology

Aligned with our commitment to fostering innovation and empowering young minds, ATPS has published seven Policy Briefs derived from our project on ***Understanding the Policy and Institutional Landscape for Technological Innovation Development in Africa to Enhance Youth Employability, Entrepreneurship, and Job Creation (UPTIER)*** implemented in eight African countries namely: Ethiopia, Ghana, Kenya, Nigeria, Rwanda, Senegal, and Uganda.

These briefs, generously supported by the Mastercard Foundation and Afreximbank, are being used to inform evidence-based policies and strategies in the respective countries in the areas of youth employment and job creation.

These engagements have provided a platform for fostering dialogue and collaboration among key stakeholders. Our shared goal is to drive impactful change that will boost youth employability, entrepreneurship, and job creation through technological innovation development.

Furthermore, the ATPS has been actively involved in the project aimed at ***Strengthening the National Research and Innovation Funding Agencies in West Africa (SRIFA)***

The overall goal of this project is to provide training and technical support that will strengthen the national research and innovation funding agencies in six selected West African countries namely, Burkina Faso, Côte d'Ivoire, Ghana, Nigeria, Senegal, and Sierra Leone. Such support will enable the Councils achieve their objectives in line with the statutes establishing them in their various countries. Collaborating with the African University of Science & Technology (AUST), ATPS has facilitated validation workshops across the West African countries. Between March and May of 2024, we successfully conducted these workshops in the six (6) participating West African countries.

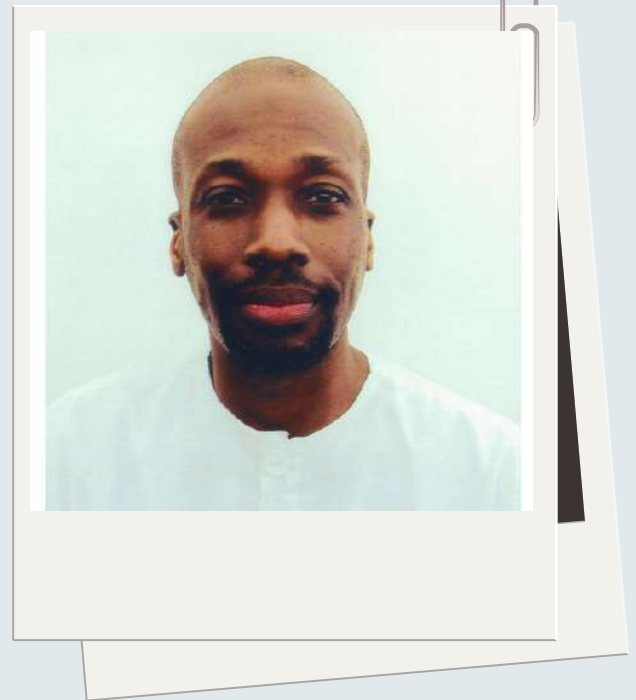
The first phase of our Artificial Intelligence for Agriculture and Food Systems Project comes to an end in September 2024. We are happy to announce that we have identified and worked with ten (10) innovators and researchers across eight (8) African countries to develop and deploy AI tools and innovations in agriculture and food systems that are currently making waves across the continent in solving complex challenges in the sector.

A new phase is being discussed with the donors to deepen our impacts and position some of the AI innovations and tools to scale.

Looking ahead to the remainder of 2024, I am confident that ATPS will continue to make significant strides in advancing science, technology, and innovation for sustainable development in Africa. My sincere appreciation goes out to our dedicated team, partners, and stakeholders for their unwavering support and commitment to our shared vision.

I use this opportunity to heartily thank our consortium of donors for their unwavering belief in us to deliver impactful programs to different end-users in the STI ecosystem in Africa. We continually solicit for more support from donors and partners to enable us implement and achieve our objectives as now contained in our brand new ATPS Phase IX Strategic Plan, 2023-2028.

African Continental Free Trade Area to rural farmers by using Whatsapp or an app



By Mamadou Youssouf Thiam

The African Continental Free Trade Area (AfCFTA) is a big deal. It's not just another bureaucratic initiative but a groundbreaking effort to create a unified market for goods and services across Africa. But what does it mean for you as a rural farmer? And how can technology, specifically WhatsApp and mobile apps, help you comprehend its implications and opportunities? It might seem complex, but don't worry; we'll break it down in simple terms.



Understanding the African Continental Free Trade Area

Let's begin with the basics. AfCFTA is a remarkable development in the world of commerce. In terms of participating countries, it's the largest free trade area globally. Its primary goal is to boost intra-African trade, stimulate investment and innovation, and foster sustainable development across the continent.

For the African farmer, this trade agreement changes the playing field. It's about unlocking new markets, amplifying demand for your products, and providing a fairer shot at prosperity. To illustrate the scale of the opportunities at hand, consider this: The United Nations Economic Commission for Africa estimates that AfCFTA could boost intra-African trade by a whopping 52.3% by 2022. Imagine the possibilities that open up when so many more people buy what you grow!

The Potential of AfCFTA for Rural Farmers

Let's dig a bit deeper into how AfCFTA can revolutionize the prospects for rural farmers. At its core, AfCFTA is about extending beyond local markets and stepping onto the continental stage. It's about showcasing your products to a broader audience, ensuring that your hard work fetches the best possible price.

However, every significant opportunity presents challenges. With AfCFTA, you might find competing with larger producers or meeting specific standards challenging. But fear not; recognizing these challenges is the first step to overcoming them. With the proper knowledge and tools, you can navigate these hurdles and make the most of the opportunities that AfCFTA presents.

The Power of Technology in AfCFTA

This is where technology steps in. Mobile phones, once a luxury, have become an indispensable tool for rural farmers. They are gateways for accessing information, connecting with buyers, and monitoring crops. And with the rise of mobile apps and platforms like WhatsApp, accessing essential information about AfCFTA is now just a few taps away.



Making Sense of AfCFTA with WhatsApp

WhatsApp is for more than just catching up with friends and family. It's a potent tool that can help you understand AfCFTA better.

WhatsApp groups can connect you with fellow farmers, trade experts, and potential buyers. These groups can provide real-time updates on market prices, trade policies, and emerging opportunities. In 2020, the Digital Agriculture Platform in Kenya utilized WhatsApp to reach over 300,000 farmers with vital information. This kind of initiative can change how you farm, and you, too, can benefit from such information dissemination.

To make the most of WhatsApp, remember these key pointers:

- Join only verified groups.
- Avoid sharing personal information unless necessary.
- Always confirm the information you receive.

Leveraging Mobile Apps for AfCFTA

There's a world of mobile apps designed to help you navigate AfCFTA. These apps offer a plethora of information, from detailed explanations of AfCFTA policies to market trends and opportunities.

For instance, consider AgroCenta, an app from Ghana that combines smallholder farmers now with an online market, providing them with fair and transparent pricing. Another app, Tula from Kenya, offers agricultural advice, market information, and financial services. Getting started with these apps is simple. All you require is a smartphone and an internet connection. Download the app from your device's app store, create an account, and you're all set to explore!

Success Stories

There are many success stories across Africa of farmers who have harnessed technology to tap into the opportunities offered by AfCFTA. Let's take the example of Grace, a smallholder farmer from Uganda. Grace joined a WhatsApp group dedicated to AfCFTA. Through this group, she connected with buyers in neighboring countries, which allowed her to increase her income by an impressive 35%. These are the kind of opportunities that AfCFTA and technology can offer you.

Navigating AfCFTA Challenges

As we mentioned earlier, AfCFTA does present particular challenges. You might find competing with larger producers or meeting higher standards daunting. However, these challenges can be surmounted with knowledge and the right resources.

Staying updated with the latest agricultural practices can help you compete more effectively. Here's where technology can be a massive help. Various mobile apps provide tips and tutorials on modern farming techniques that can help increase your yield and meet the required standards.

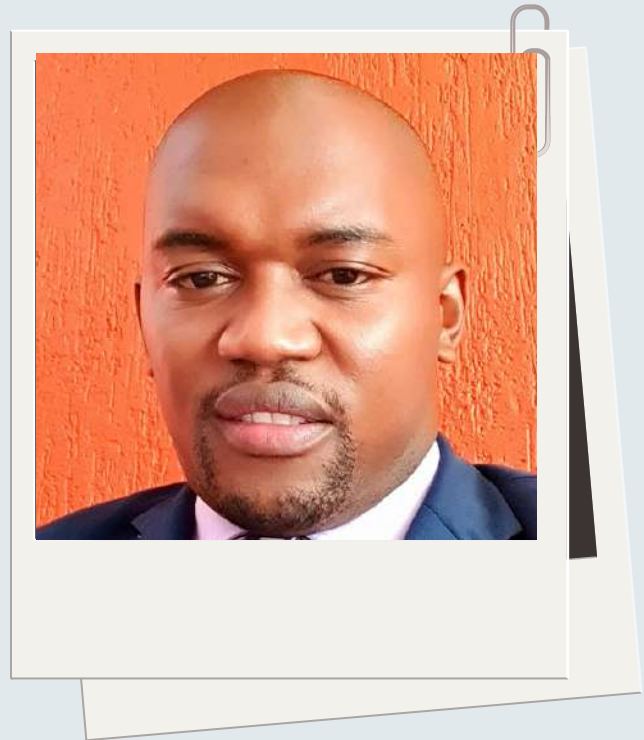
Also, consider joining farmer cooperatives. These cooperatives can provide support in various forms, such as access to credit, better bargaining power with buyers, and shared resources for storage and transport. Several AfCFTA-focused apps and WhatsApp groups provide information on local cooperatives you can join.

Conclusion

Understanding AfCFTA and leveraging technology can substantially benefit you as a rural farmer. It's not just about being part of a larger market but also about learning, growing, and improving your farming practices. With the right tools - your smartphone and a stable internet connection - and the right attitude, you can turn AfCFTA into an opportunity for growth and prosperity.

So, it's time to embrace the future of farming. Use WhatsApp, download those apps, join relevant groups, and immerse yourself in AfCFTA. As they say, knowledge is power; in this case, it could also mean a more profitable farm and a better life for you and your family. The future of farming is in your hands. With AfCFTA and the power of technology, the sky's the limit.

Embrace rerouting of vehicle technology systems to avert urban traffic congestion in Kenya



By Stephen Nduvi, a seasoned policy analyst and researcher in sustainable development thematic areas, Nairobi, Kenya.

Introduction

While the Kenyan government has undertaken various efforts to enhance mobility infrastructure and the quality of public transport, the menace of city congestion remains unresolved. The need for sustainable innovations to enhance efficiency in public transport remains a priority for the government. This will help to boost the country's economy by addressing inadequate mobility infrastructure that has led to the jeopardy of congested and polluted cities, and wasted man work hours. The brief recommends amendment of the Traffic Act to enable rerouting of traffic into efficient routes; and the Ministry of Transport, Infrastructure Housing, Urban Development and Public Works should intensify adoption of intelligent transport systems and capacitation of related stakeholders to alleviate urban traffic congestion.

Context

Various countries including Kenya have embraced intelligent traffic management such as adaptive traffic light control systems to regulate traffic congestion. The controlling of traffic by the traffic lights is based on locally collected real-time traffic information such as the Sydney Coordinated Adaptive Traffic System (SCATS) and the Split Cycle Offset Optimization Technique (SCOOT). This helps to improve the throughput of urban traffic at each main intersection under normal conditions. However, SCATS and SCOOT are not able to detect and notify of en-route events such as congestion and accidents and guide the event-influenced vehicles to the their most appropriate optimal roads.

Slow frequency of events traffic update has the potential to create secondary congestion especially where vehicles in a particular traffic congestion area share similar destination. The next road redirecting(NRR) system has been argued as potential application that has the ability to reduce the average travel time, and enhance travel time reliability while taking cognition of the enroute events.

The Kenyan government has undertaken various initiatives towards decongesting Nairobi city. Some of the initiatives include the Nairobi expressway project, the Southern bypass, the city commuter rail, bus termini in various parts in Nairobi, expansion of various access roads connecting the city, the incoming Bus Rapid Transport (BRT) system, and the Integrated Traffic Management System. Intelligent transport system has been piloted in several major junctions outside the city centre including roads such as Western Ring Road. Nevertheless, the impact of these initiatives is yet to be felt as traffic congestion in the city continues to persist.

The Traffic Act on Part VIII on traffic regulation does not provide for counter flow driving of public and private vehicles. The inflexibility of the traffic laws undermines effectiveness in maximizing the use of existing road facilities especially during peak-period when traffic flow is biased towards a given direction. Alleviating peak-period congestion through rerouting of vehicles remains relevant in ensuring optimal utilization of the limited road infrastructure. Adopting traffic engineering approaches that maximize the level of service an existing traffic network offers leverage in reducing congestion at given points that are prone to traffic gridlocks. The road infrastructure should be in a manner that easily allows easy transition to counter flow lanes without causing obstructions or accidents. The applicability of the package should be determined by the incidence and location of specific areas where traffic main accumulates during peak-period. The traffic regulations may need to clearly stipulate the time of usage of the counter flow lanes and also enhance monitoring mechanisms to ensure drivers do not misuse them.

Majorly, traffic congestion is usually experienced mostly during peak-period in the morning and evening. Data from Nairobi Metropolitan Area Transport Authority (NAMATA) IN 2019 indicated that traffic crisis costs the economy almost \$1 billion annually in terms of productivity. Similarly, data from Numbeo on Traffic Index 2021 shows that Nairobi is the 7th most congested city in the world, and 2nd most in Africa with a score of 281.63. The average time spent in traffic gridlock is 57.67minutes. The need for the government to adequately address congestion of the urban Centre's remains crucial. The brief focuses on the merits of intelligent transport innovations as a viable measure to curb traffic congestion as opposed to the lopsided supply driven initiatives such as expansion of road network.

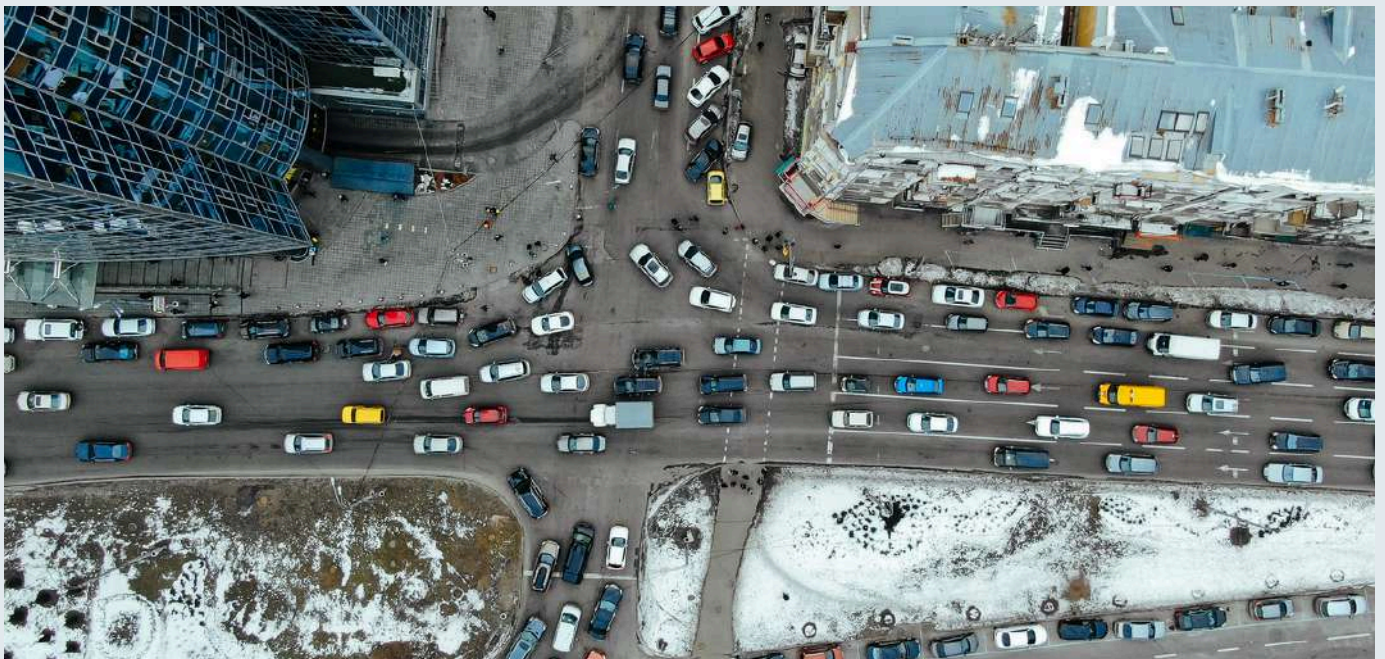
Strategic advantages of the NRR system

The NRR system offers the following strategic advantages in the management of traffic congestion in urban areas.

Adaptability and ability to detect and notify of en-route events

The NRR system is a multi-agent system (MAS) that can be deployed on other existing infrastructure such as SCATS and able to coordinate various agents by use natural traffic propagation by intelligent traffic lights at various road intersections. It has two-step rerouting that works by calculating the optimal next roads that a set of concerned vehicles can use to bypass the blocked or congested area of the road and use of the vehicle navigation system to update the new route up to the final destination. The two step rerouting process also helps to overcome the unavailability of route choice information caused by need for and drivers unawareness of their full routes. By facilitating easy computation of the optimal next road, the systems fit well in redirecting vehicles in timely manner before reaching the location of the en-route event.

Rerouting is aimed at creating a traffic Pareto-efficient point where traffic is evenly distributed in real time while avoiding creating different congestion spots in the rerouted roads. This helps to benefit the overall system as it's assumed that traffic congestion is as a result of unevenly assigned traffic in relation to the existing road infrastructure. It seeks to balance traffic load throughout the road network. It also helps to achieve the minimum average travel time by enabling the exchange of route choices among vehicles. For instance, at an NRR enabled junction, NRR in the 1st step reroutes the vehicles over a small number of road segments around the event while considering balancing of existing traffic at the junction, and impact of the diversion on individual vehicle's optimal route. The 2nd step employs VNS to propose an optimal route from the end of diversion to the final destination.



Complements traffic information and context-awareness creation

The NRR system offers not only traffic-related information for computing better routes to vehicles but also creates awareness of the environment in which the vehicles are used. This is a competitive advantage over the existing smartphone based vehicular navigation systems such as Google Maps, Waze, and TomTom that only handle traffic congestion by recommending the fastest routes for users without creating context-awareness. Environmental context-awareness not only improves traffic mobility but also enhances public safety. For instance, through synchronization of crime related data along major highways in Nairobi such as the southern bypass, the safety of drivers and passengers can be enhanced.

Intelligent transport systems(ITS) integrate advanced sensors and communication technologies to process information so as to enable more efficient and safer mobility along the roads. Vehicular ad hoc networks (VANETs) and the fifth-generation (5G) networks play a critical role in supporting ITS applications with vehicular communications such as vehicle-to-vehicle (V2V) to vehicle-to-everything (V2X) to vehicle-to-infrastructure (V2I) communication modules. The modules allow real-time communication with the environment to provide traffic-related data. The vehicles should be equipped with on-board units (OBU) so as to communicate with other vehicles, roadside infrastructures, edge servers, and the cloud. Edge servers provide processing and storage resources on the network edge, consequently, enabling fast responsiveness.

Vehicles installed with VANETs make use of V2V or V2I communication modules to sense their environment and provide real-time traffic-related data. The mobile sensing nodes provides different types of information about the urban environment such as road geometry, traffic flow, weather conditions, human behavior, traffic light, crash risk, and public safety information. The NRR system also requires to have access to public safety information of the city to extract knowledge about risk areas in various routes to improve vehicles' mobility and security. Similarly, different approaches such as web information, participatory sensing, and crowd-sourcing-based systems can be used to acquire additional information about the environment.

Public safety information such as criminal reports is fed into the system by safety information providers such as police departments, social media, and participatory sensors in order to build information about illegal activities in the city. A safety risk estimation data flow tool is used to process each data sample in order to provide a reliable criminal event database. The database provides information on the location of the crime using its address, maps the crime to the closest route, and characterizes the safety of each crime. Therefore, the systems build up knowledge of both traffic conditions and dangerous areas in the city whose signals are remitted to the vehicles installed with VANETs, consequently enabling them to plan a route that improves mobility and safety.

Conclusion and Prospects

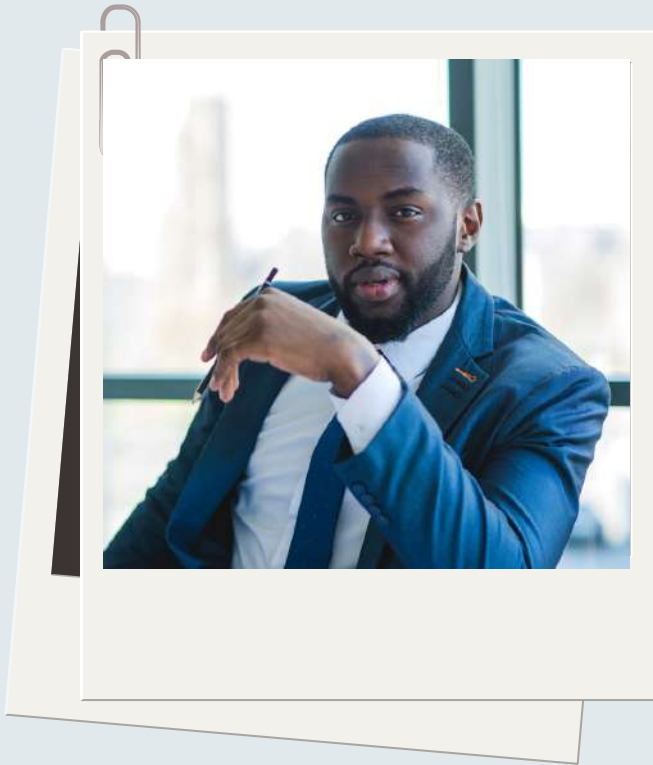
The NRR system facilitates real-time traffic congestion management by rerouting vehicles to the next optimal efficient road while considering both traffic conditions and public safety issues. The system presents a better trade-off between safety and efficiency in urban area traffic congestion management. It also has the capacity to minimize the problem of creating different congestion spots on the roads.

The Ministry of Transport, Infrastructure Housing, Urban Development, and Public Works in Kenya should pursue the Parliament to amend the Traffic Act to allow rerouting of vehicles even on counterflow roads. This will allow counterflow driving in road sections prone to traffic gridlocks. Similarly, there is an urgent need to replace the analog traffic light control system with an intelligent traffic light control system. This will enhance the traffic management system to be responsive to the current traffic situation and reduce vehicle waiting time during the red phase especially when there is no traffic on the other side of the road.

The Ministry of Transport, Infrastructure Housing, Urban Development, and Public Works should intensify partnerships with intelligent transport management solutions providers to procure applications for the digital management of traffic congestion.



Empowering African Innovation: A Path to Sustainable Development



By Oluwaseun Adeoti, an accomplished Nigerian entrepreneur with a passion for technology and innovation.

Throughout my career in research and development, I've traversed diverse landscapes, from my roots in South Africa to distant places like Seattle. What remains constant amidst this journey is the profound impact of innovation in changing lives.

Investments in science, technology, and entrepreneurship have catalyzed remarkable global health and development achievements, from significant reductions in child mortality to expanded access to clean water and sanitation. These investments have not only spurred economic growth and job creation, particularly among youth but have also propelled us towards a future where dignity is within reach for all.

In the new era of sustainable development, ambitious targets that have been unveiled in Africa are indeed attainable, but only through harnessing the determination and creativity of the world's burgeoning community of innovators.

Local leadership plays a vital role in this endeavor. Nobody understands the challenges faced better than those directly affected by them. The Gates Foundation's commitment to Africa rests on this principle, fueling optimism for the recent launch of Grand Challenges Africa.

Grand Challenges Africa marks a significant initiative led by African leaders to bolster local scientific capacity and shape the continent's research and development agenda. It owes its inception to the visionary leadership of regional institutions such as the New Partnership for Africa's Development and the African Academy of Sciences. Housed within the latter, Grand Challenges Africa is overseen by the Alliance for Accelerating the Excellence in Science in Africa (AESAs), supported by partners like the Wellcome Trust and the U.K.'s Department for International Development.

Building upon the foundation laid by previous Grand Challenges investments on the continent, Grand Challenges Africa has been engaging African innovators to develop contextually relevant solutions to pressing challenges, ranging from sanitation to malaria. AESA will convene these innovators to glean insights and shape priorities, fostering a collaborative approach toward addressing Africa's development goals.

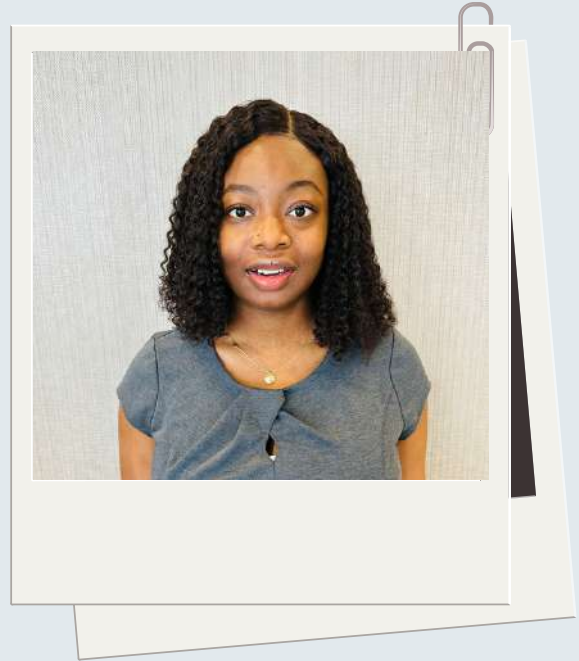
AESA's journey mirrors that of past Grand Challenges endeavors, which have successfully partnered with countries like Brazil, India, and South Africa to tackle national development priorities. These collaborations serve as models for Grand Challenges Africa, offering potential partnerships and strategies for fostering innovation across the Global South.

By empowering African scientists and governments to define the continent's research and development agenda, AESA and Grand Challenges Africa herald a new era of scientific leadership in Africa, promising transformative change and sustainable development for the region and beyond.

Grand Challenges Africa

Emerging Trends and Technologies in Taxation and Audit: Assessing Africa's Preparedness

By Dr. Beatrice Oyinkansola Adedokun, an Audit and Assurance Analyst at Deloitte, USA.



The fields of taxation and audit are undergoing significant transformations driven by emerging technologies and evolving trends. These advancements promise to enhance efficiency, accuracy, and compliance. As Africa navigates its digital transformation journey, it is crucial to assess the continent's readiness to adopt and leverage these new technologies to improve tax administration and audit processes.

Emerging Trends



(i) Automation and Artificial Intelligence (AI): Automation and AI are revolutionizing tax administration and audit processes by automating repetitive tasks, reducing human error, and enhancing decision-making. AI algorithms can analyze vast datasets to identify patterns and anomalies, enabling more effective fraud detection and risk assessment. A study by PwC indicates that AI and automation could reduce the time spent on tax compliance activities by up to 80%. The International Federation of Accountants (IFAC) reports that 65% of audit firms globally are investing in AI and automation technologies.

ii) Blockchain Technology: Blockchain offers a transparent and tamper-proof method for recording transactions, which can significantly improve the accuracy and reliability of tax records and audits. This technology can streamline tax reporting and ensure compliance through immutable records. The World Economic Forum estimates that by 2027, 10% of the global GDP will be stored on blockchain technology. Deloitte's Global Blockchain Survey reveals that 53% of executives see blockchain as a top-five strategic priority.

iii) Big Data and Analytics: Big data analytics enables tax authorities and auditors to process and analyze large volumes of data in real time, identifying trends, detecting anomalies, and predicting compliance risks. This enhances the ability to conduct thorough audits and enforce tax compliance. According to Accenture, big data analytics can improve tax revenue collection by up to 15%. A survey by EY found that 75% of tax authorities worldwide are investing in data analytics capabilities.



iv) Cloud Computing: Cloud-based solutions provide scalable and flexible platforms for tax administration and auditing. These solutions enable real-time data access and collaboration, improving efficiency and reducing operational costs. Gartner predicts that by 2025, 85% of enterprises will have a cloud-first principle. The Cloud Security Alliance reports that 69% of organizations are currently migrating their data to cloud-based systems.

v) Mobile Technology: Mobile technology facilitates easy access to tax services and information, especially in remote areas. Mobile tax filing apps and platforms enable taxpayers to submit returns, make payments, and receive notifications through their smartphones. The GSMA reports that there are over 800 million mobile subscribers in Sub-Saharan Africa, highlighting the potential for mobile-based tax solutions. A study by the International Telecommunication Union (ITU) found that mobile broadband penetration in Africa is expected to reach 50% by 2025.

Assessing Africa's Preparedness

Africa's preparedness to adopt these emerging technologies in taxation and audit varies across the continent. While some countries are making significant strides, others face challenges that hinder their progress.

▶ Digital Infrastructure

Robust digital infrastructure is essential for the successful implementation of advanced technologies. While Africa has seen improvements in internet penetration and mobile connectivity, there are still gaps in digital infrastructure, especially in rural areas. The International Telecommunication Union (ITU) reports that internet penetration in Africa was 39.3% in 2021, compared to the global average of 63%. The World Bank highlights that only 28% of Africans have access to high-speed internet.

Regulatory Frameworks

Effective regulatory frameworks are crucial for fostering the adoption of new technologies in taxation and audit. Many African countries are updating their tax laws and regulations to accommodate digital transactions and ensure compliance. A report by the African Tax Administration Forum (ATAF) indicates that 60% of African countries have implemented or are in the process of implementing digital tax regulations. The Organisation for Economic Co-operation and Development (OECD) notes that several African countries are participating in the Inclusive Framework on Base Erosion and Profit Shifting (BEPS) to modernize their tax systems.

Capacity Building

Developing the necessary skills and knowledge among tax officials and auditors is vital for leveraging emerging technologies. Continuous training and capacity-building initiatives are needed to ensure that tax authorities can effectively use new tools and technologies. The African Development Bank (AfDB) has committed \$25 million to capacity-building programs for tax officials across the continent. A survey by the International Monetary Fund (IMF) found that 70% of African tax authorities are investing in training programs related to digital taxation.

Public Awareness and Engagement

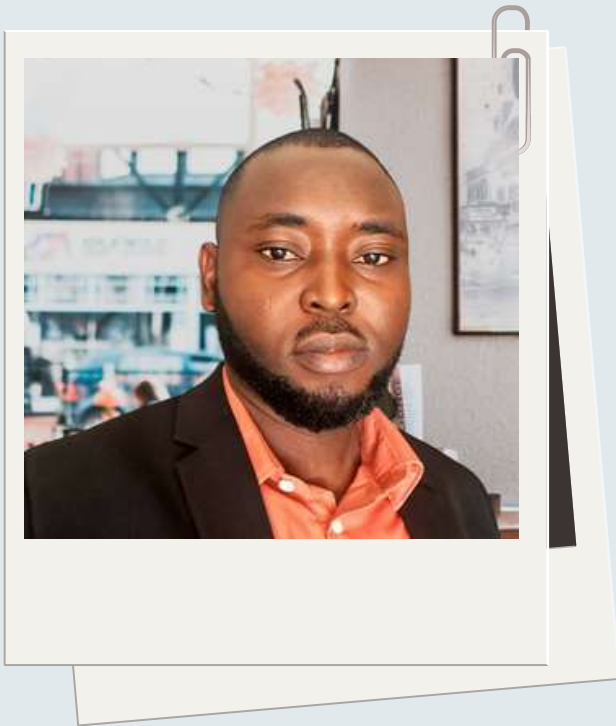
Raising awareness and engaging with taxpayers about the benefits of new technologies in taxation can improve compliance and trust in the tax system. Public education campaigns and user-friendly digital platforms are essential in this regard. The World Bank's Doing Business report indicates that improving tax compliance procedures can increase tax revenue by up to 20%. A survey by Afrobarometer found that 65% of Africans are willing to use digital platforms for tax-related activities if they are accessible and user-friendly.

Conclusion

The adoption of emerging trends and technologies in taxation and audit holds great promise for enhancing efficiency, accuracy, and compliance in Africa's financial systems. While there are challenges to overcome, significant progress is being made in building digital infrastructure, updating regulatory frameworks, and investing in capacity-building initiatives. By learning from global experiences and leveraging the potential of advanced technologies, Africa can strengthen its tax administration and audit processes, ultimately contributing to sustainable economic growth and development.

As Africa continues to embrace digital transformation, the integration of technologies such as AI, blockchain, big data analytics, cloud computing, and mobile technology will be pivotal. These advancements will not only improve tax collection and compliance but also foster transparency and trust in the financial systems across the continent.

The Role of Institutions in Achieving Net-Zero Emissions in Africa



By Dr. Kingsley Ukoba, a distinguished Mechanical Engineer with a PhD focusing on the interplay between sustainable energy, climate change, and air pollution. Dr. Ukoba is also a prolific author, with two books and over 70 peer-reviewed articles to his name.

Achieving net-zero emissions is a critical objective for the global community, and Africa is no exception. As the continent experiences rapid economic growth and urbanization, it faces significant challenges and opportunities in mitigating climate change. Institutions across Africa—governmental, educational, and private sector—play pivotal roles in guiding the continent towards a sustainable, net-zero future. This article explores the current state of emissions in Africa, highlights the roles of key institutions, and discusses the path forward for achieving net-zero emissions.

The Current State of Emissions in Africa

Africa's contribution to global greenhouse gas emissions is relatively low compared to other continents, accounting for about 4% of the world's total emissions. However, emissions are on the rise due to rapid industrialization, deforestation, and increased energy demand. According to the United Nations Environment Programme (UNEP), Africa's CO₂ emissions grew by approximately 2.3% annually over the past decade. Key statistics highlight the urgency of addressing emissions. The energy sector is the largest contributor to Africa's emissions, with fossil fuels accounting for 80% of the energy mix.

Africa loses about 3.9 million hectares of forest annually, contributing significantly to carbon emissions. By 2050, Africa's urban population is expected to triple, increasing the demand for energy and transportation, which could further drive up emissions.

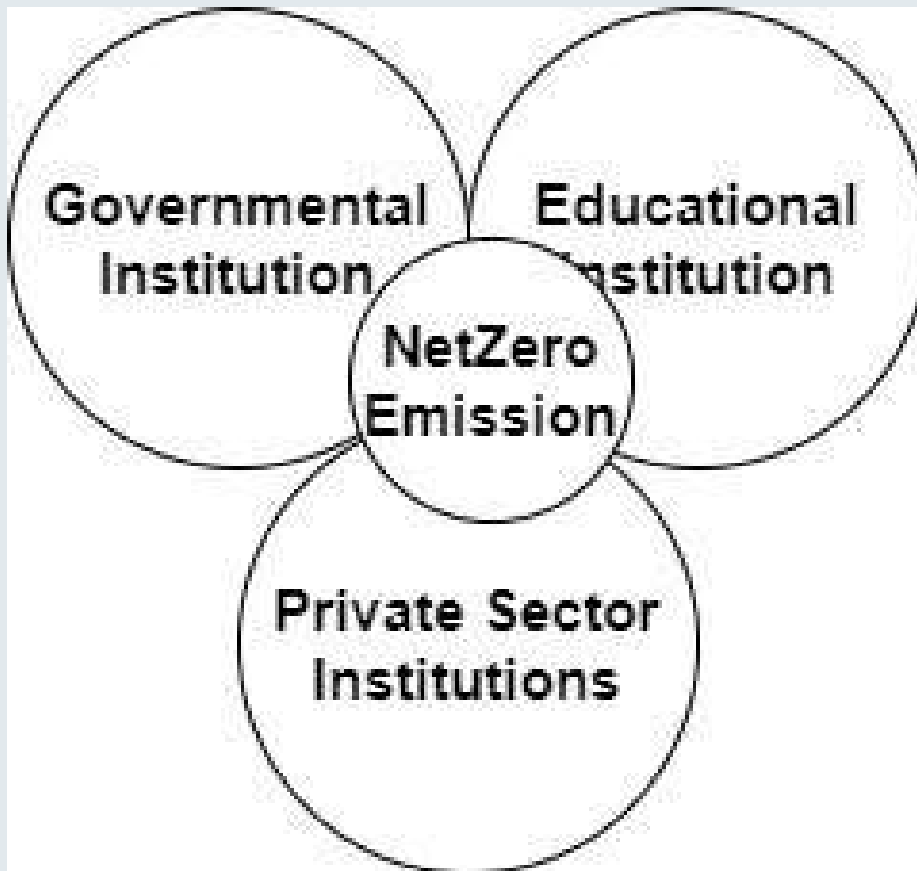


Figure 1. The interplay of key institutions vital for achieving netzero in Africa

Governmental Institutions

As shown in figure 1, governmental institutions are essential for setting and enforcing policies that promote sustainable practices. Several key institutions and frameworks are leading the way. The African Union (AU) plays a critical role in coordinating climate action across the continent. The African Union's Agenda 2063 emphasizes sustainable development and climate resilience as key priorities. The AU also supports the African Renewable Energy Initiative (AREI), which aims to increase renewable energy capacity. Individual African governments are crucial in implementing national policies and regulations to reduce emissions. For example, South Africa has set a target to peak its greenhouse gas emissions between 2020 and 2025 and then decline in absolute terms. Morocco is another leader, with its ambitious renewable energy program aiming to achieve 52% of its electricity production from renewable sources by 2030.

The African Development Bank (AfDB) supports sustainable development projects across the continent, focusing on renewable energy, sustainable agriculture, and climate resilience. The bank has committed to allocating 40% of its investments to climate finance by 2020, totalling approximately \$25 billion.

Educational Institutions

Educational institutions are at the forefront of research and innovation, which are vital for developing sustainable solutions. African Centre for Technology Studies (ACTS) is a leading research institution focused on science, technology, and innovation for sustainable development. It conducts research on renewable energy, climate change adaptation, and sustainable agriculture. Universities such as the University of Cape Town and Makerere University are conducting cutting-edge research on climate science and renewable energy technologies. These institutions also offer specialized programs to train the next generation of climate scientists and engineers. Various initiatives, like the African Network for Solar Energy (ANSOLE), are working to build local expertise in renewable energy through training and capacity-building programs. These programs are crucial for developing a skilled workforce capable of implementing and maintaining sustainable energy solutions.

Private Sector Institutions

The private sector is essential for financing and deploying sustainable technologies. Companies like Azuri Technologies and M-KOPA are leading the way in providing affordable solar energy solutions to off-grid communities in Africa. Their business models not only reduce emissions but also improve energy access and economic development. Banks and investment firms are increasingly recognizing the importance of sustainable investments. For instance, the Standard Bank Group has committed to financing renewable energy projects and reducing its exposure to fossil fuel investments. Industry associations such as the African Solar Industry Association (AFSIA) advocate for policies that support the growth of renewable energy markets in Africa. They also facilitate knowledge sharing and collaboration among stakeholders.

Collaborative Efforts for a Sustainable Future

Achieving net-zero emissions in Africa requires a collaborative approach that leverages the strengths of governmental, educational, and private sector institutions. Key areas of collaboration include regional cooperation, public-private partnership, and global engagement. Governments and businesses can work together to fund and implement large-scale renewable energy projects, develop sustainable infrastructure, and create green jobs. Public-private partnerships can also facilitate the transfer of technology and expertise, accelerating the adoption of sustainable practices. African countries can benefit from regional cooperation to share knowledge, resources, and best practices.

Regional initiatives, such as the African Renewable Energy Initiative (AREI), aim to increase renewable energy capacity across the continent and can be instrumental in achieving net-zero emissions. By participating in global climate initiatives, African institutions can access funding, technology, and expertise. Engaging with international organizations and agreements, such as the Paris Agreement, ensures that Africa is part of the global effort to combat climate change.

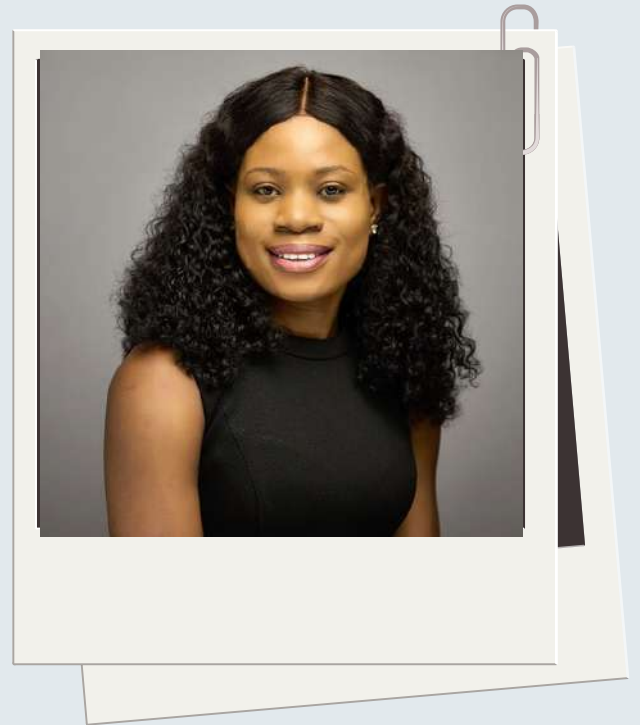


Conclusion

Institutions across Africa have a critical role to play in achieving net-zero emissions. Governmental bodies must create and enforce supportive policies, secure international funding, and develop resilient infrastructure. Educational institutions are essential for driving research, innovation, and capacity building. The private sector must invest in sustainable technologies and practices, fostering innovation and entrepreneurship. Through collaboration and commitment, Africa can achieve a sustainable future, mitigating the impacts of climate change and promoting economic development.

Cybersecurity in Africa: Challenges and Opportunities

*By Oluwabusayo Adijat Bello,
a Data Analyst at Northern Trust, USA*



In an era of rapid digital transformation, cybersecurity has become a critical concern for nations around the globe, including those in Africa. As African countries embrace digital technologies and online platforms to drive economic growth and social development, the need to protect sensitive information and infrastructure from cyber threats has never been more urgent. This article explores the challenges and opportunities associated with cybersecurity in Africa and highlights the path forward for enhancing digital security on the continent.

The Growing Importance of Cybersecurity in Africa

The digital revolution is well underway in Africa. Internet penetration and mobile phone usage have surged dramatically, with over 525 million internet users and more than 800 million mobile subscriptions across the continent, according to the International Telecommunication Union (ITU). This digital connectivity is fueling economic growth, enhancing access to education and healthcare, and fostering innovation in various sectors. However, the increased reliance on digital technologies also exposes African countries to a range of cyber threats. Cybercriminals are exploiting vulnerabilities in digital infrastructure, targeting businesses, governments, and individuals. Common threats include phishing attacks, ransomware, data breaches, and online fraud, which can have severe economic and social impacts.

Key Challenges

Many African countries lack robust cybersecurity infrastructure and capabilities. This includes insufficient investment in cybersecurity tools, technologies, and skilled personnel to detect and mitigate cyber threats effectively. Cybersecurity regulations and policies are often underdeveloped or inconsistently enforced. This creates gaps in the legal framework that cybercriminals can exploit, making it challenging to prosecute and deter cybercrime. There is a lack of awareness about cybersecurity risks and best practices among the general public, businesses, and government entities. This lack of awareness can lead to poor cybersecurity hygiene, making systems and data more vulnerable to attacks. Budget constraints limit the ability of many African countries to invest in state-of-the-art cybersecurity measures. This financial limitation hampers efforts to build resilient cyber defenses and respond effectively to incidents.



Opportunities and the Path Forward

Despite these challenges, there are significant opportunities to enhance cybersecurity across Africa. Leveraging these opportunities can help build a more secure and resilient digital environment. Investing in cybersecurity education and training is crucial. African governments and private sector organizations can collaborate to develop training programs that build local expertise in cybersecurity. Initiatives like cybersecurity boot camps, certification programs, and university courses can help cultivate a skilled workforce. Developing and enforcing comprehensive cybersecurity laws and regulations is essential. African countries can learn from global best practices and adapt them to local contexts.

Regional cooperation, such as through the African Union's Convention on Cyber Security and Personal Data Protection, can also help harmonize efforts and enhance collective security. Collaboration between the public and private sectors can drive innovation and investment in cybersecurity. Private companies can share threat intelligence, provide advanced cybersecurity solutions, and support capacity-building initiatives. Governments can create enabling environments that encourage private sector participation. Public awareness campaigns can educate citizens about cybersecurity risks and promote best practices. Governments, NGOs, and tech companies can work together to disseminate information through various channels, including social media, community programs, and educational institutions. Emerging technologies such as artificial intelligence (AI) and machine learning can enhance threat detection and response. African countries can adopt these technologies to improve their cybersecurity posture. Additionally, cloud-based security solutions can provide scalable and cost-effective protection for businesses and government agencies.



Conclusion

Cybersecurity is a critical challenge and opportunity for Africa in the digital age. By addressing key challenges and leveraging available opportunities, African countries can build robust cybersecurity frameworks that protect their digital infrastructure, promote economic growth, and safeguard the well-being of their citizens. As the continent continues to embrace digital transformation, prioritizing cybersecurity will be essential to ensuring a secure and prosperous future for all.

Ulaya Mwale Founder and CEO, Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited, Malawi



Mr. Ulaya Mwale is a young and passionate Water Resources Engineer. SWIFT's main business focuses on developing and promoting various engineering and technological solutions in three main areas: Water Supply, Renewable Energy Production, and Agriculture. He has been announced as one of the 20 young entrepreneurs who won The African Youth Adaptation Solutions Challenge, held on the margins of COP27 in Sharm El Sheikh in 2022.

1. Can you share the inspiration behind starting Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited and your motivation for addressing water supply challenges in Malawi?

The inspiration behind starting Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited stemmed from the pressing need to address water supply challenges in Malawi. As a native of Malawi, I have witnessed firsthand the impact of water scarcity on agricultural productivity and livelihoods. My personal motivation comes from a deep-rooted desire to make a positive impact on the lives of farmers and communities by providing sustainable water solutions.

2. What solutions has your company developed, and how are you utilizing sustainable technologies to address water supply challenges in Malawi?

SWIFT has developed innovative irrigation technologies that harness sustainable practices to address water supply challenges in Malawi. Our company utilizes drip irrigation systems, rainwater harvesting, and water-efficient farming techniques to optimize water usage and minimize waste. These solutions not only improve crop yields but also contribute to water conservation and environmental sustainability.

3. How does Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited contribute to climate adaptation in Malawi?

SWIFT contributes to climate adaptation in Malawi by promoting water-efficient farming practices and reducing reliance on traditional irrigation methods that are often water-intensive. By integrating sustainable technologies, we help farmers adapt to changing climate patterns and mitigate the impact of droughts and water scarcity on agricultural production.

4. What challenges have you faced in building and growing Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited, and how do you adapt your technologies to mitigate those challenges?

Building and growing SWIFT has presented various challenges, including access to capital, navigating regulatory frameworks, and gaining acceptance of new technologies among traditional farming communities. To mitigate these challenges, we have focused on community engagement, providing training and support, and demonstrating the tangible benefits of our technologies. Additionally, we continuously adapt our solutions based on feedback and local conditions to ensure their effectiveness and acceptance.

5. As the winner of the 2022 Youth Adapt Challenge, how do you see the role of young entrepreneurs like yourself in addressing environmental and societal challenges in Africa?

As the winner of the 2022 Youth Adapt Challenge, I believe that young entrepreneurs play a crucial role in addressing environmental and societal challenges in Africa. Our fresh perspectives, innovative ideas, and determination to create positive change are essential in driving sustainable development and adaptation to climate change.



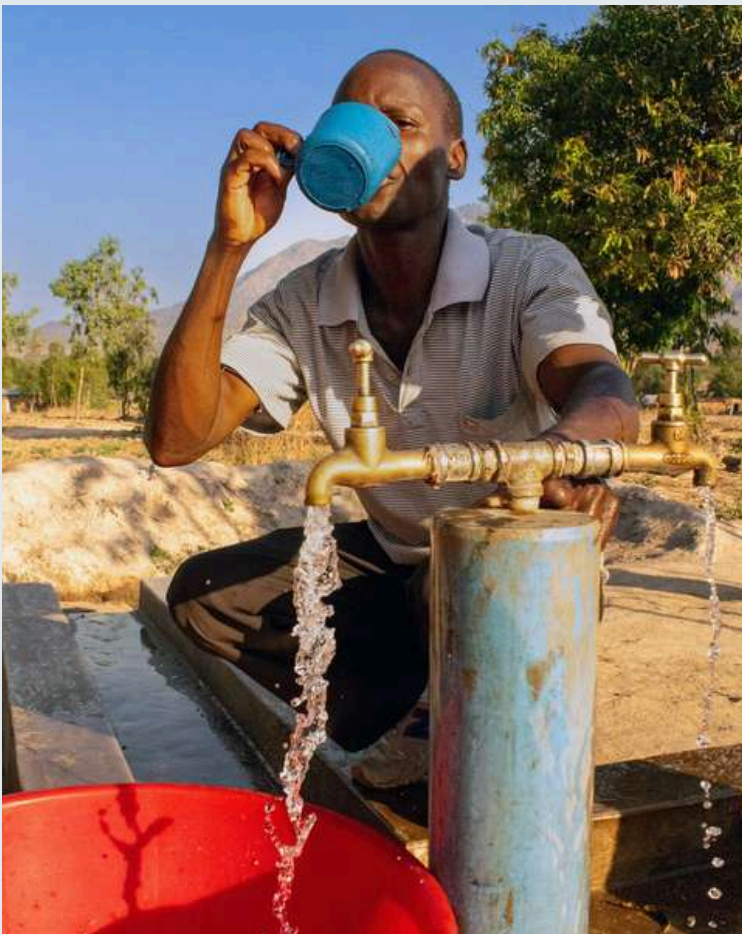
A woman in Malawi fetching water from a borehole

6. What are the long-term goals and aspirations of Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited, both in terms of local impact in Malawi and its potential contributions to sustainable development on a broader scale?

The long-term goals of SWIFT include expanding our impact in Malawi by reaching more farming communities and enhancing food security through sustainable irrigation and farming technologies. Additionally, we aspire to contribute to sustainable development on a broader scale by sharing our knowledge and solutions with other regions facing similar challenges.

7. How does Sustainable Water Irrigation and Farming Technologies (SWIFT) Limited collaborate with local communities, government agencies, and other stakeholders to ensure the success and sustainability of its projects?

SWIFT collaborates closely with local communities, government agencies, and other stakeholders to ensure the success and sustainability of our projects. We engage in participatory approaches, involve local farmers in the design and implementation of our solutions, and work in partnership with government bodies to align our initiatives with national development strategies.



A man refreshing with clean water from one of SWIFT's borehole projects

8. Lastly, what advice would you give to other young entrepreneurs who are passionate about making a difference in their communities through sustainable technologies and innovation?

My advice to other young entrepreneurs passionate about making a difference through sustainable technologies and innovation is to stay resilient, remain open to learning and collaboration, and prioritize community engagement. Building strong relationships with stakeholders and continuously adapting your solutions based on feedback and local needs are key to creating meaningful and lasting impact.

ATPS holds Stakeholder Engagement and Dissemination Workshops in Line with the UPTIER Project

The African Technology Policy Studies Network (ATPS) has successfully concluded a series of Stakeholder Engagement and Dissemination Workshops as part of the Understanding the Policy and Institutional Landscape for Technological Innovation Development in Africa to Enhance Youth Employability, Entrepreneurship, and Job Creation (UPTIER) Project. These significant events took place in Abuja, Nigeria, on March 27, 2024, and in Kigali, Rwanda, on April 29, 2024.

The policy engagement workshops, held in two of the MasterCard Foundation's (MCF) priority countries—one in West Africa and one in East Africa—aimed to strengthen the linkages among research, policy, and industry actors. These connections are essential for fostering technological innovation development and evidence-based policymaking, which are crucial for Africa's overall transformative change.



Participants during the UPTIER Stakeholder Engagement and Dissemination Workshop held in Abuja, Nigeria, on 27 March 2024.

The workshops brought together a diverse group of stakeholders, including government officials, industry leaders, researchers, and representatives from civil society. These participants engaged in sharing evidence-based knowledge, building strategic partnerships for greater impact, networking, and engaging in constructive dialogue. This collaborative approach ensures that the insights and findings from the UPTIER project are effectively communicated and utilized to drive youth employability, entrepreneurship, and job creation across the continent.

As part of the UPTIER project's outputs, ATPS has published seven comprehensive policy briefs. These briefs examine the Science, Technology, and Innovation (STI) policy landscape in Ethiopia, Ghana, Nigeria, Rwanda, Senegal, and Uganda. They explore how these policies can effectively create jobs and foster skills development for the youth. The insights provided in these briefs are critical for understanding the strengths and gaps in current policies and for recommending actionable steps towards improvement.

The stakeholder engagements in both Abuja and Kigali were a resounding success. Participants expressed enthusiasm for the knowledge shared and the potential for future collaborations. These workshops have laid a solid foundation for continued partnership and innovation, driving meaningful change across Africa.



Participants during the UPTIER Stakeholder Engagement and Dissemination Workshop held in Kigali, Rwanda, on 29 April 2024.

Through these workshops, ATPS has demonstrated its commitment to enhancing technological innovation and creating opportunities for Africa's youth. The events have facilitated a robust exchange of ideas and fostered an environment conducive to collaborative efforts aimed at policy improvement and implementation.

We look forward to building on the momentum generated by these events and continuing our mission to advance technological innovation and create sustainable job opportunities for the youth in Africa.

For more information and to access the event videos, use the links:

https://www.youtube.com/watch?v=49f_KbXcovE

<https://www.youtube.com/watch?v=67gllXy57kc>

Prof. Nicholas Ozor Appointed to Inaugural Task Force for STISA-2034

The African Technology Policy Studies Network (ATPS) is proud to announce that its Executive Director, Prof. Nicholas Ozor, has been appointed to the inaugural Task Force for the Science, Technology, and Innovation Strategy for Africa (STISA-2034). This Task Force, established by the African Union Commission (AUC), aims to chart the course for Africa's next decade of innovation and technological advancement.

The inaugural meeting of the Task Force was held from May 29 to 30, 2024, in Addis Ababa, Ethiopia. This meeting marks a significant milestone as the focus shifts from the concluding STISA-2024 to the new STISA-2034 framework. Prof. Ozor's participation underscores his pivotal role in shaping the strategic direction of science, technology, and innovation (STI) across the continent.



African Experts on the taskforce and drafting team for the development of the 10 years Science, Technology, and Innovation Strategy (STISA) 2034 for Africa.

Prof. Ozor is a distinguished scholar and leader in public policy, science, technology, and innovation. As the Executive Director of ATPS, he leads a transdisciplinary network of researchers, policymakers, private sector actors, and civil society members across 30 countries. His extensive background includes roles as Senior Research Officer at ATPS, Senior Lecturer at the University of Nigeria Nsukka, and Agricultural Extension Agent with the Enugu State Agricultural Development Programme in Nigeria.

With his extensive experience and expertise, Prof. Ozor is well-equipped to contribute to the development of STISA-2034. The ATPS community is excited to see the impactful strategies and initiatives that will emerge from this important work, driving Africa toward a future of innovation-led, knowledge-based socio-economic development.

ATPS Participates in the ICTforAg 2024 Event held in Nairobi, Kenya

The African Technology Policy Studies Network (ATPS) continues to address critical issues such as food security, climate change, and technological advancement across Africa. At the ICTforAg event held on May 29-30, 2024, Eng. Prof. Joel Nwakaire delivered a compelling presentation highlighting the transformative role of Artificial Intelligence (AI) in agricultural and economic development. The ICTforAg event in Nairobi serves as a premier forum where innovators, policymakers, researchers, and investors converge to explore the transformative power of Information and Communication Technologies (ICTs) in Agriculture.



Engr. Prof. Joel Nwakaire making a presentation on Advancing Agricultural Innovation Through AI during the ICTforAg 2024 event on 29 May 2024 in Nairobi, Kenya

This platform is designed to showcase innovations and foster collaborations aimed at addressing challenges in the agricultural sector. Against a backdrop of rapid technological advancement, the event aims to delve into the intersection of digital solutions and agricultural development.

With a theme centered around “Localizing impact through inclusion, inspiration, and innovation,” the primary objective of the event was to leverage ICT’s potential to address various agricultural challenges and explore novel pathways to enhance the prosperity of farmers and rural communities worldwide.



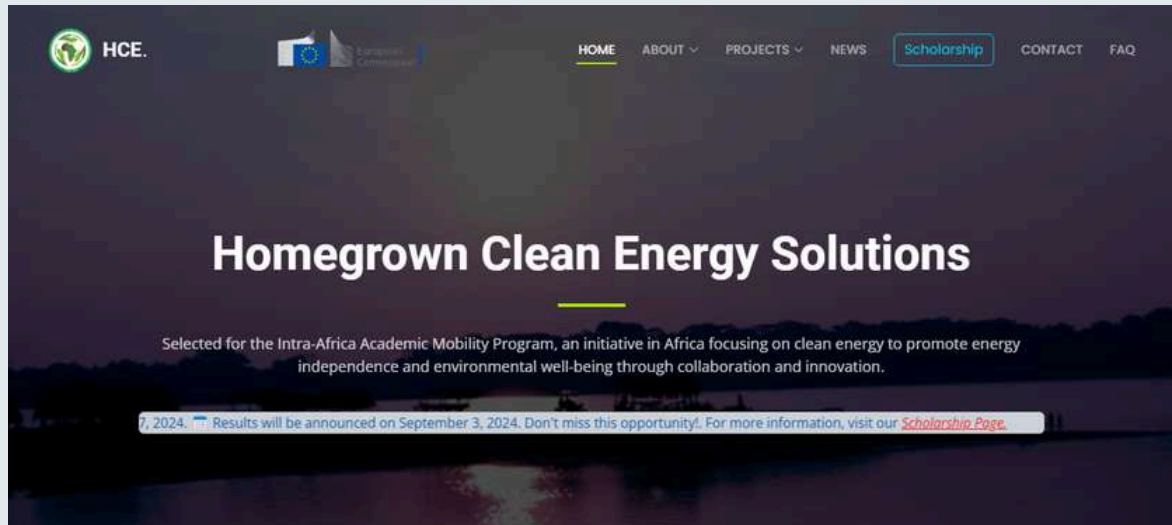
Susan Mburu the Communication and Outreach Officer at the ATPS and Engr. Prof. Joel Nwakaire pose for a photo during the ICTforAg 2024 event on 29 May 2024 in Nairobi Kenya

Prof. Nwakaire made a presentation on “Advancing Agricultural Innovation Through AI,” showcasing ATPS' leadership as the Managing Organization (Hub) for the Responsible Artificial Intelligence for Agriculture and Food Systems (AI4AFS) Innovation Research Network in Africa Project, supported by the International Development Research Center (IDRC) and the Swedish International Development Agency (SIDA).

A central theme of Nwakaire's presentation was the significant impact of climate change on agriculture and the crucial role AI can play in mitigating these effects. While AI innovations in Africa have primarily targeted disease management due to climate-induced challenges, Nwakaire emphasized that AI's potential extends far beyond, including applications in tax decisions, soil health assessments, and market analysis.

For more details on Prof. Nwakaire's insightful presentation and the potential of AI in transforming agriculture in Africa, read the full article here: <https://atpsnet.org/advancing-agricultural-innovation-through-ai-highlights-from-joel-nwakaire-presentation-at-ictforagri-2024/>

Academic Exchange Mobility Programme for Home-Grown Clean Energy Solutions in Africa



A consortium of six African universities has secured a grant from the European Education and Culture Executive Agency (EACEA) for an academic mobility scheme to pursue capacity building on Home Grown Clean Energy Solutions.

The programme will admit 21 students for the Master's programme, 9 students for the Doctorate Programme, and 4 staff into the mobility Programme from across national and disciplinary borders for postgraduate research aimed at developing the capability to provide homegrown climate solutions to address African climate challenges.

Some of the National Chapter Coordinators, past and present participants in the programmes of the African Technology Policy Studies Network (ATPS) are pioneering the initiative.

Women and physically challenged are particularly encouraged to apply

For details and call for applications, please visit the programme website: [Home: HCE \(hcesolutions.org\)](https://hcesolutions.org)

Advertisement by Prof. Michael Madukwe, ATPS National Chapter Coordinator, Nigeria



Executive Director at the ATPS Prof. Nicholas Ozor (front row, far right) poses for a photo with participants during the launch of the African Research and Innovation Partnership (ARIP) on May 15, 2024, in Abuja, Nigeria



Prof. Nicholas Ozor, Executive Director of the ATPS, among esteemed guests at the Igbinedion University 25th Anniversary celebration, held on May 10, 2024, in Okada, Edo State, Nigeria.



Prof. Nicholas Ozor, Executive Director of ATPS, presents Marie-Eve Landry Project Officer at the International Development Research Centre (IDRC) with a small gesture of gratitude during her visit to the ATPS Headquarters in Nairobi, Kenya on 20 February 2024



Marie-Eve Landry engaging the ATPS staff during her visit to the ATPS Headquarters in Nairobi, Kenya on 20 February 2024



Prof. Nicholas Ozor the ATPS Executive Director among African Experts on the taskforce and drafting team for the development of the 10 years Science, Technology, and Innovation Strategy (STISA) 2034 for Africa, during the inaugural meeting of the Task Force held from 29 to 30 May 2024 in Addis Ababa, Ethiopia.

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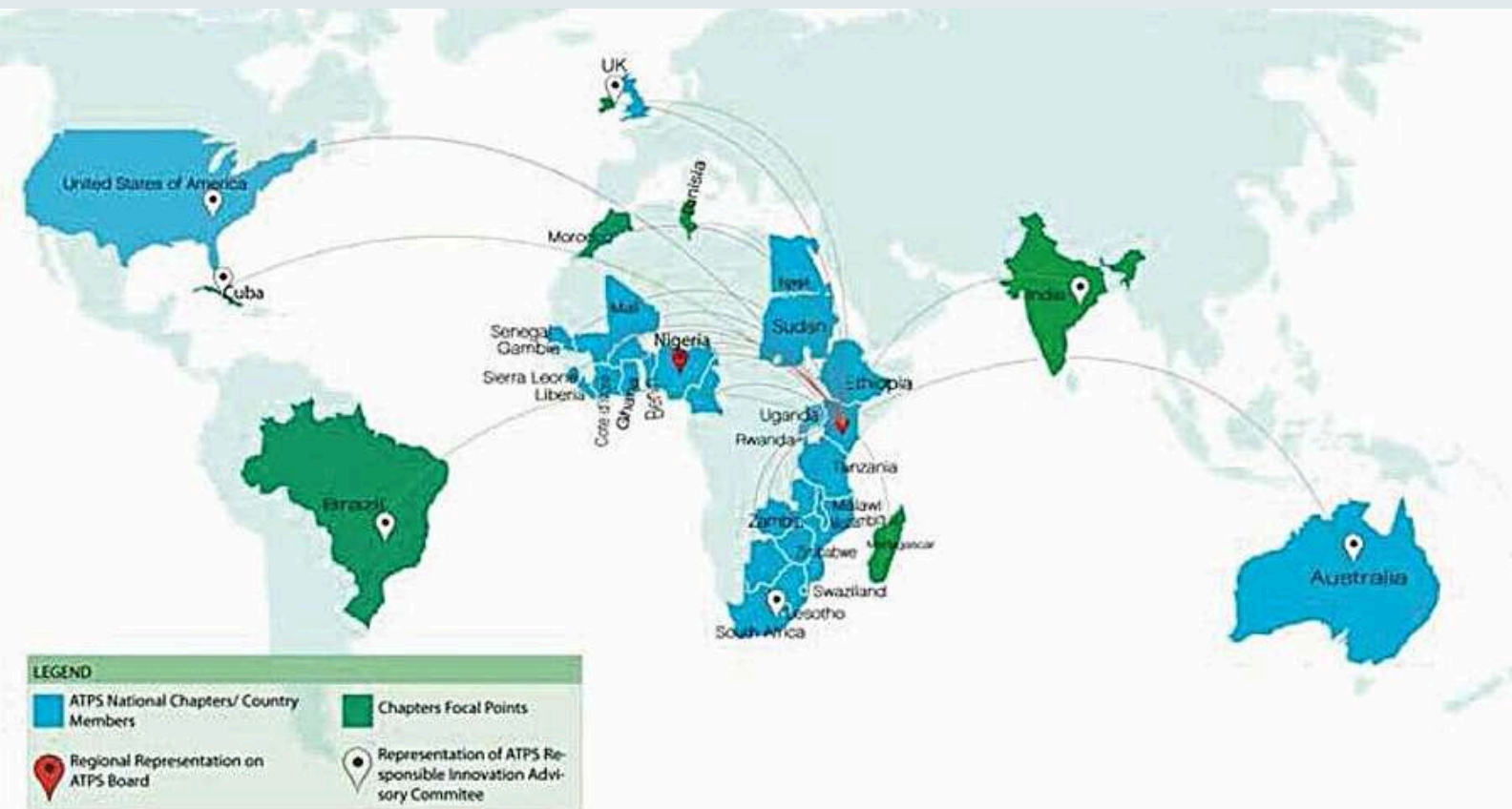
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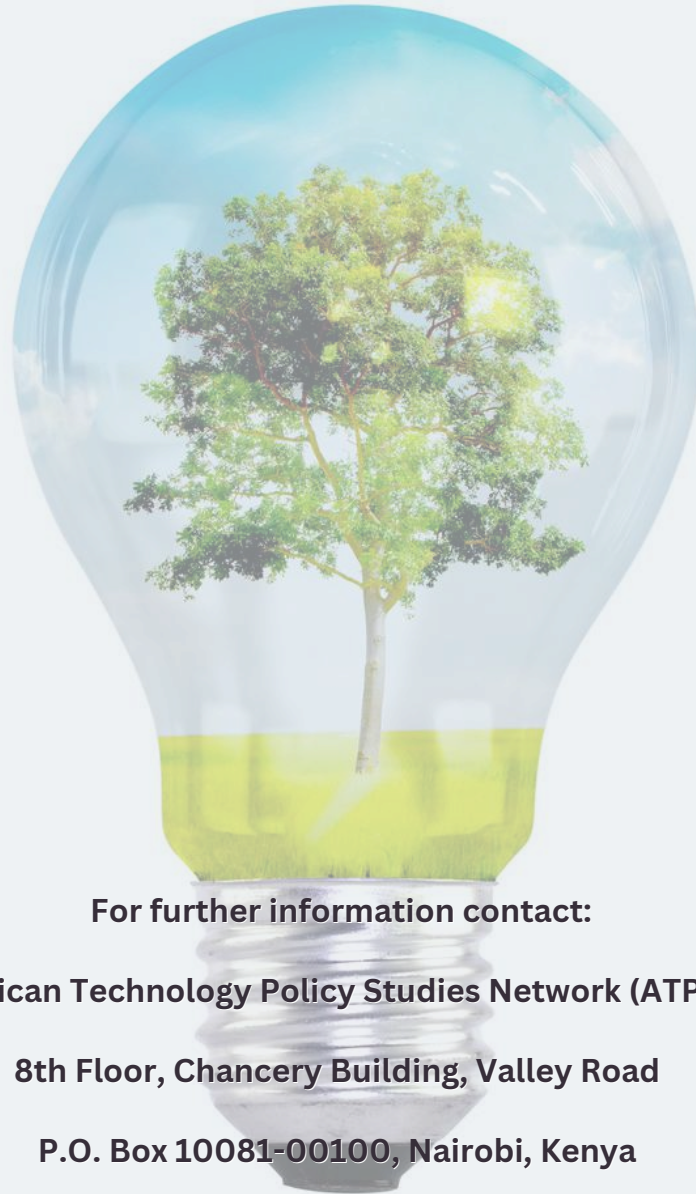
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