



**FIDIC
AFRICA**
2026
INFRASTRUCTURE
CONFERENCE
ACCRA GHANA

FIDIC

Africa M A G A Z I N E

Discover
Ghana's
Hidden Gems

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Leader
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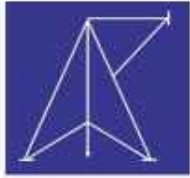
When
Expertise Is
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Smart
Leap

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ASSOCIATED CONSULTANTS LTD.

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- Suame Interchange & Local Roads Project
- Accra – Tema Motorway Expansion Project
- Eastern Corridor Lot 1 Road Project
- 4-Tier Pokuase Interchange & Local Roads Project
- Anokye Mainline Compressor Project
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50 YEARS**
OF DELIVERING EXCELLENT
SERVICE

OUR MISSION

To provide high quality multi-disciplinary services in infrastructure development in Ghana and the Africa region.

OUR VISION

To be recognised as the premier consulting firm and center of excellence delivering world-class, environmentally sensitive solutions for sustainable development of infrastructure in Africa.

OUR CORE OPERATIONS

- Transportation
- Civil/ Structural / Architectural
- Water & Sanitation
- Energy & Industrial Establishment.
- Environmental & Social Impact

Welcome Message

Africa has never waited for permission to build. From the ancient trade routes that connected kingdoms across the Sahel to the hydroelectric dams and rail lines that opened up the continent's interior, Africa's builders have always found a way. And more often than not, their constraints were the very thing that pushed them to find it.

This edition of the FIDIC Africa Magazine arrives at a defining moment. This year, the conference comes to Ghana, a country that has become one of the continent's most compelling stories of infrastructure transformation in action. The 31st FIDIC Africa Infrastructure Conference brings together engineers, innovators, financiers, and policymakers in Accra, a city that has long stood as proof of what African ambition looks like when it is properly resourced and boldly executed.

The theme this year is Future-Ready Infrastructure: Advancing Africa Through Innovation and Sustainability. It captures exactly where the profession stands right now and that is at the intersection of urgent need and genuine possibility. Every article in this edition takes that seriously.

Inside, you will find feature articles that make the case for innovation and show it in action. You will hear from engineers leading transformation on the ground, thought leaders expanding what the profession means, and young professionals who will carry this work forward. You will also find a governance argument that every infrastructure leader needs to hear, a ground-level look at the state of trade connectivity across the continent, and a guide to Ghana written for every delegate who has made the journey to be here.

This is a record of where African engineering stands today and a signal of where it is going. May it inspire you and challenge you in equal measure.

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FIDIC Africa Magazine

The FIDIC Africa Magazine is the official platform for thought leadership, project insights, and industry collaboration across Africa's infrastructure sector.

Launched alongside the FIDIC Africa Infrastructure Conference 2026, it brings together leaders, practitioners, and innovators shaping the future of infrastructure delivery on the continent.

From FIDIC best practices and project case studies to executive insights and emerging trends, the magazine showcases what is driving real impact across Africa.

With a reach of over 1.2 million professionals, it offers a powerful platform to inform, influence, and position organisations at the forefront of Africa's infrastructure transformation.

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President's Message



Eng. Sayed Rizwan Qadri

I have the great honour and privilege to address Member Associations and all stake holders through this robust Annual Magazine, as we welcome you to the 2026 FIDIC - AFRICA INFRASTRUCTURE CONFERENCE being held in Accra, Ghana having a bustling theme of Future-Ready Infrastructure: Advancing Africa Through Innovation and Sustainability.

One of the greatest strengths of FIDIC Africa is its growing and vibrant membership. Our Member Associations represent a diverse and highly skilled network of professionals committed to excellence, integrity, and collaboration. Strengthening and expanding our membership remains a key priority, as it enables us to amplify the collective voice of consulting engineers and promote the highest professional and ethical standards across the continent. Through stronger engagement and collaboration, we can better serve our members and enhance the impact of consulting engineering in Africa's development agenda.

Member Associations play a critical role in advancing the profession. They serve as the foundation of our organization, supporting professional development, upholding quality standards, advocating for the consulting engineering industry, and fostering collaboration with governments, clients, and development partners. Their leadership in promoting best practices and professional integrity ensures that consulting engineers

remain trusted partners in delivering sustainable and resilient infrastructure.

As the continent continues to integrate economically and regionally, it is essential that consulting engineers are able to work and collaborate across borders. Promoting frameworks that support the recognition of professional qualifications and encourage the mobility of engineering professionals will strengthen regional cooperation, enhance knowledge transfer, and improve the delivery of infrastructure projects across Africa.

There is a need to align and strengthen engineering education and training across the continent by developing more harmonized engineering curricula that help ensure that graduates are equipped with the skills required for modern engineering practice, including digital technologies, sustainability, climate resilience, and innovative infrastructure solutions. Collaboration between universities, industry, and Member Associations will be essential in shaping the future generation of African engineers.

Rapid technological advancements and the urgent need for sustainable infrastructure require us to continuously adapt and adopt new approaches. FIDIC Africa encourages its members to embrace innovation through the use of latest technologies, digital tools, and creative solutions that respond to the complex challenges facing our continent.

As we look ahead, I would like to express my sincere appreciation to FIDIC Africa Exco, Member Associations and all professionals who dedicate their expertise and time to advance our mission. Your commitment and leadership are essential to build a stronger and more dynamic consulting engineering community in Africa.

Together, let us continue working toward a future where engineering excellence, collaboration, and innovation drive Africa's sustainable growth and prosperity.

Sayed Rizwan Qadri
President, FIDIC Africa

Message

*from the FIDIC Africa
Infrastructure Conference 2026*

Local Organising Committee (LOC) Chair
Ing Benedicta Opokua Acherekoh



I am delighted to welcome you all to the 31st FIDIC Africa Infrastructure Conference here in Accra, Ghana. As the Ga People, the custodians of this land, would say, Oobake – you are warmly welcome to Ghana, the Gateway to Africa.

This year's theme, “Future-Ready Infrastructure: Advancing Africa through Innovation and Sustainability,” is both timely

and relevant. The challenges facing our continent – particularly in infrastructure – are significant, and they require bold innovation to move us toward the future we aspire to. The African Development Bank estimates Africa's annual infrastructure gap at between US\$130 and US\$170 billion, with a financing shortfall of approximately US\$68 to US\$108 billion. Here in Ghana, recent data presents a sobering picture of the infrastructure landscape. According to the Deputy Minister of Finance, citing World Bank-supported Global Infrastructure Hub, Ghana invests approximately 5 percent of GDP in infrastructure, which falls below the 5.4 percent average among her peer economies. This shortfall results in a financing gap of about 2.8 percent of GDP, which is significantly higher than the 1.7 percent average gap observed in comparable economies. These figures from Ghana and across the continent are not just statistics. They reflect the lived realities of people - city residents calling for efficient transport systems, industries seeking reliable and affordable energy, farmers

requiring irrigation, and a growing youth population demanding the digital infrastructure of the future.

This is where we, as industry leaders, must step forward. Through innovative thinking and sustainable approaches, we are well placed to contribute meaningfully to bridging these gaps and shaping a more resilient and inclusive future for our various countries and continent at large.

We look forward to engaging in meaningful discussions, informed by lessons from successes across our countries and the diverse experiences represented among participants. These discussions will span key areas including innovating for resilient and climate-smart infrastructure, financing Africa's sustainable infrastructure revolution, AI and digital technologies: catalysts for future-ready infrastructure, and sustainable energy and water systems for inclusive growth.

This conference is not just a talk shop – it is a convening ground for minds that will proffer practical and innovative solutions to the challenges before us. Thankfully, it is being held in a country that fosters such solutions: the beating heart of West Africa, Ghana. This conference will project the Ghana Consulting Engineers Association (GCEA) to the limelight. It will show our available network and the opportunities it can contribute to the national agenda of the 24-hour economy. It will project the GCEA as not only a local association but one with continental and global affiliations.

Ghanaians are known for our warm hospitality, and we invite you to feel at home during your stay. Beyond the conference, we encourage you to take time to experience Accra and its surroundings.

Ghana is home to two UNESCO World Heritage Sites, including the historic forts and castles that line our coastline from Keta in the



CAPE COAST CASTLE IN GHANA



KWAME NKRUMAH MEMORIAL PARK

Volta Region to Beyin in the Western Region—powerful reminders of our shared history as Africans. To experience and explore stories and artefacts that shaped not only Ghana's independence but Africa's broader liberation journey, take a visit to Kwame Nkrumah Memorial Park is located just 1.4 kilometres from the conference venue.

A memorable conference such as this needs a tangible reminder and so if you would like to take home a piece of Ghana, the Arts

Centre—just a few minutes from the Kwame Nkrumah Memorial Park—offers a vibrant selection of local crafts, textiles, and handmade souvenirs. We hope you will take the opportunity to experience not only the discussions within the conference, but also the rich history and culture that Ghana has to offer.

We invite you to be part of this journey. Register and join us in Accra, Ghana as we work together to advance future-ready infrastructure across our continent.



THE ARTS CENTRE, ACCRA



INDEPENDENCE SQUARE



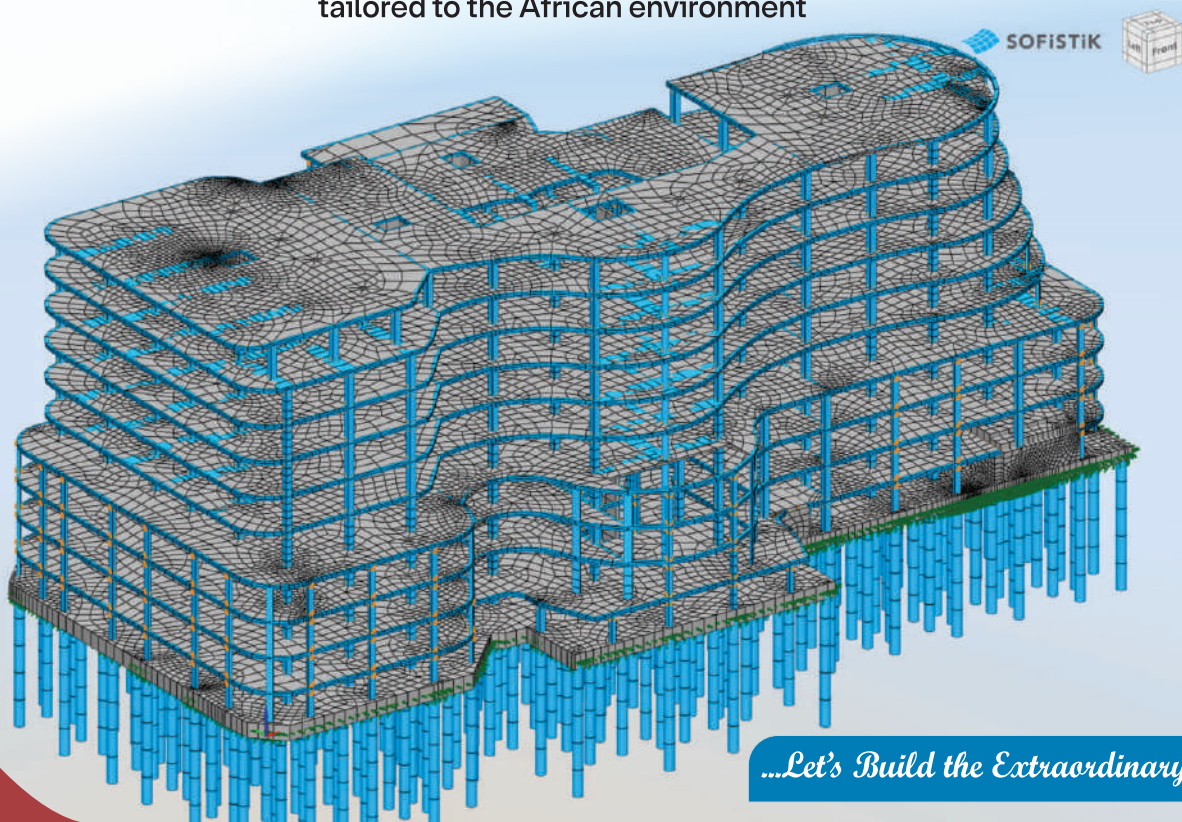
INNOVATING FOR A SUSTAINABLE TOMORROW

Delivering world-class structural and infrastructure engineering solutions across Africa, combining technical excellence, innovation, and practical constructability.

With strong expertise in foundation engineering and substructure systems, we provide reliable and efficient solutions for complex ground conditions, ensuring safety, performance, and long-term durability.

Specialists in advanced post-tensioned (PT) slab systems, we deliver optimised long-span designs that enable reduced slab thickness, faster construction cycles, material efficiency, and enhanced structural performance—providing our clients with a clear cost and delivery advantage.

Powered by cutting-edge tools such as SOFiSTiK and Autodesk BIM platforms, and as a recognized SOFiSTiK partner in Nigeria, we deliver safe, efficient, and globally compliant engineering solutions tailored to the African environment.



...Let's Build the Extraordinary Together!

MEET OUR MD

Engr. Shittu Rahman B.Eng, MBA, MNSE, MNIStructE, COREN Reg., FOSH (UK)

A visionary Civil & Structural Engineer with over 20 years of experience delivering landmark infrastructure and building projects across Nigeria, Africa, and beyond—including major flyovers, high-rise developments, industrial facilities, commercial malls, and healthcare infrastructure. Expert in advanced FEM modelling using SOFiSTiK and Autodesk platforms, and a leader in RAMAD's proprietary PT slab system—delivering faster construction, material efficiency, and superior structural performance.

Chairman, NIStructE Abuja Branch. Driving safe, cost-effective, and globally compliant engineering solutions.

KEY PROJECTS

Healthcare and industrial facilities across Nigeria and internationally, including the Cancer & Radiotherapy Center, Lesotho (Southern Africa), Abuja Hillside Hospital, Ogoni Multi-Story Hospital (PT slab), Benue Cancer Center, and Ibom International Hospital (PT high-rise solution).

Other key developments include Cloud 7 Abuja, J'Signature Hotel Port Harcourt, Port Harcourt Mall & Event Center, HyperCity Malls (Abuja & PH), and Newton Tower Lagos—all leveraging PT slab systems.

Also includes the Gombe State Tripod Project and 140m Aboh Akarai Bridge, alongside multiple high-end developments.



The Innovation Imperative

**Why African
Engineers Must
Build Differently**

Rethinking How We Build:
Innovation Beyond Technology



The question facing African engineering isn't whether to innovate. It's whether you'll be the engineer using the algorithm or the one being replaced by it.

At 6:47 am.

on a Tuesday morning, a structural engineer in Accra opens her laptop. She is facing a challenge that would have taken her predecessors weeks to resolve: optimizing a 12-storey mixed-use building for cost, carbon footprint, and compliance with newly updated seismic codes.

By 9:30 am.

She has her answer. Not because she worked faster. Not because she is smarter. But because she worked differently.

She used an AI-powered parametric design tool that tested hundreds of possible configurations in the time it took her to drink her morning coffee. The system revealed a solution that reduced material use significantly, shortened construction timelines, and lowered the building's projected lifetime carbon emissions. A result that would have been practically impossible to uncover through manual calculation alone.

In the end, the decision remained hers. The technology did not replace engineering

judgment; it expanded it.

This is not a glimpse of the future. It is already happening in Ghana, led by engineers who, only a few years ago, were designing with little more than AutoCAD, experience, and instinct.

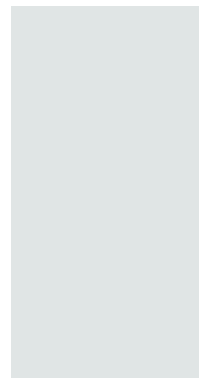
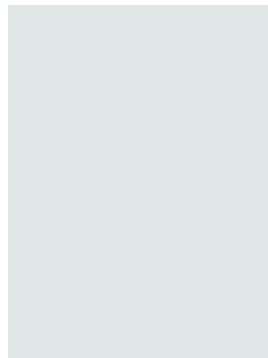
The question facing African engineering isn't whether to innovate. It's whether you'll be the engineer using the algorithm or the one being replaced by it.

1. What Innovation Really Means in African Engineering

Innovation is often treated as a buzzword, something fashionable, imported, and vaguely defined. In African engineering, we cannot afford that luxury.

Here, innovation is not about chasing every shiny new technology. It is about the systematic integration of new methods, tools, and ways of thinking that enable us to build faster, cheaper, better, and more sustainably than traditional approaches permit; within real constraints of cost, climate, capacity, and context.

Innovation in African engineering manifests in four critical dimensions:



The 4 Dimensions of Innovation

1. Digital Tools and Technologies

Building Information Modeling (BIM) that catches design clashes before they become construction nightmares. AI algorithms that optimize structural designs for multiple variables simultaneously. Drones that survey 100 hectares in three hours instead of three weeks. IoT sensors that monitor infrastructure health in real-time, predicting failures before they happen.

3. Innovative Materials

Compressed earth blocks that cost half as much as conventional concrete while sequestering carbon. Bamboo reinforcement that grows locally and performs remarkably in seismic zones. Carbon-negative concrete that actually removes CO₂ from the atmosphere. Engineered local materials that turn regional constraints into global innovations.

2. New Construction Methods

Modular construction that builds housing in factories and assembles on-site in weeks, not months. Prefabrication techniques that reduce waste by 60% and construction time by 40%. 3D printing of building components using local materials. Off-grid smart systems that leapfrog traditional infrastructure entirely.

4. Transformed Mindsets and Processes

Agile project management that adapts as projects evolve rather than rigidly following outdated plans. Integrated project delivery where architects, engineers, and contractors collaborate from day one instead of working in silos. Community co-creation that designs with people, not for them. Rapid prototyping that tests and iterates quickly instead of pursuing perfection on paper.

KEY INSIGHT

These four dimensions are not separate tracks. They work together. BIM improves collaboration. Modular construction benefits from AI optimization. Local materials succeed through agile adaptation. Innovation is a system, not a checklist.

African innovation is not about importing Western solutions. When Kenya developed M-Pesa, the world's first successful mobile money platform, it solved an African problem with an African solution and the world copied Kenya. This is the model: leverage global tools, create uniquely African applications, and lead.

2. The End of Traditional Infrastructure:

Why The Old Playbook No Longer Works

Africa needs **\$130-170** billion annually in new infrastructure investment. Currently, we deploy **\$30-40** billion per year. At this rate, the infrastructure gap closes... never.

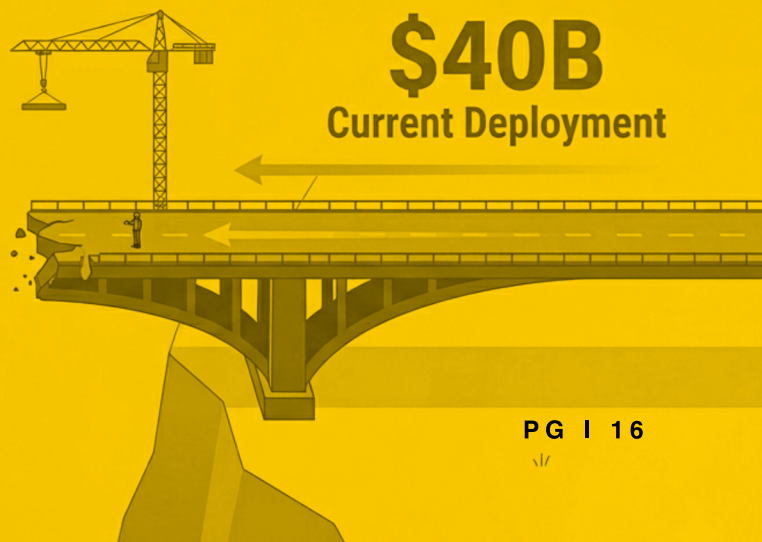
Traditional Engineering Approaches

design-bid-build, manual drafting, sequential decision-making, conventional financing cannot scale to meet this demand. The old playbook was written for a different era, different constraints, and different possibilities. It served us well, but it has reached its limits.

The Infrastructure Gap

\$170B
Annual Need

\$40B
Current Deployment



Consider the Hard Realities

Speed

Traditional methods take 24-36 months to deliver a mid-sized building from design to occupancy. Africa's urbanization is adding 24 million people to cities annually. We're not building fast enough to house, connect, or serve them. The backlog grows daily.

Cost

Infrastructure in Africa often costs 30-50% more than comparable projects in Asia due to inefficiencies, errors, and rework. Traditional methods literally bury mistakes in concrete. By the time you discover a design clash, you've already poured the foundation. Innovation catches errors digitally before construction.

Quality

Manual processes introduce human error. A misplaced decimal in calculations can compromise structural integrity. A missed coordination issue can lead to pipes clashing with electrical systems. Traditional quality control is reactive (inspecting what's already built). Innovation makes quality control proactive (preventing errors before construction begins).

Sustainability

Climate change demands designs for a hotter, harsher world. Traditional engineering education barely addressed climate adaptation. Innovation integrates climate modeling, lifecycle assessment, and resilience planning from day one.

COVID-19

exposed another flaw: traditional approaches require physical presence. Projects halted during lockdowns. But engineering firms that had already adopted cloud collaboration, digital documentation, and virtual coordination kept building. Innovation isn't just better; sometimes it's the only option.

WARNING

The old approach is boring the next generation away from engineering. Africa's brightest young minds see software engineers building apps that reach millions in months, while civil engineers spend years navigating bureaucracy to build a single bridge. If we don't make engineering exciting, innovative, and impactful, we'll lose our talent to other fields.

3. THE 10x MINDSET: African Engineers Thinking Exponentially

Incremental improvement is comfortable but insufficient. A 5% cost reduction feels like progress. Shaving two weeks off a six-month schedule seems like an achievement. But incremental thinking will never close a \$100 billion annual gap.

African engineers need to adopt exponential thinking: not 10% better, but 10x better. This isn't fantasy. It's happening now, across the continent, in specific, measurable ways.

10x Faster

- Zipline Ghana delivers medical supplies by drone in 30 minutes to locations that would take 3+ hours by road (a 6x speed improvement that saves lives).
- Modular housing construction in Lagos assembles 20-unit developments in 90 days versus 18 months traditionally (a 6x acceleration).
- These aren't marginal gains. They're order-of-magnitude improvements that fundamentally change what's possible.

-
- Drone surveys cost \$500 and take hours versus traditional surveying at \$5,000 over weeks (a 10x cost reduction with faster results).
 - AI structural optimization in a Kenyan commercial project reduced steel usage by 23% while improving performance (saving hundreds of thousands of dollars on a single building).
 - Local material innovation using compressed earth blocks costs 40-60% less than conventional construction while sequestering carbon.

10x Cheaper

10x More Sustainable

- Buildings designed with AI lifecycle analysis achieve 50-70% carbon reduction compared to conventional designs.
- Smart grids with AI optimization reduce energy waste by 30-40%.
- Green building innovations in Morocco's sustainable housing projects achieve near-zero operational carbon. These aren't just better, they're transformational.

It is uncomfortable but liberating. It challenges everything we learned. But once you see that 10x is possible, you can't unsee it. And once you achieve it in one project, you can't accept anything less.

the 10x

Mindset asks different Questions

Not "How do we build this bridge 5% cheaper?" But "What if we didn't need this bridge at all?"

1

Not "How do we reduce errors?" but "What if errors were impossible?"

2

Not "How do we train more engineers?" but "What if AI augmented every engineer to perform 10x their

3

4. Engineering Without Limits

How African Innovators Turned Constraints into Breakthroughs

Here's a truth that Silicon Valley worships but African engineers often overlook: constraints breed innovation. Limitations force creative thinking. When you have unlimited resources, you build conventionally. When you have constraints, you build breakthroughs.

Africa's infrastructure constraints; limited capital, scarce materials, unreliable power, and skilled labor shortages are not just challenges to overcome. They're competitive advantages in disguise.

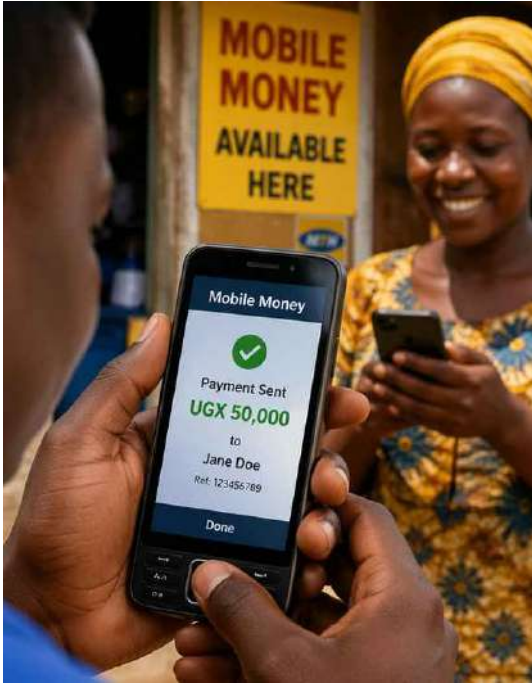
The Constraint Catalyst Principle in Action

Constraint: No reliable grid power in rural areas.

Breakthrough: Africa now leads the world in off-grid solar innovation. Pay-as-you-go solar systems pioneered in Kenya and Ghana are being deployed from India to Latin America. We turned an energy deficit into global leadership in distributed renewable systems.

Constraint: Limited traditional banking infrastructure.

Breakthrough: M-Pesa and mobile money revolution. Kenya leapfrogged the entire physical banking infrastructure that developed countries spent decades building. Now Kenya processes more mobile transactions per capita than the United States. Banks are copying mobile money not the other way around.



Constraint: Poor road networks making rural healthcare delivery nearly impossible.

Breakthrough: Zipline's autonomous drone delivery network. Rwanda and Ghana pioneered a system that's now expanding to the United States, Japan, and Europe. We didn't wait for roads; we built airways. We turned geographic isolation into an opportunity to innovate aviation logistics.

Constraint: Expensive imported construction materials and unreliable supply chains.

Breakthrough: Advanced local material engineering. Compressed earth blocks, bamboo reinforcement, recycled plastic bricks, palm fiber composites. What started as making do with what we had became a global movement toward sustainable, locally-sourced construction. Now European architects study African vernacular innovation for climate-resilient design. This pattern repeats across every constraint we face. Limited access to advanced software? African engineers become masters at maximizing free and open-source tools and contribute back to those tools, improving them for everyone.



The lesson isn't that constraints are good, they're not. No one celebrates poverty or underdevelopment. The lesson is that when you're forced to innovate, you often discover solutions that work better for everyone. Off-grid solar isn't just for villages without power; it's resilience for cities vulnerable to grid failures. Mobile money isn't just for the unbanked; it's convenient for everyone. Drone delivery isn't just for remote areas; it's the future of logistics globally.



The engineering firms that will dominate the next decade won't be those with the most resources. They'll be the ones that learned to innovate under constraint (our competitive advantage).

5.

From **Blueprints** to Breakthroughs:

Africa's Engineering Evolution

To understand where we're going, we need to see how far we've come and how quickly the transformation is accelerating.

2015

**The
Traditional
Era**

Site surveys took weeks with total stations and manual calculations. Designs were created in 2D AutoCAD. Coordination happened through printed plans laid out on conference tables, with clashes discovered during construction. Project communication meant site visits, phone calls, and faxed markups. Progress tracking relied on weekly reports and monthly site meetings. Material sourcing meant calling suppliers individually. Most importantly: engineering was fundamentally a local, isolated profession.

2020

The Digital Transition

Drones became affordable, cutting survey time to hours. Some firms adopted BIM, though it remained niche. Cloud storage enabled basic file sharing. Mobile apps appeared for site documentation. However, these tools existed in silos; an innovation here, a digital tool there, but no integrated systems. COVID-19 forced rapid digital adoption, revealing both the possibilities and the gaps.

2025

The Integration Point (Now)

AI enters design workflows. BIM becomes standard for major projects in urban centers. Drones are ubiquitous. IoT sensors monitor infrastructure in real-time. Cloud collaboration enables international teams. Digital twins allow virtual testing before physical construction. Mobile money facilitates contractor payments. 5G networks support data-intensive applications. Most critically: these technologies now work together, creating an integrated digital engineering ecosystem. We're at the inflection point where innovation shifts from competitive advantage to competitive necessity.

2030

The Intelligent Infrastructure Vision

AI co-pilots every design decision, optimizing for cost, carbon, and performance simultaneously. Digital twins are standard, not exceptional; every major infrastructure project exists virtually before physically. Robotics handle repetitive construction tasks while humans focus on complex problem-solving. Blockchain tracks material supply chains, ensuring authenticity and sustainability. Parametric design allows mass customization of housing; unique designs at commodity prices. All of this happens in Africa first, because we're building new infrastructure, not retrofitting old systems.

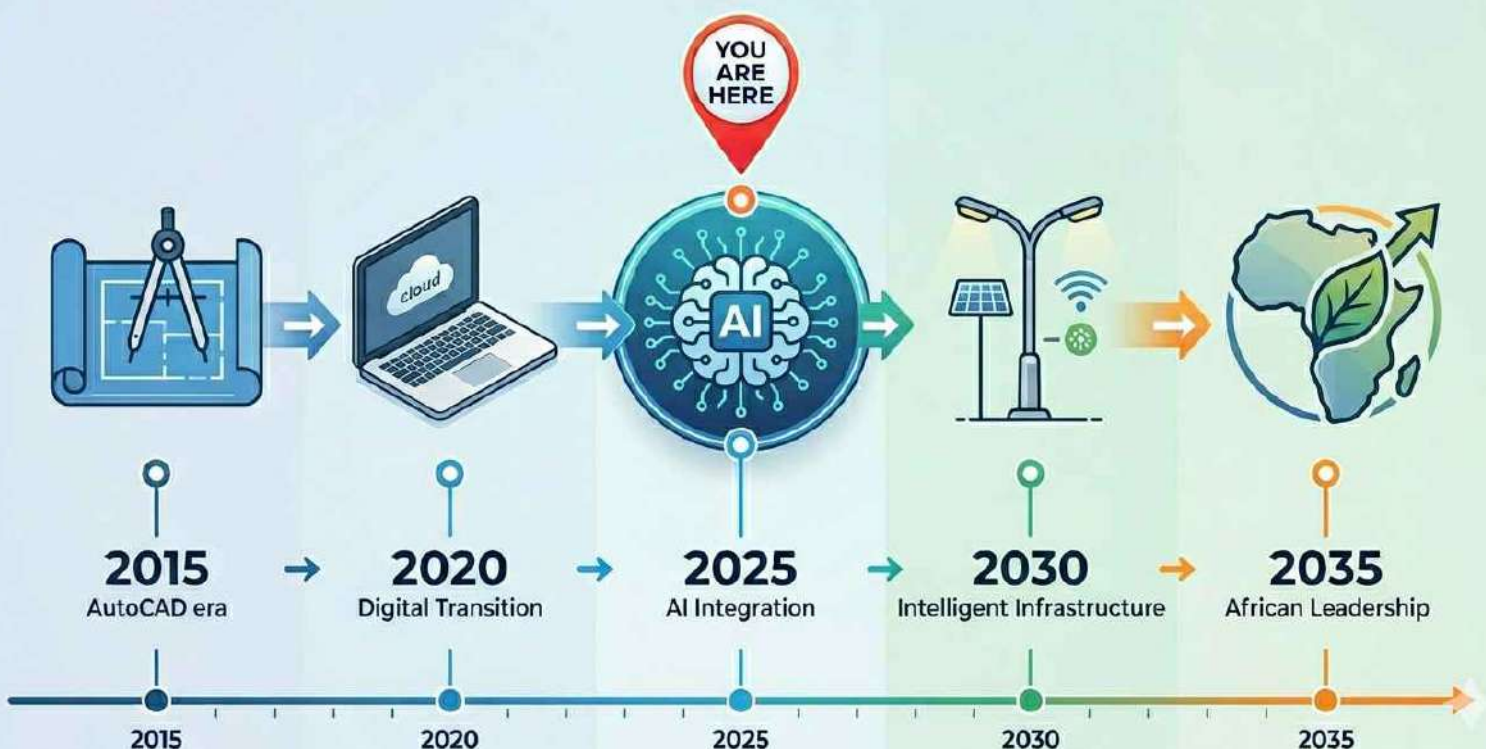
2035

The African Engineering Leadership Era

African engineering firms lead globally in sustainable infrastructure innovation. African universities produce the world's most innovation-ready engineers. 'The African Model' - integrated digital tools, sustainable materials, community co-creation becomes the global best practice. International firms recruit African engineers not as cheap labor but as innovation leaders. The engineer who started this journey in 2026 is now a global expert in AI-driven sustainable infrastructure.

This timeline isn't speculative. It's based on current trajectories. The question is whether you'll participate in this evolution or be left behind by it. The transition from 2025 to 2030 will happen whether you're ready or not. Those five years will determine the next three decades of your career.

And here's what's encouraging: you don't need to master everything by next week. You need to start. One tool. One project. One innovation. The engineer in Accra who optimized that building didn't learn AI overnight. She took a three-week online course, tried it on a small project, failed, adjusted, and tried again. Six months later, she's transforming how her entire firm approaches design.



The Imperative Is Clear

African engineering stands at a crossroads. Down one path lies incremental improvement, gradual progress, and permanent subordination to external expertise. We continue building the way we've always built, getting slightly better each year, never quite closing the gap.

Down the other path lies exponential transformation. We embrace innovation not as a luxury but as survival. We leverage our constraints as competitive advantages. We build the infrastructure that Africa needs and the world will want. We position ourselves as innovation leaders, not perpetual followers.

The choice isn't really a choice at all. The infrastructure gap won't close itself. Climate change won't wait for us to catch up. The next generation won't be patient with outdated approaches. And the global engineering profession won't hand us leadership, we have to earn it through innovation.

Innovation is no longer optional. It's the only path forward. The only question remaining is: will you lead it, follow it, or be swept aside by it?

This magazine exists to help you choose leadership. The following articles show you where innovation is happening in Ghana, how it's succeeding across Africa, and what specific tools and skills you need to master. The roadmap is clear. The resources exist. The opportunity is now.

Africa doesn't need engineers who can explain why innovation is hard. Africa needs engineers who can show how innovation is done.

The imperative is innovation. The time is now. The engineers are us.

Smart Leap:

Smart Leap:

How Innovation
Is Reshaping National
Infrastructure

Innovation in Action:
Engineering Solutions
Shaping the Golden State



On a humid morning in East Legon, a construction site manager doesn't reach for her phone to call, it's to launch a drone. Within eight minutes, the DJI Phantom has mapped a 4.2-hectare development site, capturing 847 high-resolution images. By lunchtime, the photogrammetry software has produced a 3D terrain model accurate to 3 centimeters. What used to take a crew of five surveyors three weeks now costs \$400 and finishes before noon.

Fifteen kilometers away in Tema, the port authority monitors real-time IoT sensor data. An algorithm predicts that Crane 7 will need maintenance in 11 days. Scheduled during a quiet window, this prevents a \$180,000 emergency breakdown for just \$8,000 in preventive work.

In Kumasi, a young structural engineer reviews a Building Information Model (BIM) for a hospital wing. The software has automatically detected 23 clash points between mechanical, electrical, and structural systems. Problems that once triggered costly delays are solved digitally before a single foundation is poured.

This isn't Ghana's future. This is Ghana today. While innovation is often discussed as a possibility, the Golden State is quietly demonstrating it in practice not through proclamations, but through implementation.

Building Smart:

Innovation in Ghana's Major Infrastructure Projects

Here's where Ghana's smart leap becomes tangible in actual infrastructure projects deploying innovative methods and achieving measurable results.

Energy Sector Transformation

Ghana's energy sector showcases some of the nation's most sophisticated infrastructure innovation. The Electricity Company of Ghana has been deploying smart metering systems across the country in phases. In 2024 alone, ECG launched programs to replace hundreds of thousands of meters across multiple regions including 450,000 meters in Accra West and 250,000 in Accra East with advanced smart prepaid meters integrated into a unified Meter Management System (MMS). These

intelligent systems enable advanced data analytics that can support demand forecasting, theft detection, and improved load management, with early implementations showing potential to reduce technical losses by 15-20% while enabling real-time grid management impossible with analog infrastructure.

GridCo has been exploring and adopting advanced grid modeling and simulation tools, virtual models of the physical grid that simulate operational scenarios, test expansion plans, and predict maintenance needs. When severe weather threatens, operators can run multiple simulations to identify vulnerable nodes and pre-position resources, helping to prevent major outages and maintain supply to critical facilities.

Ghana's renewable energy integration demonstrates innovation at scale. The Bui Power Authority has developed a 250MW solar program at the Bui hydroelectric site, with a 50MW solar farm commissioned in 2020, now Ghana's largest operational solar installation. This hybrid hydro-solar system uses optimized tracking systems that adjust panel angles throughout the day based on sun position, cloud coverage, and temperature data. Compared to fixed installations, this significantly increases energy capture while improving overall system resilience. IoT sensors monitor system components, predicting failures before they occur and reducing downtime from days to hours. Additionally, BPA completed a groundbreaking 5MW floating solar plant on the Bui reservoir, the first in West Africa with plans to scale to 65MW.

Transport Infrastructure Innovation

The Tema Port expansion project represents one of Ghana's most ambitious infrastructure undertakings. Managed by Meridian Port Services with AECOM as project management consultant, the \$1.5 billion project employed digital coordination tools across multiple engineering disciplines. Completed ahead of schedule in April 2020, the expansion increased capacity from 800,000 TEUs to 3.7 million TEUs annually, positioning Tema as one of West Africa's largest ports. The 1.4km quay with four deep berths can now

accommodate ultra-large vessels carrying up to 18,000 containers. Digital project management enabled construction sequencing that kept operational berths functioning throughout the expansion, critical for maintaining Ghana's maritime trade. The project created over 5,000 jobs and trained more than 4,000 Ghanaians to international construction standards.

Accra has been developing intelligent traffic management capabilities through the Accra Areawide Traffic Intelligent System. Phase 1, completed in 2019, connected 44 signalized intersections to a centralized Traffic Management Centre. The system uses adaptive traffic controllers with integrated cameras for monitoring and violation detection. Phase 2 aims to expand coverage to 253 total intersections across the city. While full AI-driven computer vision systems are still being explored for future deployment, the current interconnected adaptive controllers represent a significant improvement over traditional fixed-schedule traffic lights.

Infrastructure inspection is also being transformed through technology. Drone-based structural assessment using high-resolution imagery and thermal sensors can identify concrete degradation and structural issues invisible to ground-level visual inspection. These detailed condition assessments enable targeted repairs rather than wholesale replacement, potentially reducing project costs significantly while extending infrastructure life.

Urban Development and Housing

The Saglemi Affordable Housing Project, despite facing project management challenges, pioneered prefabrication techniques in Ghana's residential construction sector. Wall panels, roof trusses, and bathroom pods manufactured off-site demonstrated that industrialized building techniques could dramatically reduce construction time per unit from traditional timeframes of many months to a matter of weeks. While the project faced delivery complications, the construction methodology itself proved the viability of modern manufacturing approaches in Ghana's context.

Private developers in Accra and Kumasi increasingly adopt green building standards, integrating solar panels, rainwater harvesting, natural ventilation, and energy-efficient building envelopes from the design phase. Several recent commercial buildings have achieved 40-50% operational energy reduction compared to conventional construction, proving that sustainability can deliver return on investment through lower utility costs.

Digital Infrastructure Backbone

Perhaps less visible but equally critical: Ghana's digital infrastructure itself represents sophisticated engineering innovation. The national fiber optic backbone required innovative installation techniques through challenging terrain, including underwater crossings of the Volta River. Network operations centers use advanced monitoring systems to identify potential cable degradation before service interruption occurs.

In November 2024, Ghana launched its 5G wholesale infrastructure network through Next Gen Infraco (NGIC), marking a significant milestone in the country's digital transformation journey. The infrastructure deployment began in major cities including Accra, Kumasi, and Takoradi, with plans for nationwide coverage by 2026. The wholesale model, where NGIC builds and maintains the infrastructure while telecommunications providers purchase capacity to offer services to customers aims to maximize coverage while minimizing redundant investment. While the infrastructure rollout is progressing, commercial 5G services to consumers are still in early stages as telecommunications operators work through the technical and commercial arrangements for service delivery. This telecommunications backbone will enable the next generation of smart city applications, from advanced traffic management to digital construction supervision.

Healthcare Infrastructure Innovation

Zipline Ghana's medical drone delivery network represents infrastructure innovation at its purest, solving a fundamental logistics problem through engineering creativity. Operating from four distribution centers, the network delivers blood products, vaccines, and emergency medications to over 2,000 health facilities across Ghana. The

infrastructure includes not just drones but sophisticated inventory management systems, automated battery swap stations, precision landing technology, and real-time flight control. Since 2019, Zipline has completed over 1 million deliveries, saving an estimated 1,500 lives through faster emergency response. The system uses machine learning to optimize flight routes, predict demand patterns, and position inventory strategically turning healthcare logistics into a data science problem.

These Projects share common characteristics:

they leverage digital tools for design and management, they measure and optimize performance continuously, they integrate multiple technologies synergistically, and critically they deliver measurable improvements in cost, time, quality, or sustainability. Innovation in Ghana isn't theoretical. It's operational.



REAL GHANA PROJECTS



Ghana's Moment

Ghana's infrastructure innovation isn't a government program or corporate initiative. It's a grassroots transformation driven by engineers who recognized that the old ways couldn't deliver the infrastructure Ghana needs. From the surveyor who bought a drone to the structural engineer who learned BIM in evening classes to the construction manager who digitized his workflow, innovation spreads through individual decisions to try something new.

The ecosystem supporting this transformation continues maturing; better connectivity, stronger academic programs, growing investment, and policy frameworks that encourage rather than obstruct innovation. But the ecosystem follows the innovators, not the other way around. Infrastructure changes because engineers change.

Ghana's smart leap demonstrates what's possible when innovation moves from aspiration to implementation. The projects profiled here aren't showcase demonstrations, they're operational infrastructure serving real needs, built by Ghanaian engineers using accessible tools and replicable methods. If it works in Ghana, it can work anywhere in Africa.

The story of Ghana's infrastructure innovation is still being written. The next chapter will be written by the engineers reading this by the choices you make about whether to maintain comfortable routines or embrace uncomfortable growth. Ghana has shown it's possible. Now the question is: what will you build?

The tools are available. The examples are proven. The future is being built. Join the engineers making Ghana's smart leap a reality.



SHAPING GHANA'S INFRASTRUCTURE. ENABLING ITS FUTURE.

Over a decade of local delivery, backed by more than 90 years of impact across Africa and the Middle East.

ZUTARI AT A GLANCE

Zutari is a multinational buildings and infrastructure advisory firm partnering with clients to create sustainable, future-ready solutions. With nine decades of experience in Africa and the Middle East, we combine expertise, digital skills, and a commitment to infrastructure that drives progress.

OUR PRESENCE IN GHANA

Since 2013, Zutari has supported Ghana's development across key sectors, from transport and water to energy and the built environment. Our Accra-based team brings strong local insight, strengthened by regional and global expertise, delivering solutions that are relevant, resilient, and locally grounded.

DELIVERING IMPACT ON THE GROUND

From concept to completion, our work reflects impact across sectors:

Kumasi City Mall

Delivered civil and HVAC engineering for a retail development, supporting growth with efficient, integrated design.

Kumasi Roads and Drainage Extension

Design review and supervision of urban roads, bridges, and drainage to improve mobility and regional growth.

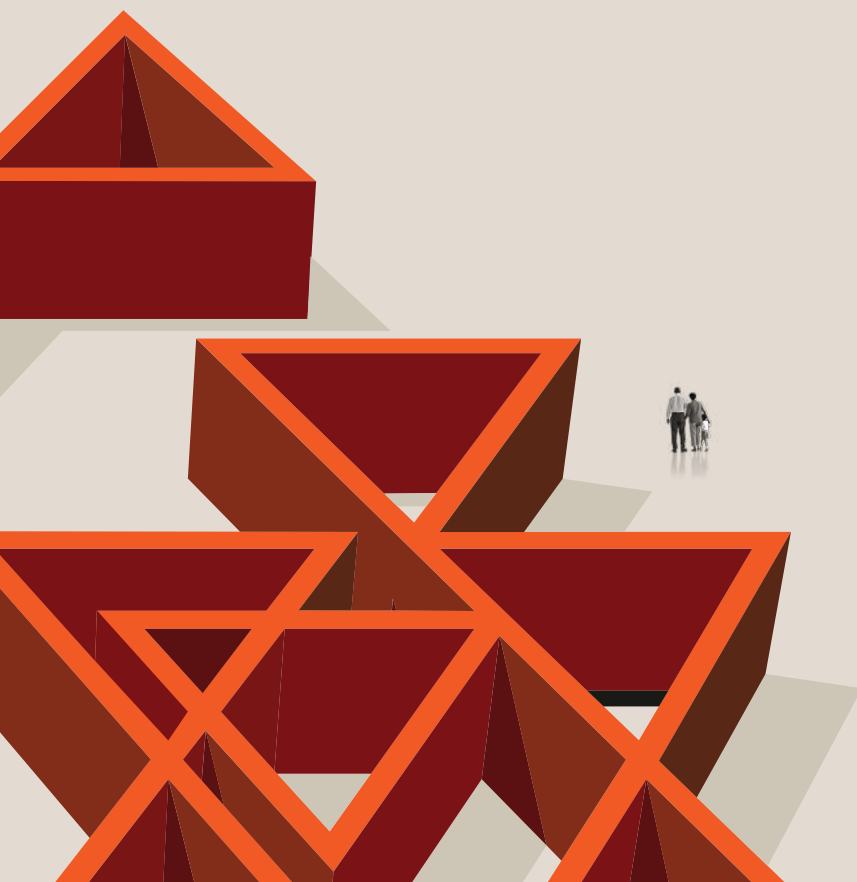
Tema Port Expansion

Designing and building essential operational and administrative facilities to boost trade capacity and regional connectivity at one of West Africa's busiest ports.



WE DON'T JUST DELIVER
INFRASTRUCTURE, WE
ENABLE GROWTH,
STRENGTHEN COMMUNITIES
AND CREATE LASTING IMPACT.

Discover how we're partnering
for impact in Ghana:



THE INTELLIGENT CONTINENT:

Where African Engineering Meets Artificial Intelligence

Innovation Across Africa:
Five Countries Engineering the Future

In Kigali, an algorithm decides which roads to pave next. In Lagos, artificial intelligence predicts traffic congestion three hours before it happens. In Nairobi, machine learning analyzes water pipe acoustics to detect leaks before they waste thousands of liters. In Cairo, computer vision monitors construction sites, flagging safety violations in real-time. In Casablanca, neural networks optimize renewable energy dispatch across Morocco's national grid.

This isn't science fiction. This isn't pilot projects. This is operational infrastructure across Africa. Continent-scale deployment of artificial intelligence in engineering applications that rival or exceed implementations in developed nations. While global headlines focus on AI chatbots and

recommendation engines, African engineers are quietly building the world's smartest physical infrastructure.

Africa is becoming the intelligent continent, not through imported solutions, but through homegrown innovation born from necessity, accelerated by capability, and scaled through collaboration. The story of African infrastructure AI isn't about catching up. It's about leaping ahead.

This article profiles five countries leading distinct dimensions of infrastructure innovation, then reveals the cross-cutting AI breakthroughs transforming engineering across the continent. Together, they demonstrate that when it comes to intelligent infrastructure, Africa isn't the future - Africa is the present.

1. The African Innovation Export:

*Five Engineering Solutions
Going Global*



Mobile First Infrastructure Management

Kenya didn't just pioneer mobile money. It pioneered the entire concept of mobile-first infrastructure. When M-Pesa launched in 2007, it solved a financial access problem. But the infrastructure it created: ubiquitous mobile connectivity, trusted digital payments, citizen comfort with phone-based transactions enabled far more.

Today, Kenyan construction firms manage billion-shilling projects entirely through mobile applications. Site supervisors document progress, subcontractors submit invoices, and suppliers confirm deliveries all from phones, no laptops required. M-Akiba, Kenya's mobile-

based government bond platform, raised infrastructure financing from citizens using SMS. NaiLab's startups deploy IoT sensor networks managed through USSD menus accessible on the simplest phones.

The innovation isn't the mobile technology. It's the conviction that Africa's infrastructure management should be designed for the devices Africans actually use. This insight, born in Kenya, now influences how engineering firms from India to Indonesia approach digital transformation. Kenya taught the world: don't wait for everyone to have computers. Build for phones.

Drone Technology Leadership

When Zipline began medical drone deliveries in Rwanda in 2016, skeptics dismissed it as a publicity stunt. Eight years later, Rwanda operates the world's most sophisticated autonomous delivery network, has trained drone operators from 40+ countries, and established regulatory frameworks other nations now copy.

But Rwanda's drone innovation extends beyond medical logistics. The government deployed drones for comprehensive land surveying, mapping the entire country in 18

months, work that would have taken decades using ground surveys. Construction firms use drones for daily site monitoring, with AI analyzing footage to track progress against schedules automatically. Agriculture extension services deploy multispectral drone imaging to diagnose crop health and optimize irrigation.

Rwanda's insight: regulations should enable innovation, not obstruct it. While many countries spend years debating drone rules, Rwanda created clear frameworks quickly, iterated based on experience, and positioned itself as Africa's drone hub. The payoff: international companies test in Rwanda, train in Rwanda, and often base African operations in Rwanda. Leadership through permission.



South Africa

BIM and Digital Twin Mastery

South Africa's engineering sector leads Africa in Building Information Modeling adoption, with penetration rates approaching European levels. But the real innovation lies in how South African firms deploy BIM not just for design coordination but for entire project lifecycles—from feasibility through demolition 50 years later.

Digital twins: virtual replicas of physical infrastructure that update in real-time, originated in manufacturing but found sophisticated application in South African infrastructure. Johannesburg's smart buildings use digital twins to optimize energy consumption, predict equipment failures, and plan renovations without disrupting

operations. The Gauteng Freeway Improvement Project created a digital twin of the entire highway network, using traffic sensors and cameras to feed live data into the model for congestion prediction and incident response.

South Africa's contribution to global practice: digital twins aren't just for new mega-projects. They're essential for managing aging infrastructure in resource-constrained environments. When you can't afford to replace everything, intelligent management becomes survival. South African innovations in retrofitting sensors to existing infrastructure and building models from historical data are now studied globally.

Egypt's New Administrative Capital: a \$58 billion development larger than Singapore represents the world's largest deployment of AI project management systems. Coordinating 10,000+ workers, hundreds of contractors, and thousands of concurrent activities requires computational orchestration impossible through traditional methods.

Machine learning algorithms optimize construction sequencing, predicting cascading delays before they occur and automatically adjusting schedules across interdependent tasks. Computer vision monitors worker safety, identifying missing

PPE or unsafe behaviors in real-time across dozens of simultaneous sites. Predictive analytics forecast material needs weeks in advance, coordinating just-in-time delivery for projects consuming concrete by the ton per minute.

Egypt's lesson: scale changes everything. Techniques that work for single buildings fail for entire cities. AI isn't luxury at mega-project scale, it's the only way humans can maintain control of complexity. International mega-projects now study Egyptian AI deployment, recognizing that Africa is pioneering necessary techniques for humanity's largest construction projects.

Egypt

AI-Driven Mega-Project Management



Green Engineering Standards

Morocco's renewable energy achievements are well-documented, the Noor solar complex, aggressive wind deployment, 52% renewable electricity by 2030 targets. Less recognized: the engineering innovation enabling this transition. Morocco has developed sophisticated grid integration AI that manages intermittent renewable sources with minimal fossil backup.

Machine learning predicts solar and wind generation 72 hours ahead with 95% accuracy, allowing grid operators to schedule dispatchable generation and coordinate with European imports/exports optimally. AI-driven demand response systems shift industrial loads to match renewable availability, effectively using the economy as a battery. Morocco's buildings increasingly deploy neural networks for HVAC optimization, learning occupancy patterns and weather forecasts to

minimize energy while maintaining comfort.

Morocco's innovation: sustainability requires intelligence. You can't achieve 50% renewable penetration with 20th-century grid management. AI transforms intermittent sources from liability to asset. As the world pursues net-zero, Morocco's engineering solutions developed under Africa's intense sun and desert conditions become global blueprints. Climate necessity drives innovation exportable everywhere.

These five countries demonstrate different innovation strengths, but common threads emerge: mobile-first thinking, regulatory agility, necessity-driven creativity, and willingness to deploy at scale rather than perpetually pilot. Africa's engineering innovations go global not because they're African, but because they work.

2. When Bridges Think:

AI's Role in Africa's Smart Infrastructure Future

The convergence of physical infrastructure and digital intelligence creates what engineers call "smart infrastructure", roads that monitor their own condition, buildings that optimize their own energy use, water systems that detect and repair their own leaks. This isn't automation, it's autonomy. Infrastructure that doesn't just respond to commands but makes intelligent decisions independently.

Africa is uniquely positioned to lead smart infrastructure deployment. We're building new systems rather than retrofitting old ones, making it easier to embed intelligence from the start. Resource constraints demand maximum efficiency from every asset, justifying the investment in monitoring and optimization. And leapfrogging legacy approaches means no institutional resistance to "this isn't how we've always done it."

Smart Transportation Networks

Lagos operates Africa's most sophisticated AI traffic management system, processing data from 200+ cameras and sensors across the metropolitan area. Machine learning predicts traffic patterns three hours ahead, enabling dynamic signal timing and route guidance that reduces average commute times by 18%. The system learns continuously, as Lagos grows and traffic patterns evolve, the AI adapts automatically without manual reprogramming.

Nairobi's Bus Rapid Transit system uses AI for fleet management, predicting passenger demand and optimizing bus deployment in real-time. The algorithm considers weather, events, holidays, and historical patterns to position vehicles where needed most. Result: 15% increase in passenger satisfaction and 22% improvement in vehicle utilization, more service with the same fleet.

Intelligent Water Infrastructure

Water scarcity makes smart water management existential across much of Africa. AI-driven systems optimize this precious resource in ways impossible through human operation alone. Cape Town's water network, stress-tested by the 2018 "Day Zero" crisis, now uses machine learning to balance supply and demand dynamically, predict consumption patterns, and identify waste or theft.

Pressure management AI adjusts water pressure throughout distribution networks based on demand and pipe condition, reducing leaks while maintaining adequate service. Trials in Ghana and Tanzania demonstrate 25-35% reduction in water loss, millions of liters saved annually through intelligent pressure control. When every liter counts, AI becomes infrastructure necessity.

Self-Monitoring Structures

Embedded sensors turn passive structures into active systems that monitor their own health. The Kazungula Bridge between Zambia and Botswana includes 150+ sensors measuring stress, vibration, temperature, and displacement. AI analyzes this data continuously, detecting patterns that precede structural problems, enabling preventive intervention before damage becomes critical.

High-rise buildings in Johannesburg and Nairobi deploy structural health monitoring that detects earthquake damage, foundation settlement, or material degradation automatically. After seismic events, AI can assess building safety within minutes, determining occupancy risk faster and more accurately than human inspection, critical for emergency response and business continuity.

Smart infrastructure represents the maturation of African engineering innovation. We've moved from adopting digital tools to creating intelligent systems. Bridges don't just think, they learn, adapt, and optimize continuously. This transformation positions Africa not as infrastructure client but as smart infrastructure laboratory, proving concepts the developed world will eventually deploy.

The Intelligent Continent Emerges

Africa's infrastructure AI deployment tells a story rarely heard in global technology narratives: the story of a continent not waiting for permission, not accepting a subordinate role, but leading through bold implementation of intelligent infrastructure at scale.

From Kenya's mobile-first management to Rwanda's drone networks, South Africa's digital twins, Egypt's mega-project AI, and Morocco's renewable integration. African innovation isn't incremental. It's

transformational. We're not adding AI to traditional infrastructure; we're rethinking infrastructure entirely around intelligence.

This leadership position isn't guaranteed. It requires sustained investment in digital

infrastructure, education, and innovation-friendly policy. But the trajectory is undeniable. The intelligent continent isn't a vision for 2050. It's emerging now, project by project, innovation by innovation, across the African landscape.



Building with Intelligence:

How AI Is Changing Engineering Decisions

Artificial intelligence transforms infrastructure development across every phase of the building lifecycle. Understanding how AI integrates into engineering practice requires examining specific applications at each stage, from initial concept through decades of operation. This section provides a technical roadmap for AI deployment across the complete project timeline.

Phase 1: *Pre-Design* & **Feasibility** *Analysis*

Site Selection and Analysis

Machine learning algorithms analyze multiple sites simultaneously, evaluating hundreds of parameters: topography, soil conditions, access to utilities, environmental constraints, zoning compliance, and proximity to amenities. AI processes satellite imagery, GIS data, traffic patterns, and demographic information to score site suitability objectively.

Implementation: Upload site coordinates and project requirements into platforms like Spacemaker or Autodesk Forma. The AI generates comparative analyses showing optimal site utilization, potential challenges, and preliminary cost estimates for each location. This analysis, which traditionally required weeks of consultant work, completes in hours with greater comprehensiveness.

Feasibility Prediction

AI-powered feasibility tools analyze historical project data to predict outcomes for proposed developments. By training on thousands of past projects, algorithms estimate construction costs, timeline risks, regulatory hurdles, and market viability with accuracy exceeding traditional methods. Neural networks identify patterns between project characteristics and success factors that human analysts miss.

Implementation: Input project parameters (size, type, location, budget, timeline) into AI estimating platforms. The system compares against its training dataset, flags high-risk factors, and provides probability distributions for cost and schedule outcomes rather than single-point estimates. This probabilistic approach enables better risk management from project inception.

Phase 2: *Design* Development

Generative Design

Generative design represents AI's most transformative impact on engineering. Engineers specify constraints and objectives: site boundaries, program requirements, budget limits, sustainability targets, structural performance criteria, and algorithms generate thousands of design alternatives optimized for multiple competing goals simultaneously.

How it works: Define your design space (what can vary) and evaluation criteria (what matters). The AI uses evolutionary algorithms, testing design variants, keeping successful features, discarding poor performers, and iterating thousands of times. For a commercial building, it might explore facade configurations balancing daylight, energy performance, views, structural efficiency, and cost, finding solutions human designers wouldn't conceive through manual iteration.

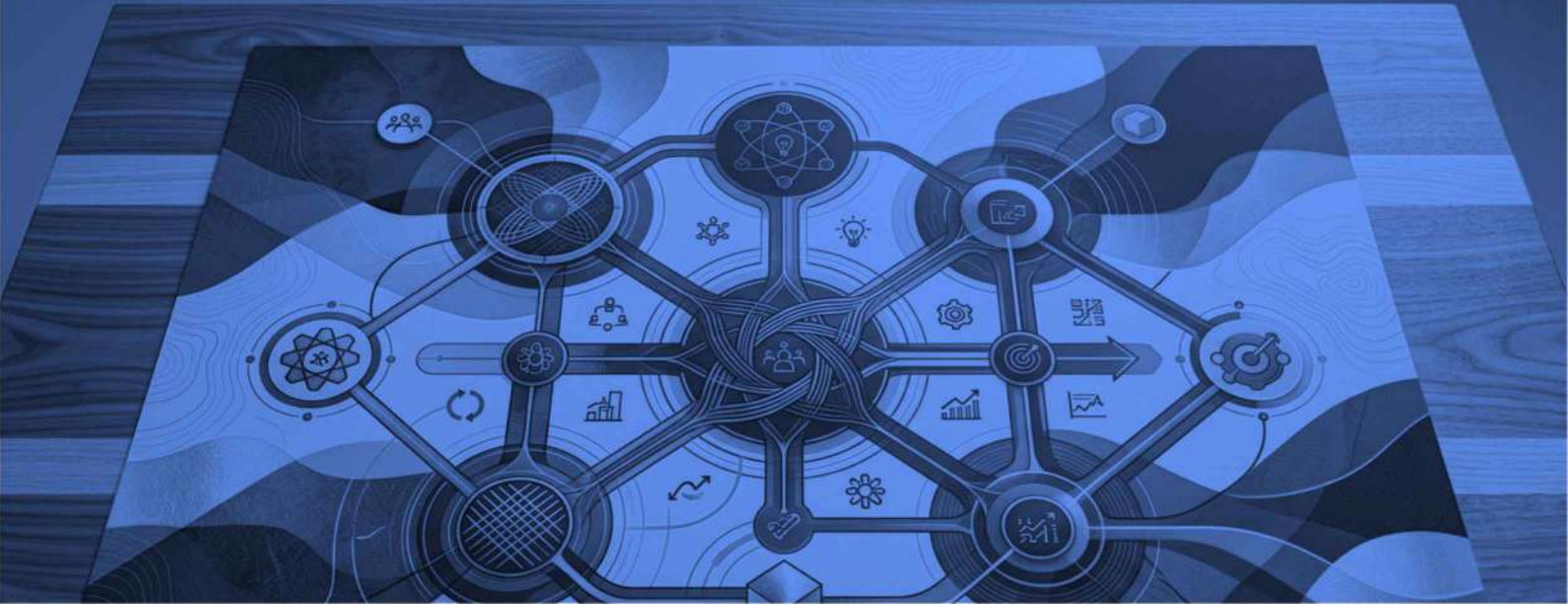
Tools: Autodesk Generative Design, Grasshopper with optimization plugins (Galapagos, Wallacei), Rhino.Compute, Spacemaker. These integrate with existing

BIM workflows, allowing engineers to explore radical alternatives while maintaining design control. The engineer sets objectives and constraints; AI explores the solution space.

Structural Optimization

AI-powered structural analysis optimizes member sizing, material selection, and load paths for minimum weight, cost, or embodied carbon while meeting all safety requirements. Topology optimization uses finite element analysis combined with machine learning to identify the most efficient material distribution for given loading conditions.

Implementation: Model your structure in software like ETABS, SAP2000, or Robot Structural Analysis. Apply AI optimization plugins that iterate structural configurations, testing each against code requirements. The system proposes steel reductions of 15-25% while maintaining or improving performance. For concrete structures, algorithms optimize rebar placement and concrete grades for minimum material with maximum strength.



Energy and Environmental Modeling

Machine learning accelerates energy simulation by training on millions of building energy models. Instead of running computationally expensive simulations for every design iteration, AI predicts energy performance based on building geometry, orientation, envelope properties, and systems. This enables real-time energy feedback during design rather than post-design verification.

Tools and workflow: Use DesignBuilder, IES-VE, or EnergyPlus for initial detailed simulations. Train AI models (or use pre-trained models from Autodesk Insight or Sefaira) on these results. During design iteration, AI provides instant energy predictions as you modify window sizes, shading, insulation, or orientation. When energy targets aren't met, AI suggests specific modifications most likely to improve performance.

Clash Detection and Coordination

AI enhances BIM clash detection by learning which conflicts matter and which are false positives. Traditional clash detection flags every geometric intersection; AI understands context, ignoring intentional overlaps, prioritizing critical clashes, and predicting constructability issues beyond pure geometry conflicts.

Implementation: After running standard clash detection in Navisworks or BIM 360, apply AI filtering to categorize issues by severity, suggest resolution strategies, and identify systemic coordination problems. Machine learning trained on resolved clashes recognizes patterns for instance, certain mechanical-structural conflicts always resolve by moving the duct, so AI prioritizes mechanical coordination earlier in design.

Phase 3: *Construction* **Execution**

Computer Vision for Progress Tracking

AI-powered computer vision analyzes photos and videos from construction sites, comparing actual conditions against BIM models to automatically calculate percentage complete for every building element. Drones or workers capture site imagery; neural networks trained on construction imagery identify completed work, match it to the digital model, and generate progress reports without manual input.

How to deploy: Install 360-degree cameras at fixed locations or use drones for weekly site captures. Upload imagery to platforms like OpenSpace, HoloBuilder, or StructionSite. The AI processes images, recognizes building elements, compares against BIM, and produces as-built documentation automatically. For scheduling, integrate with project management software, AI updates task completion percentages based on visual evidence rather than contractor self-reporting.

Quality Control and Defect Detection

Computer vision identifies construction defects: concrete cracks, improper rebar spacing, misaligned elements, finish quality issues. AI trained on thousands of defect images recognizes anomalies faster and more consistently than human inspectors. Thermal imaging combined with AI detects energy leaks, moisture intrusion, and installation problems invisible to visual inspection.

Technical implementation: Use high-resolution cameras or thermal sensors to document work. AI software analyzes imagery in real-time, flagging potential issues for human verification. For concrete, algorithms detect hairline cracks by analyzing pixel patterns. For MEP installation, computer vision verifies component placement matches shop drawings. Systems learn from inspector feedback, when humans confirm or reject AI-flagged issues, the model improves continuously.

Safety Monitoring

AI safety systems monitor construction sites continuously via cameras, detecting workers without required personal protective equipment, identifying unsafe behaviors (working at height without fall protection, proximity to hazardous equipment), and alerting supervisors in real-time. Computer vision recognizes hard hats, safety vests, harnesses, and guardrails, flagging violations before incidents occur.

Deployment: Install cameras covering high-risk zones, edges, excavations, heavy equipment areas. Connect to AI platforms like Smartvid.io or Vinnie that process video feeds continuously. When the system detects violations, it generates alerts to site supervisors' phones with photo evidence and location. Over time, the system learns site-specific hazards and provides predictive safety recommendations.

Predictive Scheduling

Machine learning analyzes schedule performance data, weather forecasts, material delivery tracking, and workforce availability to predict delays before they cascade. AI identifies critical path risks, recommends mitigation strategies, and automatically adjusts downstream activities when disruptions occur.

How it works: Feed historical project data (planned vs. actual durations, delay causes,

resource constraints) into scheduling AI. The system learns which task types overrun, which dependencies typically fail, and which external factors (weather, approvals, deliveries) create risk. For active projects, AI monitors progress and forecasts completion dates probabilistically, updating as conditions change. Integration with project management software (Primavera P6, Microsoft Project) enables automated schedule optimization.

Equipment and Resource Optimization

AI optimizes equipment deployment across multiple sites or within large projects. Algorithms analyze utilization patterns, predict demand, and recommend equipment moves to minimize idle time while ensuring availability when needed. For material logistics, machine learning predicts consumption rates and schedules deliveries for just-in-time arrival, reducing on-site storage requirements.

Implementation: Track equipment with GPS or RFID tags. Log usage in management systems. AI analyzes utilization data, identifies underutilized assets, and suggests reallocation. For materials, integrate procurement systems with installation tracking, when AI detects foundation concrete placement ahead of schedule, it automatically advances rebar delivery to prevent delays while avoiding excess inventory.

Phase 4:

Operations and **Maintenance**

Predictive Maintenance

This represents AI's highest-value operational application. IoT sensors continuously monitor equipment and structural systems; machine learning identifies patterns preceding failure. Vibration analysis detects bearing wear in rotating equipment. Thermal signatures reveal electrical connection degradation. Acoustic monitoring identifies pipe leaks weeks before surface evidence appears.

Technical approach: Install sensors measuring relevant parameters: temperature, vibration, current draw, pressure, flow rate, strain, displacement. Stream data to analytics platforms (AWS IoT, Azure IoT, or specialized CMMS with AI capabilities). Machine learning models trained on normal operation learn baseline patterns. Deviations trigger alerts ranked by urgency. The system recommends specific maintenance actions based on failure mode probabilities.

Example workflow: HVAC system pressure sensors detect gradual decline indicating filter clogging. AI predicts filter will reach critical

restriction in 11 days. System automatically generates work order for filter replacement scheduled during low-occupancy period. Maintenance happens proactively rather than reactively, preventing system failure and optimizing labor deployment.

Structural Health Monitoring

For critical infrastructure: bridges, high-rises, dams, embedded sensors continuously measure structural response to loads and environmental conditions. AI analyzes strain patterns, deflections, and vibrations to detect damage, degradation, or unusual behavior indicating structural distress. This shifts from scheduled inspection to continuous monitoring with immediate anomaly detection.

Implementation: During construction, install strain gauges, accelerometers, tilt sensors, and displacement monitors at critical locations. Connect to data acquisition systems feeding cloud-based analytics. AI establishes normal response baselines under various loading conditions (traffic, wind, temperature changes). When sensor readings deviate from

expected patterns, AI flags potential issues for engineering review. After seismic events, AI can assess building safety within minutes based on sensor data, determining occupancy risk faster than physical inspection.

Energy Management and Optimization

AI-powered building management systems learn occupancy patterns, weather influences, and equipment performance characteristics to optimize HVAC, lighting, and plug loads for minimum energy while maintaining comfort. Reinforcement learning algorithms discover control strategies human operators wouldn't program manually, achieving 20-40% energy reduction beyond conventional building automation.

How it works: Deploy smart thermostats, occupancy sensors, and utility meters throughout buildings. AI platforms (BrainBox AI, Building IQ, 75F) analyze data streams, predict occupancy and weather, and adjust systems proactively. The AI learns: 'Conference room typically fills at 2 PM Tuesdays, takes 20 minutes to cool adequately, so pre-cooling should start at 1:40 PM.' Or: 'When outdoor temperature exceeds 32°C, economizer mode becomes ineffective, switch to full mechanical cooling.' These micro-optimizations compound to significant savings.

Occupant Experience and Space Utilization

AI analyzes occupancy data to optimize space utilization in commercial buildings. Sensors and WiFi tracking (anonymized) show which spaces get used, when, and for how long. Machine learning identifies patterns enabling better space planning, meeting room allocation, and amenity placement. For large campuses, AI recommends consolidation or expansion based on actual usage rather than assumptions.

Implementation: Install occupancy sensors (PIR, CO2, desk booking systems) and integrate with space management software. AI analyzes utilization patterns, identifies underused areas, and suggests repurposing. For flexible workspace, algorithms predict demand and recommend booking policies maximizing utilization while ensuring availability. Smart apps allow occupants to report issues (temperature complaints, equipment failures); AI correlates these with sensor data to identify systematic problems.

Asset Lifecycle Management

AI optimizes long-term asset management by predicting remaining useful life for building systems and components. Instead of replacing equipment on fixed schedules, AI recommends replacement timing based on condition, performance trends, and economic analysis, balancing maintenance costs

against replacement costs and energy efficiency gains from newer equipment.

Approach: Maintain digital asset registry integrated with maintenance records, sensor data, and financial systems. AI analyzes failure rates, maintenance costs, and performance degradation to forecast optimal

replacement timing. For capital planning, algorithms generate multi-year renewal forecasts showing when major systems (roofs, chillers, elevators) will require replacement, enabling budget preparation and avoiding emergency replacements at premium cost.

AI Integration Principles for Success

Start With Data Infrastructure

AI requires data. Before deploying AI tools, ensure data collection infrastructure exists. For design AI, this means structured BIM models with consistent metadata. For construction AI, regular photo documentation and progress tracking. For operations AI, sensor networks and maintenance logs. Poor data quality produces poor AI results. Invest in data infrastructure first.

Integrate, Don't Isolate

AI tools work best when integrated into existing workflows rather than operating as separate systems. Choose platforms that connect with your BIM software, project management tools, and business systems. Data should flow automatically between systems. Manual data transfer between AI tools and primary software creates friction that undermines adoption.

Human-AI Collaboration

Deploy AI to augment human decision-making, not replace it. AI handles computational heavy lifting, pattern recognition, and optimization. Humans provide context, judgment, creativity, and accountability. The most effective implementation keeps humans in control while leveraging AI's computational advantages.

Continuous Learning

AI systems improve with use. When deploying predictive models, capture actual outcomes and feed them back to the system for retraining. This creates virtuous cycles where AI gets more accurate over time. Budget for ongoing model refinement, not just initial deployment.

Manage Change Carefully

AI adoption fails when organizational change management is neglected. Engineers need training not just on tools but on AI concepts, understanding how models work, when to trust AI recommendations, when to question them. Pilot AI on non-critical projects first. Demonstrate value before mandating adoption. Address job security concerns openly and honestly.

The *Intelligent* *Engineering* Practice

Integrating AI across the building lifecycle transforms engineering from a sequential, document-driven process to a continuous, data-driven operation. Design becomes exploration of vast possibility spaces. Construction becomes monitored, predictive, and adaptive. Operations shift from reactive maintenance to proactive optimization. The infrastructure becomes intelligent, monitoring itself, optimizing its own performance, and predicting its own needs.

This transformation is already underway. The tools described here exist today, proven in thousands of projects globally. The barriers to adoption are no longer technical, they're organizational, educational, and cultural. Engineers who master AI integration position themselves at the forefront of their profession. Those who resist find their skills increasingly obsolete.

The Future Engineer

The *Future* Engineer:

Skills,
Mindsets,
and Tools for
Tomorrow

Engineering the Future: What African Innovators Need to Lead the Next Decade

In 2015, you needed to know AutoCAD, understand structural codes, and have experience with concrete and steel. That skill set could carry an entire 40-year career.

In 2026, you still need those fundamentals. But now you also need to understand Building Information Modeling, work with AI design tools, interpret drone survey data, collaborate through cloud platforms, and design for carbon neutrality. The half-life of engineering skills has collapsed from decades to years.

By 2035, today's cutting-edge tools will be table stakes. The engineers who thrive won't be those who mastered 2025's technology, they'll be those who learned how to learn continuously, who embraced change rather than resisted it, and who positioned themselves at innovation's leading edge rather than trailing behind it.

This article provides the roadmap: the specific tools you should master now, the capabilities you'll need tomorrow, and the mindsets that will enable 30+ years of relevance in an accelerating profession. Whether you're a student planning your career or a veteran engineer adapting to disruption, this is your guide to engineering's future, and your place in it.

1. The *Innovation* Stack:

**7 Technologies Every African
Engineer Must Master by 2026**

These seven technology capabilities form the foundation of modern engineering practice. Mastering all seven positions you in the top 10% of African engineers. Mastering 3-4 makes you competitive. Having none increasingly makes you unemployable on major projects.

Technology 1:

Building *Information Modeling* (BIM)

What It Is:

3D modeling software that creates intelligent digital representations of buildings and infrastructure, with every component containing data about materials, costs, specifications, and relationships to other elements.

Why Essential:

BIM is becoming mandatory for government projects across Africa. Clients expect it. Competitors offer it. Without BIM capability, your firm loses bids regardless of technical expertise in other areas.

Tools to Learn:

Autodesk Revit (industry standard), ArchiCAD (alternative), or open-source options like FreeCAD and BlenderBIM for learning. Start with Revit, most employers require it.

Learning Path:

LinkedIn Learning or Coursera BIM fundamentals (20-30 hours), then practice by modeling a real project in 3D. Join BIM user groups in Accra, Nairobi, or Lagos for peer learning. Budget 3-6 months for competency.

Career Impact:

BIM coordinators earn 25-40% premium over traditional drafters. BIM managers on major projects command salaries competitive with senior engineers. Early proficiency = career acceleration.

Technology 2:

AI & Machine Learning Basics

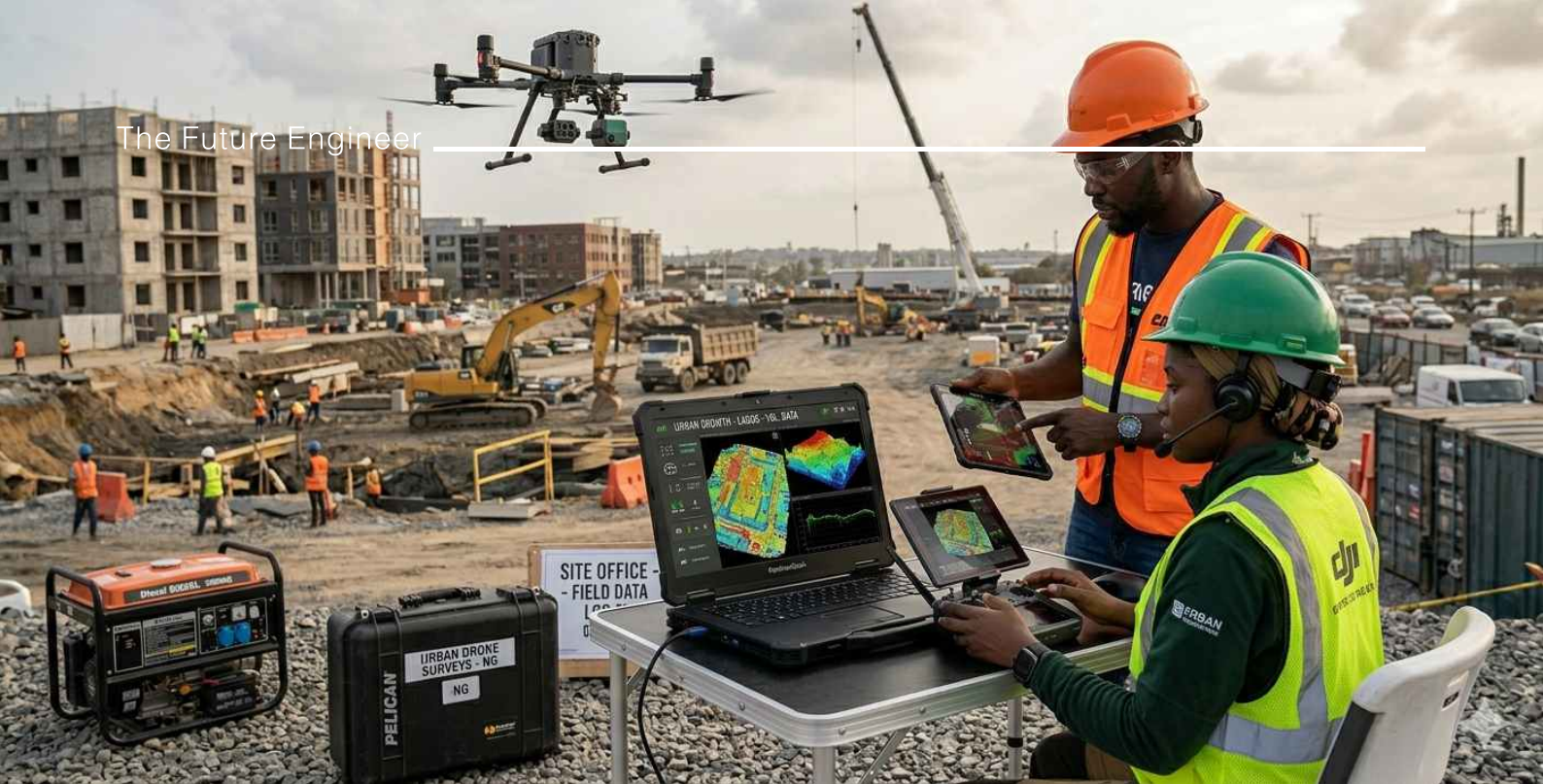
What It Is: Understanding how artificial intelligence works, how to use AI-powered engineering tools, and basic prompt engineering to work effectively with AI assistants like ChatGPT, Claude, and specialized engineering AIs.

Why Essential: AI increasingly assists (and sometimes replaces) routine engineering calculations, design iterations, and documentation. Engineers who use AI multiply their productivity. Those who don't fall behind.

Tools to Learn: ChatGPT/Claude for general assistance, Spacemaker for site optimization, TestFit for building layouts, various structural optimization plugins. Python basics help but aren't essential, many tools are no-code.

Learning Path: Start using ChatGPT/Claude daily for engineering questions, code generation, calculation checking. Take a basic AI course (Andrew Ng's AI for Everyone is excellent). Experiment with engineering-specific AI tools on real projects.

Career Impact: Engineers proficient with AI tools complete designs 30-50% faster with better optimization. This isn't future speculation, it's happening now. Early adopters gain competitive edge in quality and speed.



Technology 3:

Drone Operations & Data Processing

What It Is: Piloting drones for site surveys, capturing aerial imagery, and processing photogrammetry data into accurate 3D models, topographic maps, and volumetric measurements.

Why Essential: Drone surveys cost 80% less and complete 90% faster than traditional methods. Any surveying or monitoring work without drones is obsolete. Clients expect drone deliverables.

Tools to Learn: DJI drones (Phantom 4 RTK or Mavic 3 Enterprise for professionals), PIX4D or Drone Deploy for processing, basics of photogrammetry and ground control points.

Learning Path: Obtain Remote Pilot License (requirements vary by country, check your aviation authority). Take online photogrammetry course. Practice on small sites before bidding commercial work. Partner with experienced operators initially.

Career Impact: Drone capability transforms surveying businesses from labor-intensive to technology-enabled, allowing small firms to compete with large ones. Creates new service lines (monthly progress monitoring, asset inspection).



Technology 4:

IoT & Sensor Networks

What It Is: Internet of Things sensors that monitor infrastructure conditions, collect performance data, and enable predictive maintenance through continuous measurement of strain, temperature, vibration, and other parameters.

Why Essential: Smart infrastructure is the future, buildings and systems that monitor themselves, predict failures, and optimize performance automatically. Understanding sensor deployment and data interpretation becomes core engineering competency.

Tools to Learn: Basic electronics (Arduino/Raspberry Pi for experimentation), sensor types and applications, wireless

communication protocols, data visualization platforms (Grafana, ThingSpeak), and fundamentals of data interpretation.

Learning Path: Start with simple Arduino projects (temperature monitoring, vibration detection). Progress to commercial sensor systems. Focus on application rather than building sensors yourself, understand what's possible and how to specify, deploy, and interpret results.

Career Impact: Structural health monitoring is a growing specialty. Engineers who understand sensors can offer value-added services beyond traditional design, ongoing monitoring contracts generate recurring revenue.



Technology 5:

Parametric & Generative Design

What It Is: Algorithmic design where you define rules and parameters, then software generates thousands of design alternatives automatically, optimizing for multiple objectives simultaneously.

Why Essential: Parametric design enables mass customization and optimization impossible through manual methods. It's becoming standard for complex projects where performance matters, stadiums, towers, bridges.

Tools to Learn: Grasshopper (Rhino plugin), Dynamo (Revit plugin), or web-based tools like Spacemaker. Focus on tools that integrate with software you already use.

Learning Path: Parametric thinking differs from traditional design, it's more programming than drawing. Take structured courses (many free on YouTube), practice by recreating existing designs parametrically, then apply to actual projects. Budget 6-12 months for fluency.

Career Impact: Parametric specialists are in high demand for complex projects. This skill differentiates you from traditional engineers, fewer competitors, higher rates, more interesting work.



Technology 6:

Digital *Project Management* Platforms

What It Is: Cloud-based collaboration platforms that centralize project documentation, track progress, manage communications, and provide real-time visibility into project status for all stakeholders.

Why Essential: Modern projects involve distributed teams, diaspora consultants, international partners, multiple contractors. Email and WhatsApp don't scale. Professional platforms become necessary as projects increase in complexity.

Tools to Learn: Procore (construction-specific), Autodesk BIM 360 (BIM-integrated), Microsoft Project (traditional PM), or Asana/Monday (general collaboration). Pick one platform and master it thoroughly.

Learning Path: Most platforms offer free trials and tutorials. Start using one on a pilot project even if the client doesn't require it. The workflow discipline and documentation quality improvements quickly justify the cost and learning time.

Career Impact: Project managers proficient with digital platforms get promoted faster, they deliver projects more reliably. For consultants, offering digital project management becomes a service differentiator clients value.



Technology 7:

Sustainable Design Software

What It Is: Software for energy modeling, carbon calculation, lifecycle assessment, daylighting analysis, and green building certification, tools that quantify environmental performance and guide sustainable design decisions.

Why Essential: Net-zero carbon requirements are becoming mandatory. Clients demand sustainability metrics. Green building certification (LEED, EDGE, Green Star) requires quantitative analysis. You can't design sustainable buildings without measurement tools.

Tools to Learn: DesignBuilder or IES-VE for energy modeling, One Click LCA for carbon assessment, EDGE software for green building certification. Many have free versions or educational licenses.

Learning Path: Take courses in sustainable design principles first, tools follow concepts. EDGE certification training is free and excellent. Practice by analyzing existing buildings before designing new ones.

Career Impact: Sustainability specialists command premium fees and work on the most innovative projects. As carbon regulations tighten globally, this expertise shifts from niche to mainstream, early practitioners position themselves as experts.

2. *Beyond* Automation:

How AI Makes African Infrastructure Smarter, Not Just Faster

The common fear: AI will replace engineers. The reality: AI augments engineers who embrace it and replaces those who don't. Understanding this distinction determines whether AI becomes your competitive advantage or existential threat.

AI excels at tasks requiring pattern recognition across massive datasets, optimization with multiple competing objectives, and tireless iteration without fatigue. It processes thousands of design alternatives in minutes, analyzes historical project data to predict outcomes, and monitors infrastructure continuously without breaks.

Humans excel at understanding context, making judgment calls with incomplete information, navigating stakeholder politics, creative problem-solving for novel challenges, and ethical decision-making balancing competing values. We understand what problems matter, interpret AI outputs through practical wisdom, and adapt solutions to local constraints.

The future belongs to engineer-AI partnerships where each does what they do best. You provide strategic direction, contextual understanding, and creative vision. AI provides computational power, pattern recognition, and optimization. Together, you achieve results neither could accomplish alone.

What This Means Practically:

Don't fear AI taking your job. Fear competitors using AI to outperform you.

Invest time learning AI tools now. The learning curve isn't steep, but the competitive advantage compounds over time.

Focus on developing uniquely human skills AI can't replicate: client relationships, creative problem-solving, strategic thinking, leadership.

Position yourself as the engineer who augments human expertise with AI capability, this hybrid competency defines the next generation of engineering leadership.

AI doesn't make engineers obsolete, it makes mediocre engineering obsolete. Excellence

has always required continuous learning. AI just accelerates the cadence. Engineers who thrive treat AI as a tool amplifying their capabilities, not a competitor threatening their livelihood.

3. Innovation *you can* Touch:

Integrating Innovation into Engineering Practice

Knowing what tools to learn is the easy part. Actually integrating them into daily practice while maintaining productivity on current projects, that's the challenge most engineers face. Here's the proven roadmap:

The Pilot Project Approach

Never attempt innovation on critical-path projects with tight deadlines. Start with smaller, lower-risk projects where experimentation is acceptable. Use one new tool per project, don't try to revolutionize everything simultaneously.

For example: Use BIM on a small residential project while continuing AutoCAD for major commercial work. Deploy drones on one survey while conventional methods continue for others. This reduces risk while building competency and demonstrating value before scaling adoption.

The Learning Time Investment

Allocate dedicated learning time, treat it as professional development, not optional extra.

Successful adopters typically invest:

- 3-5 hours weekly for 8-12 weeks to gain basic competency in a new tool
- 30-60 minutes daily using AI assistants to build fluency through practice
- One project (start to finish) applying new capability to cement learning
- Peer learning through user groups or communities (often more valuable than formal courses)

This isn't fast, but it's sustainable. Engineers who try to learn everything at once burn out. Those who progress incrementally build lasting capability.

Accessing Resources on a Budget

Innovation doesn't require unlimited budgets. Many powerful tools offer free or affordable access:

Free/Educational Software: Autodesk offers free education licenses for BIM software; BlenderBIM provides open-source BIM; FreeCAD serves parametric design; many AI tools have generous free tiers.

Online Learning: Coursera, edX, LinkedIn Learning offer courses for \$30-50/month or free with financial aid; YouTube provides countless tutorials; manufacturer training (EDGE, Autodesk) is often free.

Hardware: Entry-level drones start at \$400-800; laptops capable of BIM begin around \$800-1000; cloud computing provides powerful processing without expensive workstations.

Communities: Innovation hubs in Accra, Nairobi, Lagos, etc. provide free access to equipment and training; online communities (forums, Discord servers) offer peer support; FIDIC and professional bodies host workshops.

Cost is a real constraint but rarely the binding constraint. More often, it's commitment, time, and willingness to step outside comfort zones. Engineers spend thousands on site vehicles but hesitate to invest hundreds in software training, prioritization matters more than absolute resources.

Measuring and Demonstrating Value

Track metrics that prove innovation's value:

- Time savings: how much faster projects complete
- Error reduction: fewer RFIs, change orders, rework
- Cost improvements: material optimization, waste reduction
- Client satisfaction: feedback, repeat business rates
- Competitive wins: bids won because of innovation capability

Quantified results convince skeptical colleagues, justify investment to management, and differentiate your services to clients. Without measurement, innovation feels like expensive experimentation. With data, it becomes strategic advantage.

The engineers succeeding with innovation aren't special, they're systematic. They start small, learn continuously, measure results, and scale what works. This disciplined approach transforms innovation from aspiration to operation.

4. *The LEGO* Principle:

Modular Construction's African Future

Imagine building construction like assembling LEGO: standardized components manufactured in controlled environments, transported to sites, and assembled quickly with minimal skilled labor. This isn't imagination, it's modular construction, and it's transforming how Africa builds.

Modular construction addresses Africa's specific challenges brilliantly. Skilled labor shortages matter less when complexity shifts to factories. Weather delays become minor since most work happens indoors. Quality improves through factory processes and inspection. Speed increases dramatically, buildings weeks instead of months.

African pioneers are proving the model works. Modular housing in Lagos achieves 60% time reduction and 30% cost savings versus conventional construction. Healthcare

facilities in Rwanda deploy in 90 days using prefabricated modules. Kenyan developers build affordable housing at scale through industrialized production.

For engineers, modular construction means different skills: more manufacturing engineering, stricter tolerances, logistics coordination. Design for manufacturing and assembly becomes critical—components must be shippable, assemblable, and maintain quality through transport and installation.

The LEGO principle, standardization enabling infinite variation through combination solves Africa's housing crisis more effectively than conventional building ever will. Learning modular design positions engineers for this inevitable transition. The question isn't whether Africa goes modular, but whether you'll lead or follow that shift.

5. *Vision* 2050:

What African Infrastructure Will Look Like in 25 Years

Extrapolating current trajectories reveals a future that seems fantastic but is grounded in technologies already emerging. This isn't science fiction, it's an informed projection of innovations currently in pilot deployment reaching maturity and scale.

2030

The Digital Mainstream (5 years)

BIM becomes mandatory for all government projects across Africa, with 80%+ adoption in major urban centers. AI design tools are standard, young engineers learn with AI from day one rather than treating it as advanced capability. Digital twins exist for all critical infrastructure in major cities. Drone surveys completely replace traditional methods for routine work. Mobile-first project management is universal. 5G connectivity enables real-time collaboration across continents seamlessly.

2040

The Autonomous Transition (15 years)

Construction robotics become common for repetitive tasks: bricklaying robots, autonomous compaction equipment, 3D printing of building components on-site. AI handles routine structural calculations and design optimization, with human oversight for complex decisions. Modular construction dominates affordable housing and commercial development. Carbon-negative construction becomes standard through bio-based materials and carbon-sequestering concrete. African engineering firms lead globally in sustainable infrastructure innovation.

2050

The Intelligent Infrastructure Era (25 years)

Infrastructure is fully intelligent, self-monitoring, self-optimizing, and increasingly self-repairing. Buildings adjust their own operation based on occupancy, weather, and grid conditions. Roads report their own condition and schedule their own maintenance. Water systems detect and repair their own leaks autonomously. Engineering becomes increasingly about system orchestration rather than individual component design.

African universities produce the world's most innovation-capable engineers, trained from day one in AI-augmented design, sustainable practices, and modular construction. 'The African Model' of infrastructure development: digital-native, sustainability-first, intelligence-embedded, becomes global best practice that developed nations study and adopt.

Your *Path* *Through* **This** *Future*

If you're 25 today, you'll practice through this entire transformation. If you're 45, you'll navigate the 2030 and 2040 transitions. The skills you build now determine whether you lead these changes, adapt to them, or get displaced by them. The choice and the timeline are clear.

This future isn't predetermined, it's being built by engineers making choices today. The infrastructure of 2050 reflects decisions about what tools to learn, what standards to establish, and what vision to pursue. You're not observing this future's creation. You're participating in it.

Your *Innovation Journey Starts* Now

This magazine has shown you the imperative (why innovation is essential), the evidence (what's working in Ghana and across Africa), the intelligence (how AI transforms infrastructure), and the roadmap (what tools and skills you need). Everything you need to succeed is accessible: tools exist, knowledge is available, examples are proven.

What's missing isn't resources or capability. What's missing is your decision to start. Not someday. Not when conditions are perfect.

Now this week, with the next project, using one tool on one task.

The engineers profiled throughout this magazine, the BIM champion, the drone pioneer, the AI adopter, the mobile-first manager all started exactly where you are now: knowing change was necessary, uncertain about the path, but willing to begin. They learned through doing, failed through trying, and succeeded through persistence.

Your *90-Day Action Plan:*

Week 1:

Choose one tool from the Innovation Stack that addresses your biggest current challenge. Sign up for introductory course.

Weeks 2-8:

Complete course while continuing normal work. Practice on small personal projects. Join online community for that tool.

Weeks 9-12:

Apply new skill to one pilot project. Track results: time saved, errors avoided, quality improved. Document lessons learned.

Day 91:

Decide whether to scale this innovation or add a second tool. Either way, you're no longer the engineer who talked about innovation, you're the engineer practicing it.

Africa's infrastructure future isn't being built in European offices or American universities. It's being built in Accra and Nairobi, Lagos and Johannesburg, Kigali and Casablanca by engineers like you choosing innovation over inertia.

The future engineer isn't defined by age, credentials, or years of experience. The future engineer is defined by continuous learning, technological fluency, and commitment to innovation.

The future is being built. *The question is: are you building it?*



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Talk to us today !

Q&A *with* Chair of the FIDIC Africa *Future Leader*

– Pauline Phiri



Q1.

Please introduce yourself and tell us about your role within the FIDIC Africa Future Leaders.

I am Pauline Phiri, a Civil Engineer from Zambia with over 10 years combined experience in the road construction and water supply and sanitation sectors in areas of feasibility studies, cost management, measurement engineering and contract administration. Currently serving as Chairperson of the FIDIC Africa Future Leaders, my role is to ensure that Future Leader (FL) activities and initiatives are effectively managed and aligned with the strategic priorities of FIDIC Africa. This includes promoting the active participation of FLs in conversations that shape the industry, fostering continental collaboration, knowledge exchange, and leadership development of FLs as the talent pipeline of the consulting engineering industry.

Future-ready infrastructure is not just about building for today but, it is about designing infrastructure systems that can adapt, and evolve with the future. As populations grow, climates change and technologies evolve, our infrastructure should effectively serve our communities and allow us to plan better, monitor performance, and adapt to changing social, economic, and environmental needs.

Q2.

As Chairperson of the FIDIC Africa Future Leaders, what does the idea of “future-ready infrastructure” mean to you?

Q3.

Why is it important that young professionals play an active role in shaping Africa's infrastructure future?

Young professionals are not just the future custodians of infrastructure, and if Africa's burgeoning youth population is anything to go by, it undoubtedly shows us that we have to be active contributors to shaping the way we design it today. Our superpower is that we are more connected to emerging technologies and new ways of working. The onus is therefore on us to bring fresh perspectives to influence decision-making and provide forward-thinking solutions to present and future infrastructure challenges. Our input is vital because we will ultimately be responsible for maintaining and advancing Africa's infrastructure in the future.

With digital innovation, we are no longer just building infrastructure — we're making it think, adapt, and work smarter for Africa's future. With digital modelling tools, predictive analytics, and real-time monitoring technologies, we are able to anticipate challenges (which is good for planning), make data-driven decisions (which helps us to make faster, more informed decisions) and this increases our service delivery and maintenance coverage (which is a maximum use of limited resources). This allows engineers to move from reactive problem-solving to predictive and smarter infrastructure planning. The impact is a reduction in project delays and maintenance costs, and the design of adaptable infrastructure that is quickly responsive to the needs of communities.

Q4.

In your view, how can AI and digital technologies transform the way infrastructure is planned, designed and delivered in Africa?

Q5.

From a Zambian perspective, which sectors or challenges could benefit most from digital innovation?

I would describe Zambia as a country with increasing urbanisation, and a rising demand for improved public services and economic opportunities. Like many developing countries, Zambia continues to face infrastructure gaps, particularly in areas such as water supply, energy access, waste management, and transport connectivity. These challenges, combined with the increasing demand for efficient services, present significant opportunities for digital innovation. Smart monitoring systems, improved data management, and digital planning tools can help optimise the limited resources to improve service delivery, reduce losses, and make infrastructure systems more reliable.

I would say that innovation is what makes sustainability achievable. Through innovation, we adopt tools, technologies and advanced methods to build resilient infrastructure. By applying sustainability principles in our execution, we ensure that our solutions protect and optimise available resources, are environmentally responsible, and benefit the community in the long term. A typical example to demonstrate this synergy would be a smart water network in which digital sensors and monitoring systems are installed to enable engineers to detect leaks instantly, predict maintenance needs, and manage water flow efficiently. This use of technology (innovation) reduces water wastage, lowers repair costs, and extends the lifespan of infrastructure, while the resulting resource savings, efficiency, and resilience (sustainability) ensure long-term benefits for the communities, environment and the utility companies

Q6.

How do innovation and sustainability complement each other in delivering long-term infrastructure solutions?

Q7.

What new skills and mindsets will African engineers need to thrive in an increasingly digital and sustainability-driven industry?

The engineer of the future will need to combine technical expertise with technology, data and sustainability to design practical, responsive solutions. On the technical side, strong digital competencies—including data literacy, AI, and digital modelling—will be essential for designing, planning, and managing modern projects. Equally important are soft skills such as adaptability, collaboration, continuous learning, and openness to new ideas, which enable engineers to apply these technologies effectively real-world situations. Ultimately, these tools can enhance outcomes, but the quality of infrastructure solutions depends on the principles, judgment, and creativity engineers bring to the process.

The FIDIC Africa FL group creates opportunities for FLs to contribute meaningfully to digital transformation by exposing them to emerging industry trends in infrastructure delivery through knowledge-sharing platforms, discussions, and leadership opportunities. There is a capacity development FL sub-committee specifically dedicated to the career progression and professional development of FLs. Practical skills sessions, mentorship and FL showcase sessions have been scheduled for the year to not only build on skills, but to demonstrate examples of how FLs are implementing solutions to Africa's infrastructure challenges. Our goal is to empower young professionals to actively engage in the industry, learn from experience, and build on those lessons to shape its future.

Q8.

How is the FIDIC Africa Future Leaders group helping to prepare young professionals for this transition?

Q9.

What message would you like to share with young engineers across Africa about their role in building future-ready infrastructure?

The youth make up the majority of Africa's population, which means, young engineers will need to be stewards of the next generation of infrastructure - our contribution is no longer optional! To do this, we must continuously upskill, and design with the end user in mind. Our solutions need to be adaptable and this means we need to take action, learn from feedback as we go and continuously improve our outputs. The more we step up and apply ourselves, the more confident we become, and the greater our impact is on the African landscape.

Success during my tenure as President of the FIDIC Africa Future Leaders would mean seeing more young professionals voluntarily stepping up to drive industry conversations that translate into actionable strategies under FIDIC Africa. It would also mean fostering cross-country collaborations, promoting knowledge translation, and open information sharing. My ultimate goal is to build a confident, trusted, and forward-thinking community of young consulting engineering professionals who are shaping the future of Africa's infrastructure even beyond my tenure.

Q10.

Finally, what would success look like for you during your tenure as President of the FIDIC Africa Future Leaders?

Interview

Featured Perspective From Construct Africa

**Engineer Christopher
Campbell, CESA**

The following article, originally published in Construct Africa, provides important context on the issues plaguing the South African Construction Sector

As an optimist, Engineer Christopher Campbell is bullish on the future of South Africa's currently ailing infrastructure sector

“To coin the phrase often cited by our minister of public works and infrastructure [Dean Macpherson], we should be turning South Africa into one big construction site, especially since it is viewed by most as the gateway to the African economy,” says Campbell, who is the CEO of Consulting Engineers South Africa (CESA), a voluntary association of consulting engineering firms established in 1952.

The CEO has a bevy of designations, including being an executive council member of South Africa's Construction Sector Charter Council, vice-president and chair of the Committee on Engineering Capacity Building of the World Federation of Engineering Organisations (WFEO) as well as chair of the Directors and Secretaries Advisory Council (DNSAC) of the International Federation of Consulting Engineers (FIDIC). Consequently, he is well aware of the potential of South Africa's construction industry as well as the challenges it needs to surmount.

“South Africa, along with other major economies on the African continent, is an integral element in the overall growth of our continent and cannot therefore afford to continue on the trajectory [on which] it currently finds itself,” says Campbell.

On the issues dragging the country's construction sector down, he says there are many factors hampering “what was once a world-class provider of construction services locally and globally”.

“Many [South African contractors] have been forced into almost non-existence [due to] large

contractual liabilities in overseas markets, diminishing local markets and significantly decreased investment in gross fixed capital formation in South Africa – [this has] reduced from an average of Rand 350 billion [US\$19.8 billion] in 2005 to Rand 220 billion in 2024, an almost 40% reduction (notably annualised against 2015 prices). [But] in fact, the investment should have been in the opposite direction to [tackle the country's] aging, under-maintained and under-capacity infrastructure to service a growing population of over 60 million citizens and immigrants from other parts of the continent.

“The fact the South African economy has not grown beyond 1% over several years, owing to political and policy uncertainty as well as corruption, has not helped encourage large-scale private sector and international investment. The biggest challenges at the moment would be that of addressing the impact of global criminal syndicates operating in South Africa, [the] adversarial global geopolitical climate, and [the absence of] a stable political [environment].

“Coalition governments are a new phenomenon and more maturity will be required for political parties in such alliances to be more focused on service delivery, infrastructure maintenance and development at local government levels as opposed to the partisan influences, and sometimes even personal interests, of such political actors, which is currently the state of play, especially with a local government election looming in 2026.

“At national government levels, too, despite the [formation] of the current coalition government as a Government of National Unity (GNU) ... much has to be learnt from other countries on attaining alignment between parties in such arrangements, which will serve the national interest first. Policy uncertainty and legislative misalignment discourages investment both locally and internationally.

“Despite the huge opportunities and the demand for functional and modern infrastructure, the South African fiscus alone will not be able to fund the many backlogs currently being experienced,” says Campbell.

On the skills shortage and aggressive fee discounting plaguing the construction and engineering industry in South Africa, Campbell notes that “engineering skills in the civil, mechanical and electrical fields are among the 10 scarcest skills in South Africa, according to figures published by our own Ministry of Labour and Employment”.

“In comparison with other developed countries, South Africa has about 1 engineer per 3,000 people, versus developed countries, which boast 1 engineer for every 200 people, according to earlier studies and compared to recent figures,” he says.

“The shortage is, to a large extent, within local government departments and municipalities as well as in various other spheres of government. This means public infrastructure upgrades and maintenance lack sufficient management capacity, which is exacerbated

by the onerous bidding processes that precede such projects.

“[Due to] insufficient opportunities, many younger engineers are migrating to other countries where they find more secure employment and ongoing developments [that match] their expertise. Additionally, there is also an aging workforce of seasoned engineering practitioners, some still active well into their 70s, while the cadre that should have been in a position to have been mentored by these aging practitioners are not as large in number as what is required.

“Additionally, the lack of appreciation for the value that engineering practitioners create for any society negatively impacts the potential remuneration that growing practitioners can command. Sadly, both private and public sector clients treat these professional services as a commodity and, when project bids are finalised, these [services] often come with a requirement for massive discounts, which in turn reduce the fee earnings required for a sustainable consulting engineering industry and the retention of such engineering skills. We often see many engineers joining the financial services sector where their skills are better appreciated and the financial rewards are more attractive.

“South Africa, much like many other countries, has a mixture of engineers, technologists and technicians,” says Campbell. “However, there is a greater tendency for high school graduates to pursue the latter two categories of engineering studies, which limits the number of engineers and creates an imbalance

between the various categories of engineering practitioners we need as a country.”

The CEO also notes that the South African construction industry is susceptible to rampant corruption.

“Not only do we find anomalies related to overpricing and under-delivery (if any delivery at all), the industry is also plagued by extortionists masquerading as business forums, claiming to be representative of communities who are aggrieved about not securing employment and business opportunities when projects are being executed in their localities,” he says.

“The absence of local economic development and implementation fuels the expectation that any temporary construction activity in the immediate neighbourhood should be wholly beneficial to local communities, whereas construction companies who secure these bids are not necessarily domiciled in any one location and subsequently require their core management team and reliable sub-contractors as part of these projects before they source any local sub-contractors (if these are available), to ensure effective and efficient project delivery. Where this balance is created, the projects progress well.

“The opportunism exercised by extortionist groups, known locally as the 'construction mafia', generally have no interest in adding value to these projects and are simply rent-seeking. Sadly, our local law enforcement agencies are still battling this scourge and do

not seem to be gaining control over such criminality.”

On Africa as a whole, Campbell says: “African governments need to be more focused on changing the narrative that may [stem from] a colonial school of thought, which inculcates a negative self-belief in our ability as Africans to be able to survive and thrive through trade and not aid.

“We have the human capital, especially our younger generation, we have the mineral resources and, by now, have certainly regained the intellectual prowess that was likely decimated centuries ago, when places such as Timbuktu, Mali, in the 15th and 16th centuries were recognised as centres of trade and learning. There are many world-class educational institutions around the continent and many African students often tend to obtain degrees in other countries as well.

“What we need is the eradication of corruption; ... we need stable, well-managed governments developing and implementing good policy and providing political certainty. We need these attributes to instill confidence in external investment, which, in turn, should be focused on infrastructure, both economic and social, so that economies can grow and unemployment can be significantly reduced, with [fewer] people falling victim to poverty.

“It is unfortunate that many of our African leaders do well initially and grow investment through infrastructure development and then appear to undo the good they have done by remaining in office when they no longer have

the initial drive and energy to continue what they had started. Good legacies unfortunately then become undone.”

The CEO opines that localisation should not be an option, “it should be a given as it is the only way in which we are going to afford local engineering practitioners the appropriate exposure and experience to drive such projects in the future.”

“International expertise is always welcome,” says Campbell. “However, we need to be developing the capacity locally so that we have local construction industries that are able to deliver on future projects as well as support governments that are the owners and custodian of such infrastructure and that are responsible for the lifecycle management of such infrastructure.

“Designs, material and technology choices must be appropriate to local conditions so there are no inherent challenges in obtaining compatible repair and maintenance components. This is especially true for infrastructure of a mechanical and electrical type. However, this could also apply to the difficulty in obtaining replacement components for water distribution systems, where sizes of pipes and components might have been according to imperial measurement systems in the past but now are only available in metric measurement systems.

“Procurement philosophy should be part of the turnkey approach so that local infrastructure [is developed] with long-term effective and efficient asset ownership in mind.”

With South Africa said to be the most industrialised, technologically advanced and diversified economy in Africa, Campbell says the country must act now to reverse its misfortunes.

“Infrastructure development in South Africa has always been viewed as an example of what all infrastructure developments on our continent should resemble,” he says.

“South Africa needs to turn the tide on all of its failing infrastructure areas, so that it does not resemble the state of many of our neighbouring countries, following their own liberation struggles in a post-colonial era.”

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When **Expertise** Is *Not* *Enough*

How AI Is *Changing*
Authority for Infrastructure
Leaders



Artificial intelligence is changing how we design and deliver infrastructure, and it is changing how professional authority is built, recognized, and sustained. For senior engineers and infrastructure leaders across Africa, understanding that shift is not a matter of reputation management. It is a matter of strategic positioning in a window that is already narrowing

A New Variable in Professional Credibility

For most of their careers, senior engineers and infrastructure executives have operated on a well-established model of professional authority. Credibility accrued through project delivery, institutional affiliation, peer referral, and sustained participation in bodies like FIDIC. The room you earned your way into gave you access to the next one. Reputation was a closed-circuit system, built inside professional networks and validated by peers who shared the same context.

That model remains operative. What has changed is that it now runs alongside a second system, one that operates at a different speed, at global scale, and by different rules entirely. The 2024 Edelman-LinkedIn B2B Thought Leadership Impact Report, which surveyed 3,484 management-level professionals across seven countries, found that 73% of decision-makers now consider an organization's thought leadership a more trustworthy basis for assessing capabilities than its formal marketing materials or credentials presentations.

The same study found that 75% of C-suite executives and senior buyers said a piece of thought leadership had led them to research a product or service they had not previously considered. The evaluation no longer begins at first contact. It begins at first search, and what decision-makers find in that process shapes the framing every subsequent conversation inherits.

For professionals whose expertise has been built inside institutional networks, this creates a structural gap that credentials alone cannot close.

What AI Is Changing?

The rise of AI-assisted research has not introduced this dynamic. It has accelerated it in ways that demand direct examination.

Decision-makers are using large language models and AI research tools to evaluate potential advisors, shortlist panelists, and identify expert sources. These tools synthesize publicly available information, articles, interviews, published frameworks, conference contributions, into a working professional profile.

The output reflects the input. A professional with an attributable body of public thinking surfaces right away. A professional whose expertise lives inside closed systems does not surface at all, regardless of the depth of that expertise.

There is a second dimension with longer-term strategic significance. Peer-reviewed

research from Princeton University, published in the KDD 2024 proceedings under the title "GEO: Generative Engine Optimization," found that content documentation directly shapes what AI systems surface and cite, and that this effect reinforces itself over time.

The practitioners whose ideas appear when a procurement director asks about risk allocation in climate-exposed infrastructure contracts, or when a journalist queries sustainable financing frameworks in emerging markets, are not necessarily the most experienced professionals in those fields. They are the most documented ones.

This is the mechanism most infrastructure executives have not yet built into their strategic thinking. AI is not simply reflecting existing professional authority. It is beginning to construct it.

The Specific Opportunity for African Infrastructure Leadership

This shift carries significance for professionals operating across the African continent, and it presents a strategic opening with no equivalent in the current global infrastructure discourse.

The expertise concentrated within organizations like FIDIC Africa is, by any serious measure, among the most relevant in the world right now. The infrastructure challenges being navigated across the continent, constrained financing environments, climate adaptation at scale, local content policy frameworks, urbanization pressures that outpace historical precedents elsewhere, are not peripheral concerns within the global infrastructure agenda. They are its defining questions for the next three decades. Yet the global discourse on those questions remains anchored in institutions based in Europe and North America. Frameworks are imported. Intellectual reference points are

established by voices that often have less direct operational experience of the conditions they are describing. This is not a permanent feature of the landscape. It is an open position, and it will be occupied by whoever moves to fill it.

The window is narrowing. The Princeton research indicates that AI citation authority is path-dependent: early documentation shapes what gets cited, what gets cited shapes what gets indexed, and what gets indexed shapes what gets surfaced. The professionals who establish an attributable public record of high-integrity thinking in the next two to three years will be positioned as the reference points for the decade that follows.

Three Principles for Building Legacy

For senior infrastructure leaders, repositioning professional credibility in the current environment is not a communications exercise. It is a strategic one, and it benefits from the same rigor applied to any long-horizon infrastructure problem.

Three principles define the approach that produces results.

First, specificity over scope. The professionals who build the strongest authority records do not attempt to be present across every topic in their domain. They identify the two or three areas where their operational experience is differentiated, where they have built frameworks through lived practice that no generalist can replicate, and they make that thinking publicly accessible.

Second, attribution over volume. A single well-argued article in a credible publication carries more indexable authority than a high volume of unattributed commentary. The Edelman-LinkedIn data is unambiguous on this point: decision-makers are not looking for prolific content producers. They are looking for

specific, verifiable, expert-driven insight. The goal is a body of work that is searchable, citable, and connected to the individual's professional identity.

Third, platforms that travel. A contribution to a well-known publication reaches readers the author will never meet, in contexts the author cannot predict, and continues working long after the publication date. A conference session, a fireside conversation, a quoted perspective in an industry report, each extends professional reach beyond the boundaries of any network, calendar, or geography.

These three practices produce what no credentials database can replicate: a public record of thinking that precedes the professional into every room, including the rooms that form before anyone picks up the phone.

The authority infrastructure of the next decade in global infrastructure leadership is being built right now. The only question is who is building it.

Sources

Edelman and LinkedIn. 2024 B2B Thought Leadership Impact Report: Reaching Beyond the Ready. Survey of 3,484 management-level professionals, seven countries. Released February 2024.

Aggarwal, Pranjal, et al. "GEO: Generative Engine Optimization." Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2024). Princeton University.

From **Boardroom** to *Building* **Site:**

Why Future-Ready
Infrastructure Starts
with a Solid Governance
Foundation

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Relevant Conference Theme:
Future-Ready Infrastructure:
Advancing Africa through Innovation and Sustainability

Context and Problem Statement

Every conversation about future-ready infrastructure eventually lands on the same vocabulary: climate resilience, digital transformation, green finance, smart cities. These are the right conversations. But there is a more fundamental conversation that the engineering and infrastructure community is too slow to have. That conversation hinges on the quality of the corporate governance structure behind the organisations that design, finance, and build these assets.

Infrastructure does not fail in a vacuum. When a project runs over budget, when construction quality falls short of specification, when a contractor firm collapses mid-delivery, there is almost always a boardroom story behind the site story. The consequences of weak board governance are not felt in the boardroom first. They are felt on project sites, in communities, and in the public finances that are left to pick up the pieces.

When the corporate governance structure fails, the cracks do not stay in the boardroom; they travel all the way to the project site.

Approach and Methodology

This article demonstrates the causal link between corporate governance weaknesses and on-site infrastructure outcomes, using governance case evidence and sector lessons to map how boardroom decisions affect project execution. It uses the Carillion case as a focal

example and draws parallels with typical governance failures observed in infrastructure firms: weak non-executive oversight, incentive misalignment, inadequate audit challenge and poor stakeholder engagement. Where direct public case studies are limited, the article infers operational pathways from documented governance failures and their project-level consequences.

Carillion: A Masterclass in Infrastructure Firm Governance Failure

No case study illustrates the boardroom-to-building-site consequence chain more starkly than the collapse of Carillion, once one of the United Kingdom's largest infrastructure and facilities management contractors. On the surface, Carillion was delivering hospitals, schools, roads, and rail. Beneath the surface, a series of compounding governance failures were making project failure and eventual company collapse inevitable.

Parliamentary inquiries into Carillion collapse concluded that the engineering firm was a story of recklessness, hubris, and a board that was either unwilling or unable to apply the governance discipline the organisation required to thrive. The engineering failures across Carillion project sites did not precede the boardroom failures; they followed directly from them.

CASE IN FOCUS

- CARILLION PLC

(COLLAPSED JANUARY 2018)

Board culture: Senior executives were paid heavily for short-term revenue growth, not sustainable project margins. This incentive structure made aggressive project bidding a rational behaviour.

Audit failure: Financial liabilities were disguised through accounting practices that covered a rapidly deteriorating balance sheet. External auditors also failed to provide adequate challenge to accounting misstatements.

Non-executive oversight: Carillion's independent directors lacked the sector-specific expertise needed to interrogate project-level risk and project delivery assumptions.

On-site consequence: Projects were starved of cashflow, subcontractors went unpaid, quality controls were eroded, and public assets were left unfinished at substantial cost to the public purse and inconvenience to the public.

The Corporate Governance - Project Delivery Consequence Chain

Carillion is not an isolated case. Across the infrastructure sector from major international contractors to project-specific special purpose vehicles, the same patterns recur. Poor governance at the top of an organisation creates a cascade of operational dysfunction that eventually surfaces in the quality and continuity of infrastructure project delivery.

When boards reward short-term revenue growth over sustainable margins, project teams face pressure to underestimate costs, compress design programmes, and cut corners on construction supervision. When audit challenge is weak and financial reporting

is misleading, project risks accumulate invisibly until they become unmanageable. When board composition lacks independent technical voices, engineering risks are not adequately discussed, understood or interrogated at the level where strategic decisions are made.

The consequence chain is direct and well-documented. Governance failures do not stay in the executive suite. They move through procurement decisions, into contract structures, through supply chains, and onto construction sites.

Corporate Governance Failure



Infrastructure Project Consequence

- Weak board oversight → *Strategic risk blind spots*
- Short-term incentive structures → *Underbidding and margin compression*
- Opaque accounting → *Hidden project liabilities*
- Inadequate audit challenge → *Suppressed risk reporting*
- Absence of technical NEDs → *Poor engineering risk governance*
- Strong corporate governance → *Project Delivery integrity, quality, and sustainability*

What This Means for Africa's Infrastructure Ambition

Africa faces an extraordinary infrastructure financing and delivery challenge. The continent requires trillions of dollars of investment in roads, energy, water, digital connectivity, and climate-adaptive assets over the coming decades. International financiers, development finance institutions, and domestic capital markets are increasingly prepared to mobilize that investment; but only where corporate governance standards can protect their investment.

This is where the opportunity lies. African infrastructure clients, regulators, and contracting authorities have a genuine chance to embed governance due diligence into the architecture of infrastructure delivery from the outset. That means requiring demonstrable board independence and technical competence as a condition of contract award. Evidence shows that non-executive directors

with sector knowledge and independence improve oversight of complex engineering risks. It means insisting on audited risk disclosures and transparent project reporting as conditions of financing. It means building clawback provisions into executive remuneration so that long-term delivery outcomes, not short-term revenue targets define what success looks like for the individuals at the top of infrastructure firms.

It also means developing the governance capacity within African infrastructure organisations themselves. Boards of infrastructure firms operating across the continent should include technical voices with genuine engineering, environmental, and sustainability expertise. This is not because it is good optics, but because boards without that expertise cannot meaningfully challenge the assumptions that lead to project failure.

Conclusion: Govern to Build

The FIDIC Africa 2026 conference theme of future-ready infrastructure explicitly encompasses innovation and sustainability. But innovation and sustainability commitments made in glossy proposals are only as durable as the corporate governance structures that enforce them in practice.

Africa's infrastructure future will be built by organisations. The quality of what they build will reflect the quality of how they are governed. Engineering excellence, design innovation, and sustainability ambition all require a boardroom culture that prioritizes integrity, transparency, and long-term delivery accountability above short-term financial performance.

The lesson from Carillion and from every comparable infrastructure governance failure is not simply that bad things happen when

governance is weak. The lesson is that governance weakness is structural, predictable, and correctable. Clients, financiers, regulators, and contracting authorities all have the tools to demand better. The question is whether the infrastructure community is prepared to make governance quality as non-negotiable as structural safety. Future-ready infrastructure is not achieved by technology alone. It requires governance that binds strategy to execution, incentives to outcomes, and oversight to accountability. The Carillion case shows how boardroom failure becomes a construction-site crisis; African infrastructure leaders can avoid that fate by making governance the first line of defence for innovation, resilience and sustainability.

*Future-ready infrastructure
starts in the boardroom.
It is time to govern accordingly.*



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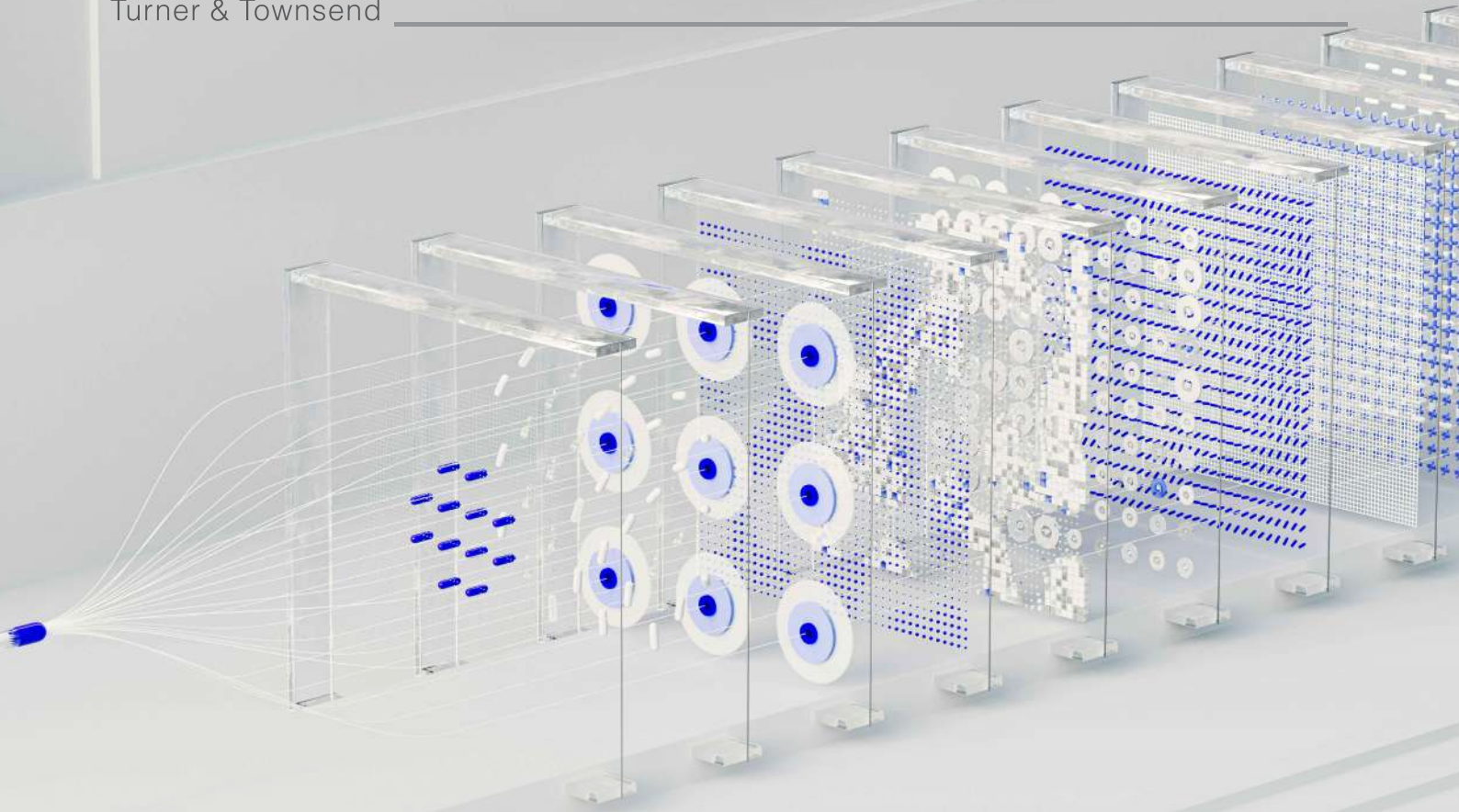
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A Data-Driven *Framework* to *Strengthen* the North–South Corridor:

What the *Evidence*
Tells Us



The North–South Corridor (NSC) is the economic artery of Southern Africa, carrying the bulk of freight between the Port of Durban and key markets across Botswana, Zimbabwe, Zambia, and the Democratic Republic of Congo. Yet, despite its centrality to regional trade, the corridor continues to face structural constraints that are now measurably worsening.

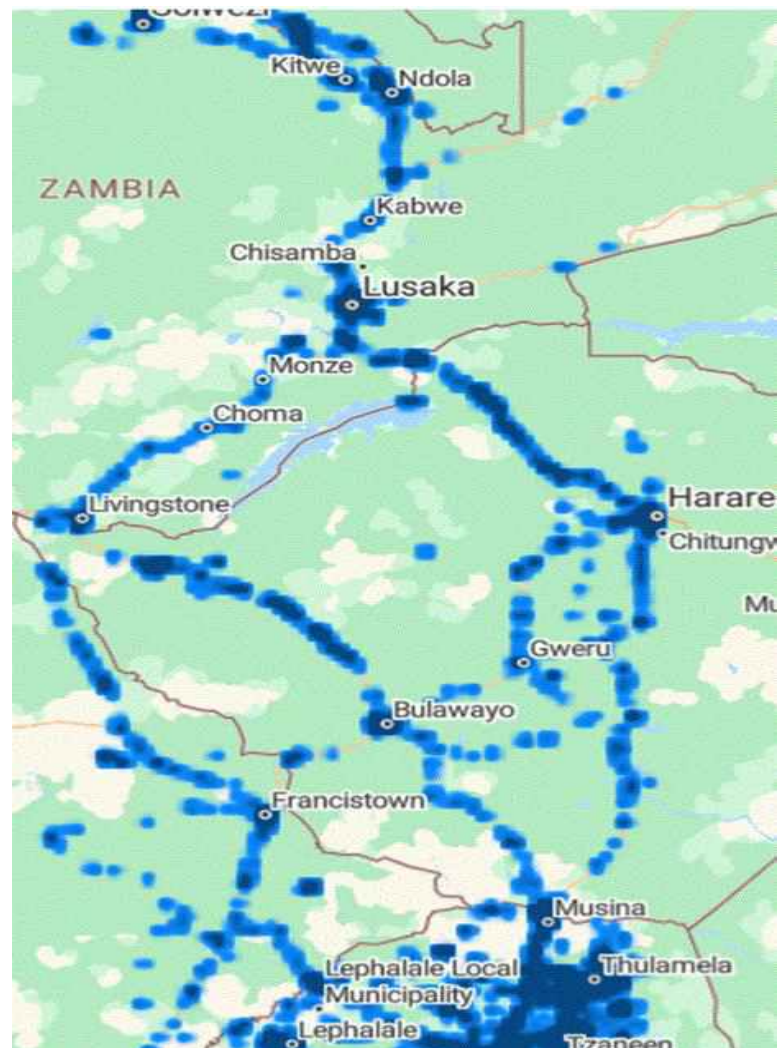
A near real-time heatmap of freight movement along the NSC indicates the density of activity across its six routes and eight borders. Increasing border crossing times, inconsistent road segment conditions, and dynamic re-routing reflect a system under simultaneous pressure with no meaningful compensating efficiencies elsewhere.

A Data-Driven Approach to Understanding Corridor Performance

TradeMark Africa (TMA), a specialised trade facilitation agency, has funded Turner & Townsend to develop a comprehensive monitoring and performance framework to bring clarity to these issues. The framework provides weekly, near-real-time visibility of heavy motor vehicle movement, border delays, and transit performance. It draws on anonymised GPS data from heavy motor vehicles and vessel tracking data from major ports.

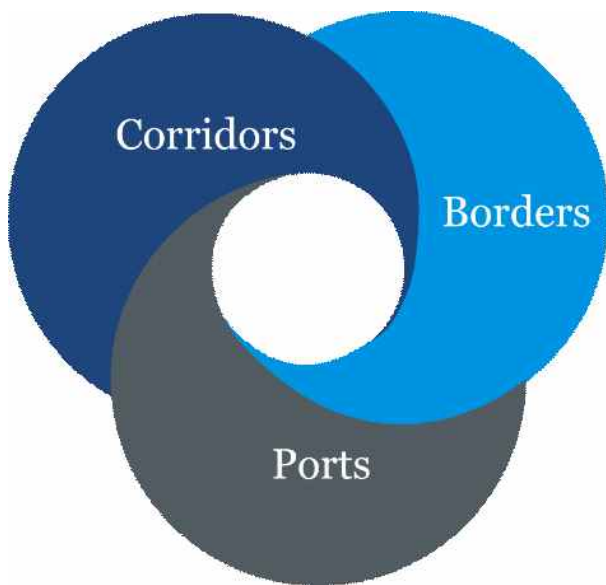
The aim was clear - to build a reliable evidence base that informs investment decisions, operational improvements, and coordinated regional action.

Turner & Townsend led the framework development and early implementation, supported by Crickmay & Associates's Logistics Monitoring System and TransMaintenance & Operations. The team convened public and private stakeholders, conducted border dialogue forums, and carried out needs assessments to identify opportunities for improvement - particularly at Beitbridge, Groblersbrug/Martin's Drift Border Posts. TMA plans to work with these stakeholders to address these challenges at key pinch points to reduce time and cost and renew the competitiveness of this strategic corridor.



What the Data Reveals:

Three Levels of Delay That Shape Corridor Efficiency



The project focused on three core performance measures:

- **Corridor Transit Time:** This corridor performance metric evaluates the time taken for heavy motor vehicles to travel along each segment of the North–South Corridor, measured separately for northbound (hinterland bound) and southbound movements (port bound). Consistently shorter and more predictable transit times - within legal and safety limits - reflect better corridor efficiency and allow operators to increase trip frequency. The key challenge is the high variability between segments, which undermines planning and increases operating costs.
- **Border Crossing Time:** Border crossing time is measured from the start of the approach zone through to exiting the border area, not just the customs precinct. This corridor performance metric captures the full impact of queuing, processing, documentation, and operational readiness. Shorter, more predictable crossing times indicate better-aligned procedures and reduced bottlenecks. Current data indicates that border delays are the largest contributor to total end to- -end corridor inefficiency.
- **Port Performance:** Port performance reflects the time heavy motor vehicles spend within the defined port precinct, including approach roads. While not a direct measure of port operational efficiency, dwell time influences overall corridor fluidity and supply-chain reliability. Improved port performance - such as the gains observed in Durban - supports the corridor, although these benefits are currently being negated by delays elsewhere.

Key Findings

from the NSC
Performance Data

Border Delays Now Dominate Total Transit Time

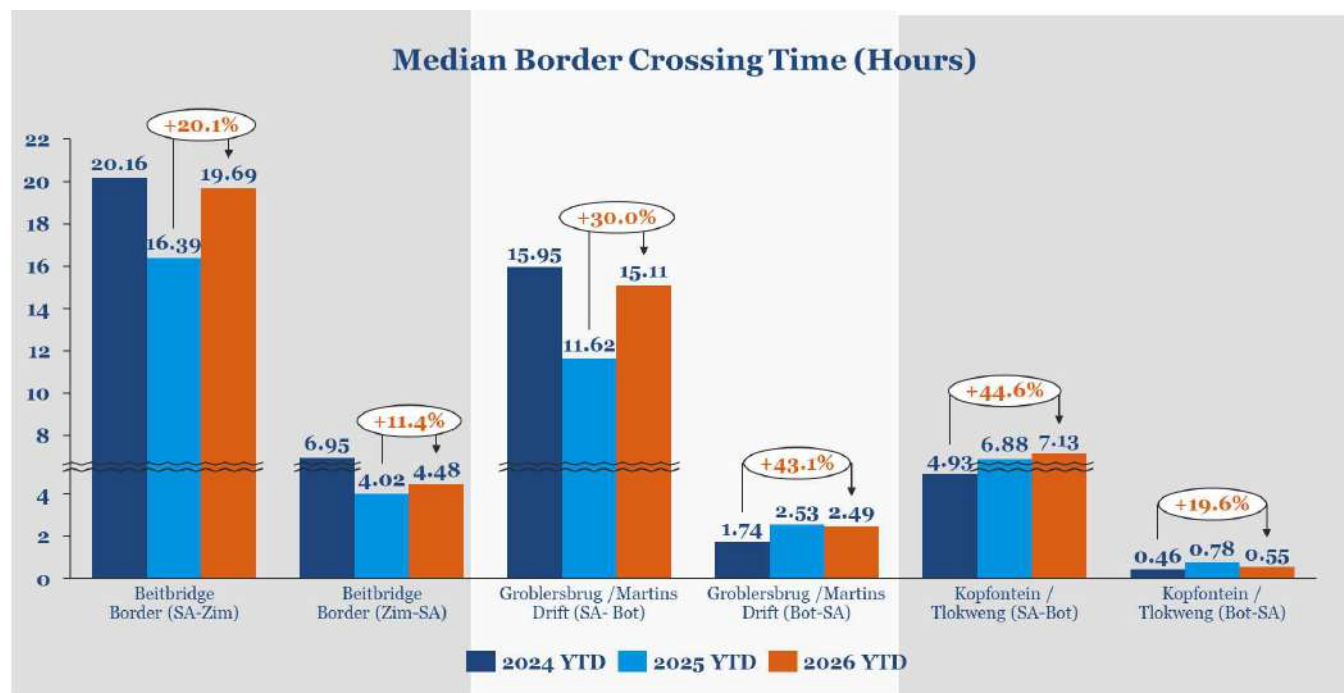
Border performance is deteriorating across several locations, with the Kasumbalesa crossing (Zambia - DRC) showing emergency-level stress, averaging 104.23 hours to cross. Northbound delays at Beitbridge, Chirundu, Kazungula, and Groblersbrug indicate systemic challenges.



A major cause is operational misalignment:

- Freight forwarders and transport operators often **do not follow** the customs process flow.
- **Paper-based** documentation persists despite electronic systems.
- Significant time is lost in the zones **before** trucks reach the customs area.

The widening gap between median and the average crossing times (close to 50%) highlights non-conformance and process inconsistencies. The median is important because it is not distorted by extreme delays—such as a few heavy motor vehicles waiting for 40 hours - and it reflects the most common level of performance, making it easier to identify process inconsistencies. Without border-specific structural and operational reforms, improvements elsewhere along the corridor will not translate into end-to-end gains.

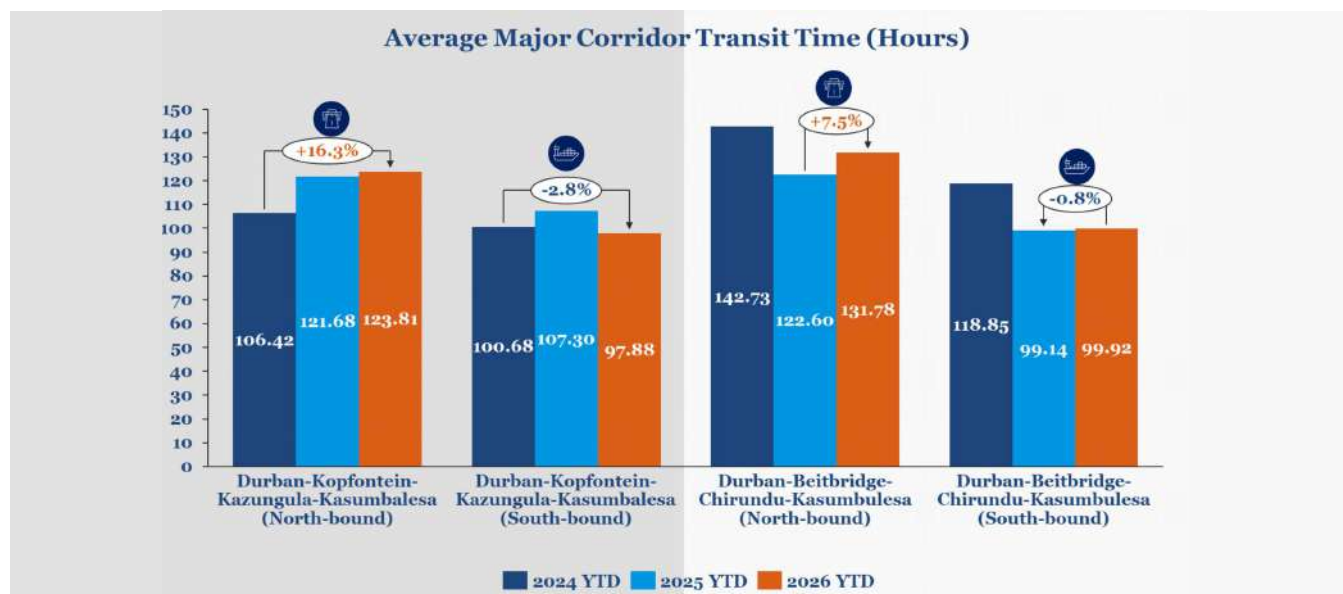


Freight volumes recovering at Beitbridge - export volumes tracked through Beitbridge show recovery in 2026 YTD (41,463 trucks) compared to 2024 and 2025. While this may marginally increase processing pressure, current volumes are not yet at a level that explains the deterioration.

Northbound Corridor Travel Times Are Increasing

Northbound segments - particularly those in Zimbabwe and Zambia – indicate sustained deterioration. This is influenced by infrastructure quality, weather vulnerability, traffic load, and maintenance practices.

The inconsistency in road segment performance directly impacts journey predictability and increases the cost of doing business.



Port Performance in Durban Is a Positive Outlier

Durban Port is showing measurable improvement:

- Vessel Port call duration reduced from 6.75 days (2024 YTD) to 6.68 days (2026 YTD)
- Heavy motor vehicle terminal times reduced by 7.75% to 4.76 hours (2026 YTD)

Yet these gains are entirely absorbed by border delays further up the corridor.

Building the Foundation for a North–South Corridor Management Institution

The project has strengthened coordination between public and private stakeholders, aligned border working groups, and established a credible evidence base for decision-making. It also supports broader policy commitments toward inclusive economic development and regional stability.

A structured roadmap now exists to guide future investments - targeting infrastructure upgrades, electronic process adoption, and institutional coordination. These elements form the groundwork for a dedicated North–South Corridor Management Institution.

The next step is to institutionalise the work through a Corridor Management Institution (CMI), continued near-real time data, backed by financial sector / industry-based partnerships, a strong communication strategy and building on the established co-operative relationships.

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Africa *The*

*Continental
Free Trade Area:*

Infrastructure
as the *Engine* of
Transformation



By Eng. **Turihohabwe**Alex

Fellow Member, Uganda Institution of Professional Engineers; Honorary Secretary, FIDIC Africa; Continental Finalist in Business and Professional Sector, CEO Global 2017; Holder Of Uganda Institution Of Professional Engineers Gold Profession Development Unit Certificate 2026



A Historic Turning Point

The African Continental Free Trade Area (AfCFTA) marks a genuine turning point in the history of the continent. For the first time, Africa's people stand on the threshold of moving freely across their own land — trading, working, and building wealth together under a shared economic vision.

Historically, the artificial boundaries drawn by colonial powers fragmented a continent, divided its peoples, and strangled intra-African trade. These borders have long been among the most significant contributors to the continent's underdevelopment. With decolonisation long achieved and AfCFTA now in place, African leaders are finally addressing the structural conditions that have held the continent back. This is focused, courageous leadership and it deserves recognition.

Yet bold policy alone cannot deliver transformation. AfCFTA opens the door, but infrastructure must carry the continent through it.

The *Infrastructure* Imperative

Free movement of people and goods requires physical connectivity. Africa needs railways, bridges, waterways, and digital networks capable of knitting 54 nations into a single, functioning economic space.

Three continental rail corridors stand out as foundational:

- Cape Town to Cairo — running through the length of eastern Africa
- Dakar to Djibouti — spanning the width of the continent west to east
- Casablanca to Cairo — connecting North Africa's major economies

These trunk lines would serve as the spine of a continental rail network, with secondary lines branching out to link landlocked nations and regional markets. The Cape Town–Cairo corridor is particularly promising: most countries along its route are politically stable, and the civil conflicts in Sudan and South Sudan, while serious, are not insurmountable obstacles to long-term planning.

The lesson is clear, the political and logistical barriers to continental infrastructure are real but not permanent. What is often lacking is coordinated prioritisation.

The Cost of *Misalignment:* A Cautionary Tale

The Standard Gauge Railway (SGR) connecting Kenya and Uganda illustrates precisely what happens when neighbouring countries fail to coordinate. Kenya built its SGR from Mombasa to Naivasha, but left the critical Naivasha–Malaba section unfinished. Uganda's own SGR plans were consequently left in limbo, since a railway without a cross-border connection has limited value. Only recently has Kenya committed to extending the line to the Ugandan border, unblocking the project on both sides.

This kind of misalignment is avoidable, but avoiding it requires institutional architecture that currently does not fully exist: a continent-wide body with the mandate, credibility, and political backing to plan and coordinate cross-border infrastructure as a unified programme rather than a patchwork of national projects.

Building the *Institution*

Europe offers a useful reference point. The continent's seamless infrastructure network — its rail corridors, motorway systems, and energy grids — was not built by individual

nations acting alone. It was planned, funded, and executed through supranational institutions over decades.

Africa already has the African Union. AfCFTA itself demonstrates what the AU can achieve when the political will is present. The next step is to establish, under the AU's authority, a dedicated infrastructure body — one that is technically credible, financially robust, and politically respected enough to plan and deliver continental connectivity projects across national boundaries.

Professional bodies such as FIDIC Africa have a critical role to play here, particularly in reforming procurement processes that currently cause chronic delays and cost overruns across the continent.

Financing the *Vision* from Within

The most powerful argument for African-led infrastructure development is that the financing does not need to come from outside. Africa can fund itself.

Nearly every African country operates some form of national social security or pension scheme. In Uganda, for example, employees contribute 5% of their earnings to the National Social Security Fund (NSSF), with employers adding a further 10%, making a combined 15% of salary channelled into long-term savings each month.

Scaling this model continentally produces striking numbers. Africa's population stands at approximately 1.49 billion. Conservatively assuming 1.2 billion and an employment participation rate of 30%, roughly 360 million workers are contributing to such schemes. At a minimum contribution of \$15 per person per month, total monthly savings across the continent reach \$5.4 billion.

If just 50% of that \$2.7 billion per month were lent to the African Development Bank (AfDB) at a modest interest rate, and sustained over five years, the cumulative capital available for infrastructure investment would exceed \$162 billion. That is a serious foundation.

This is not a hypothetical. The mechanisms already exist. What is required is the political coordination to pool them purposefully.

The *Multiplier* Effect

Infrastructure investment does not simply move people and goods, it creates the conditions for compounding economic growth. Better connectivity reduces the time and cost of doing business across borders. Lower transaction costs stimulate trade. More trade generates employment. More employment expands the pool of workers contributing to social security schemes, which in turn increases the capital available for further investment. The cycle is self-reinforcing.

Foreign investors, who have long cited poor connectivity as a barrier to entering African markets, would follow. A continent that finances and builds its own infrastructure on its own terms commands a different kind of respect in the global economy, and attracts investment on far more favourable terms.

Addressing the *Real* Challenges

It would be dishonest to understate the obstacles. African infrastructure projects today are routinely hampered by delayed financing, opaque procurement processes, slow disbursements to contractors, insufficient experienced project staff, and late project completions that inflate costs significantly.

These are not insurmountable problems. They are governance and institutional problems — and governance and institutions can be reformed. FIDIC Africa, working alongside the African Union and the AfDB, is well placed to lead the design of more efficient, transparent procurement frameworks suited to the continent's realities.

On the question of human capital: Africa's professional capacity has grown enormously. The continent is not short of engineers, economists, planners, and project managers. What is sometimes lacking is exposure to specific projects like major expressways,

standard gauge railways, and large-scale bridges being implemented at scale for the first time in a given country. That gap closes with each project delivered.

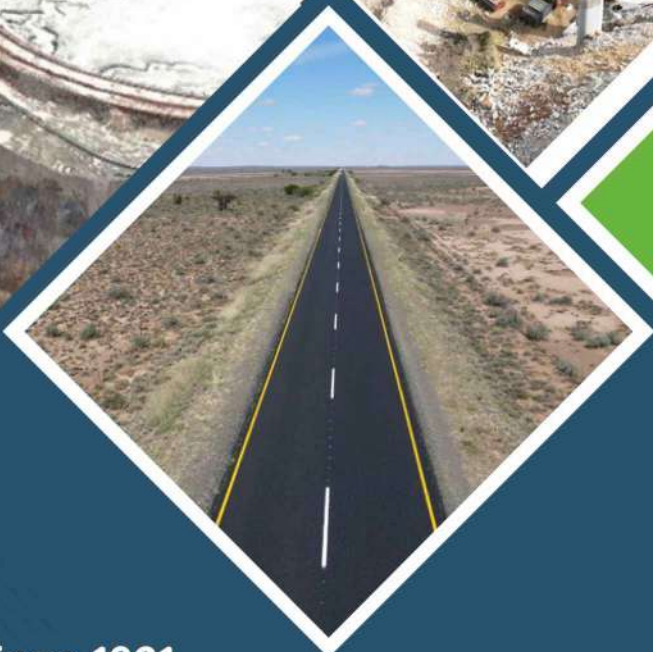
Conclusion

In the early twentieth century, the colonial powers dismissed Africans as incapable of self-governance. They were wrong. Africa decolonised, educated its people, and built functioning states. The task now is to connect those states economically, physically, and digitally into a single continental market that can compete and thrive on the world stage.

AfCFTA has set the direction. The African Union provides the institutional home. The African Development Bank offers the financial vehicle. And the people of Africa, through their savings and their labour, hold the capital.

What remains is the will to act, and the infrastructure to make the vision real.

*"An engineer's duty is
to **think of solutions:**
to turn opinion into reality."*



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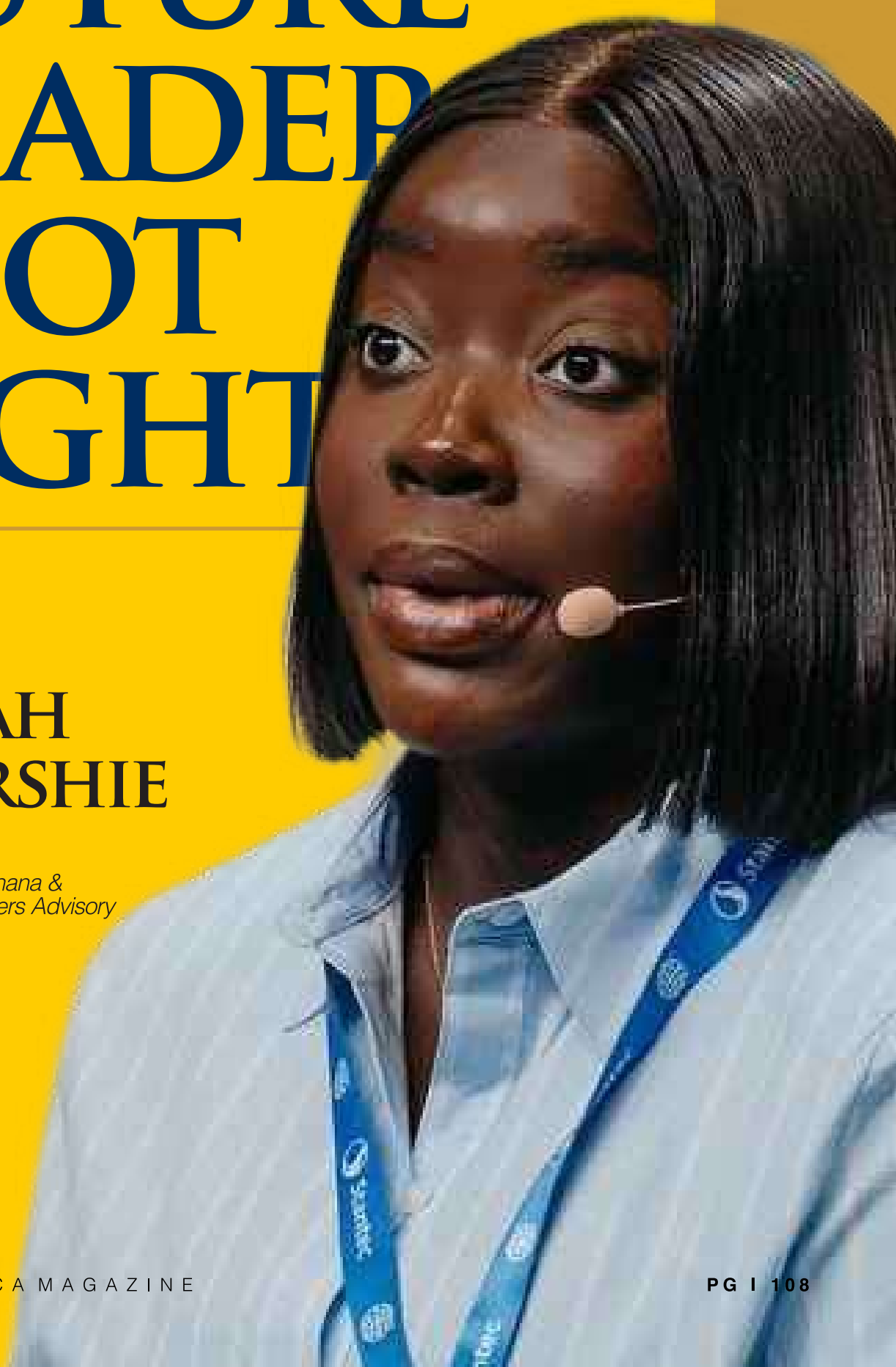
by local professionals, exemplifies responsive, context-aware execution. Employee ownership sustains a high-performance culture with graduate pipelines, mentoring, and continual upskilling. In the past year KP received 13 industry awards across Mining, Water, and Environmental disciplines, and in 2025 won South Africa's Best Employer Brand Award. As we mark 105 years, Knight Piésold continues to deliver world-class engineering that creates lasting value for clients, communities, and the continent.



FUTURE LEADER SPOT LIGHT

KEZIAH
QUARSHIE

Civil Engineer
*@ Delin Consult Ghana &
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Council Member*



THE ROAD HOME

From *England* to *Ghana.* A Deliberate Choice

There is a particular kind of courage in choosing the harder path not out of necessity, but out of conviction. For Keziah Quarshie, that choice meant leaving the structured certainties of engineering practice in the United Kingdom to return to Ghana, armed with skills, ambition, and a clear-eyed understanding of what her home country needs.

“Returning to Ghana was a deliberate choice,” she says simply. “I wanted to apply what I had learnt in a context that I understand and care about.” Her journey began earlier still, shaped by watching her father, himself a civil engineer, translate technical work into tangible change for communities. That early exposure didn't just inspire a career; it created a sense of purpose that has anchored every decision since.

The transition from the UK was not without its adjustments. Moving from highly systematised environments to what she describes as “a more dynamic context” required a different kind of adaptability. But for Quarshie, the reward has been proportionate to the challenge. “It has been very rewarding to work on projects that have a direct impact on people's daily lives,” she reflects. “That's not something you take for granted.”

ON THE GROUND

Mapping Kumasi's Movement

Ask Quarshie about the Kumasi Urban Mobility and Accessibility Project and she doesn't reach for corporate language. She talks about people, how they move, where they get stuck, what the city's rhythms actually look like from street level. "It sits right at the heart of what I care about," she says, "which is improving how people move in our cities."

The project's ambitions are broad: reducing congestion, strengthening public transport, and ensuring that vulnerable road users are properly factored into how roads are designed and managed. Quarshie's contribution has been data-intensive and hands-on, collecting and analysing traffic flows, mapping transport routes, identifying gaps between what the system promises and what it delivers.

That emphasis on evidence is not accidental. In many African cities, transport networks have evolved organically, without the benefit of comprehensive planning. Assumptions imported from other contexts frequently fail. "You can't rely on assumptions," Quarshie insists. "You need real data to understand travel patterns, demand, bottlenecks, and even how informal transport operates." It is a philosophy that has sharpened her thinking across the board: "The data will tell you what is happening, but you still need to understand why."

If the project reaches its potential, the transformation could be significantly shorter travel times, more reliable public transport, a more legible and accessible city for every resident. "It is the kind of project that can really change people's everyday experience of Kumasi," she says. "That's what keeps you going."

Data is everything. Without it, you're just guessing and in transport planning, that usually leads to solutions that don't match how people actually move.

KEZIAH QUARSHIE



BUILDING THE ENGINEER

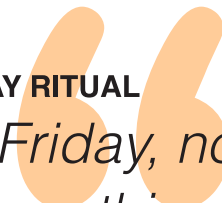
The Making of a Leader

Behind Quarshie's trajectory lies a firm Delin Consult that has made the development of its people something close to a competitive philosophy. "You're not just thrown into projects," she explains. "There's a clear effort to expose you to different aspects of the work, build your confidence, and push you to think beyond just the technical side."

That investment takes concrete form. Every Friday, without exception, engineers on the weekly roster are required to present insights drawn from their reading whether from current research or a book assigned at the start of the year. It is a small ritual with substantial consequences: it enforces discipline, keeps minds sharp, and signals, quietly but unmistakably, that intellectual growth is not optional.

Mentorship runs alongside this culture of learning. For Quarshie, the most meaningful strand of that has been working closely with her father, a relationship that is both deeply personal and professionally formative. "Having people who guide you, challenge you, and share their experience shortens your learning curve in a way you can't get on your own," she says.

THE FRIDAY RITUAL



Every Friday, no matter how busy things are, if it's your turn on the roster, you're required to present insights from your weekly readings. It forces you to stay disciplined, keep learning, and stay up to date."

"Leadership doesn't happen by accident. It has to be built." It is one of her central convictions, and it shows in everything she describes from the structured learning culture at Delin Consult to her advice for firms across Africa grappling with succession. "Firms need to be more structured about it. Real mentorship, giving young engineers responsibility, creating systems for continuous learning not just expecting people to figure it out over time."

GENEVA & BEYOND

Thinking *in Legacy*

In 2024, Quarshie joined a cohort of engineers from across the world at the FIDIC Future Leaders Management Course in Geneva, a trip that proved more formative than she had anticipated. “I knew I didn’t just want to grow as a technical engineer,” she explains. “I wanted to understand the business side of what we do, especially because I see myself running a successful firm one day.”

What she found in Geneva was a reframing of leadership itself. “It made me realise that leadership is less about position and more about responsibility, how you make decisions, how you carry people along, and the kind of culture you build.” Her cohort explored the theme of legacy, and it has stayed with her: “It got me thinking seriously about the kind of impact I want to leave, not just in projects, but in people and in the firm I help build.”

The programme also deepened her understanding of contract management not as legal formality, but as a set of instruments that



shapes risk, relationships, and outcomes on every project. “It made me more aware of how important it is to be both technically sound and commercially aware.” And it confirmed an appetite for the strategic dimension of engineering practice: how firms position themselves, create value, and build the kind of sustainability that outlasts any single project or contract.

That appetite now has a professional home. As a member of the FIDIC Future Leaders Advisory Council, Quarshie contributes to conversations about how the global engineering industry evolves, bringing an African perspective to discussions that too often default to Northern assumptions. “My contribution is really about helping bridge that gap between global best practice and local implementation,” she says, “while also advocating for more intentional leadership development for young engineers.”

TECHNOLOGY & THE FUTURE

Data-Driven *Engineering* for *Africa*

Beyond her own development, Quarshie is excited about a broader technological shift underway at Delin Consult. The firm was the first in Ghana to introduce both Miovision and MetroCount traffic data technologies automated systems that capture, classify, and analyse vehicle flows with a precision that manual counting simply cannot match. “It has really strengthened the quality and reliability of our datasets,” she notes. More recently, the firm has developed its own in-house camera-based counting and classification software, reducing reliance on external tools and producing what Quarshie describes as “much richer datasets to work with.”

These are not isolated upgrades. They reflect a deliberate strategic direction: moving the practice toward model-driven decision-making

as the default. “We are very intentional about moving away from manual approaches and towards more evidence-based, model-driven decision making,” she explains. Exploration of how AI and automation can further improve analysis is already underway.

The broader vision is compelling: a version of African infrastructure planning that is as rigorous, innovative, and data-rich as anywhere in the world and rooted in the local knowledge that makes it actually usable. “We are very focused on combining traditional engineering with modern data and technology-driven approaches,” Quarshie concludes, “because we believe that is what will define the future of transportation and transport planning in Africa.”

BREAKING BARRIERS

A Woman in Engineering

As a young female engineer in a traditionally male-dominated field, Quarshie acknowledges both the challenges and progress. "It's still a male-dominated space, and you feel that sometimes, especially in certain rooms or on site." However, her experience has also been shaped by environments where her work is respected and valued. "I've been fortunate to be in spaces where I'm taken seriously, and that makes a big difference." Her advice to other women entering the profession is both practical and empowering:

"Be confident in what you bring to the table and don't shrink yourself. At the same time, keep learning and building your competence, because that's what ultimately earns respect." For the next generation: "Don't be intimidated. There is room for you, and your perspective is needed. Focus on growing, finding the right mentors, and staying consistent."

For me, it really comes down to impact and legacy, building something that lasts, both in terms of infrastructure and in the people that come after me.

KEZIAH QUARSHIE

Listening to Keziah Quarshie speak about her ambitions - the firm she intends to help build, the systems she wants to improve, the engineers she hopes to develop - what comes through most clearly is not impatience, but intentionality. She is in no rush to skip steps. She is learning, she is contributing, and she is building toward something that she expects to last. In a field where impact is measured in decades, that is exactly the right kind of ambition.



improving the quality of life through partnerships and infrastructure



INTEGRITY

LOYALTY

COMMITMENT

what we do

- Urban and Rural Planning & Development
- Project Development
- Project Prioritization
- Feasibility Studies
- Environmental Policy & Planning
- Construction Management
- Infrastructure Design and Services
- Institutional Capacity Building
- Training and Technology Transfer



what we can do

- Site Investigation
- Land Surveying
- Environmental Assessment
- Tender Documentation
- Pre-Contract Services
- Site Supervision
- Contract Management
- Safety & Environmental Audit

softwares & programs



clientel base



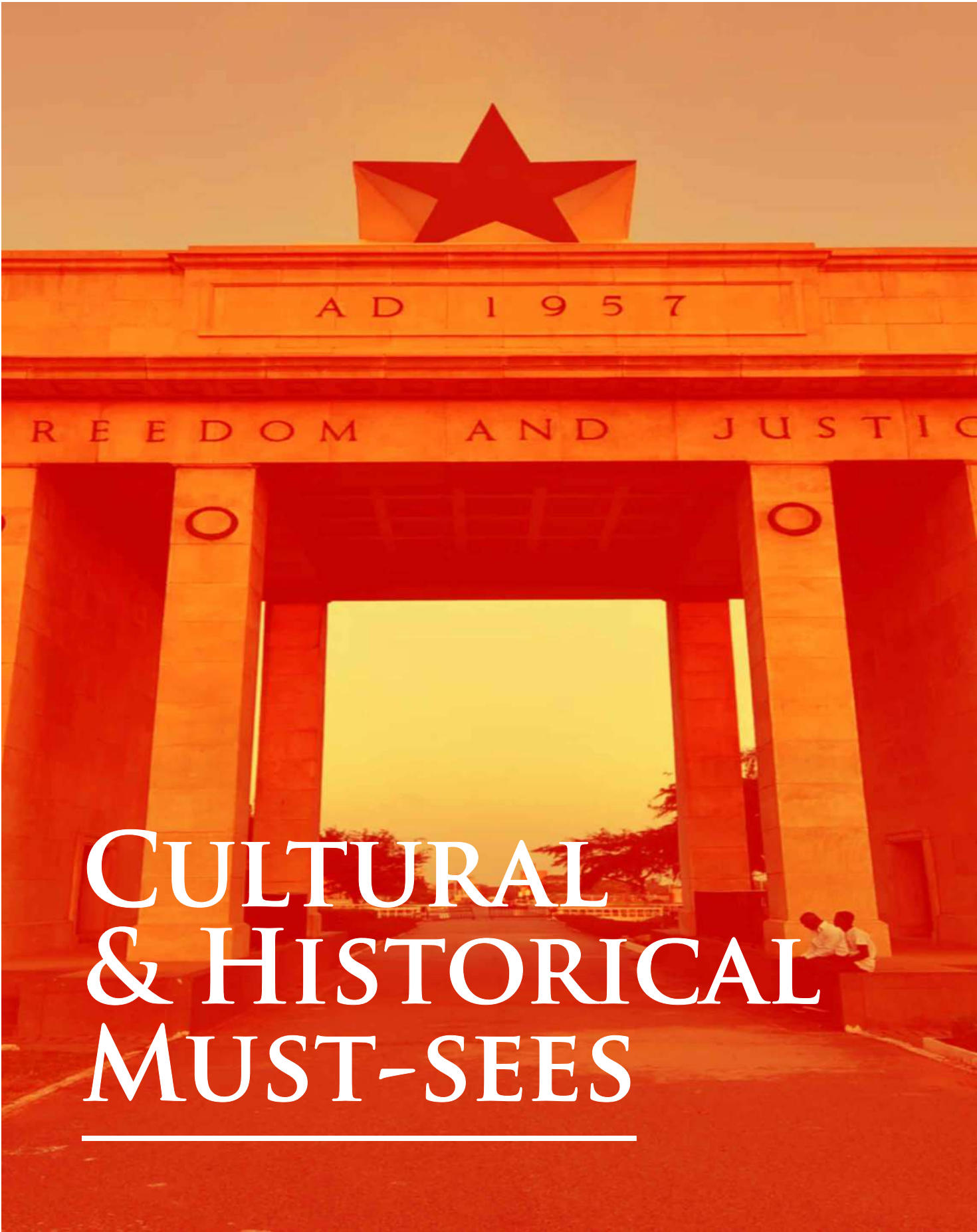
Discover Ghana's *Hidden* Gems

Your insider's guide to
Ghana's finest experiences

Welcome to *Ghana!*

While you're here for FIDIC Africa 2026, take time to experience the warmth, culture, and beauty that make Ghana special. From historic sites to stunning beaches, vibrant markets to serene gardens, here are the experiences you shouldn't miss.





CULTURAL & HISTORICAL MUST-SEES



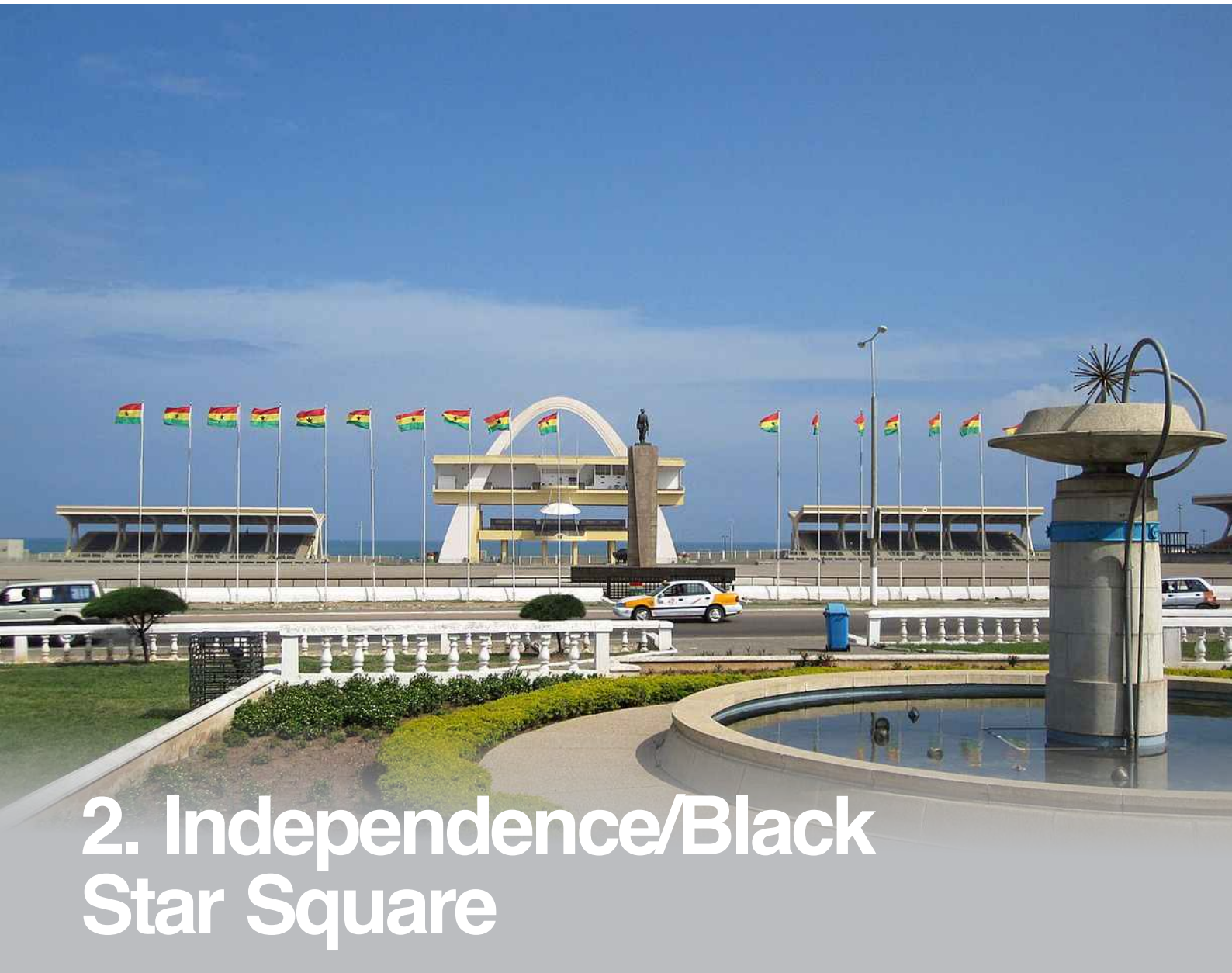
1. Kwame Nkrumah Mausoleum & Memorial Park

The Kwame Nkrumah Mausoleum & Memorial Park is one of those places that feels powerful the moment you walk in. It's right in downtown Accra, but once you step inside, it's calm and peaceful. Inside is the marble tomb of Dr. Kwame Nkrumah, Ghana's first president and the man who led the country to independence in 1957.

Around the park, you'll see statues, an eternal flame, and a small museum that tells the story of Ghana's fight for freedom. The gardens are beautiful and quiet, the kind of place that makes you slow down and reflect. The whole place isn't huge, so you can see everything comfortably in about 45 minutes without feeling rushed.

Why go? Because this is where Ghana's independence story becomes real. Nkrumah wasn't just a president, he became a symbol of African freedom and Black self-determination across the world. When you stand there and read his words about choosing self-government over comfortable servitude, it hits differently. You understand the sacrifice. You understand the courage.

It's not just a tourist stop. It's a moment. And when you leave, you really understand why Ghana is called the Black Star of Africa.



2. Independence/Black Star Square

This is the exact place where Ghana became free.

On March 6, 1957, at midnight, the British flag was lowered and Ghana's flag was raised. Kwame Nkrumah stood there and declared, "Ghana, your beloved country, is free forever." That moment didn't just change Ghana, it sparked independence movements across Africa. Within 20 years, over 30 African nations followed.

So when you stand there, you're not just in a big square. You're standing at a turning point in African history. It's powerful. It's symbolic. It's proud. The architecture reflects that too, bold, confident, post-colonial ambition. Ghana building something grand on its own terms.

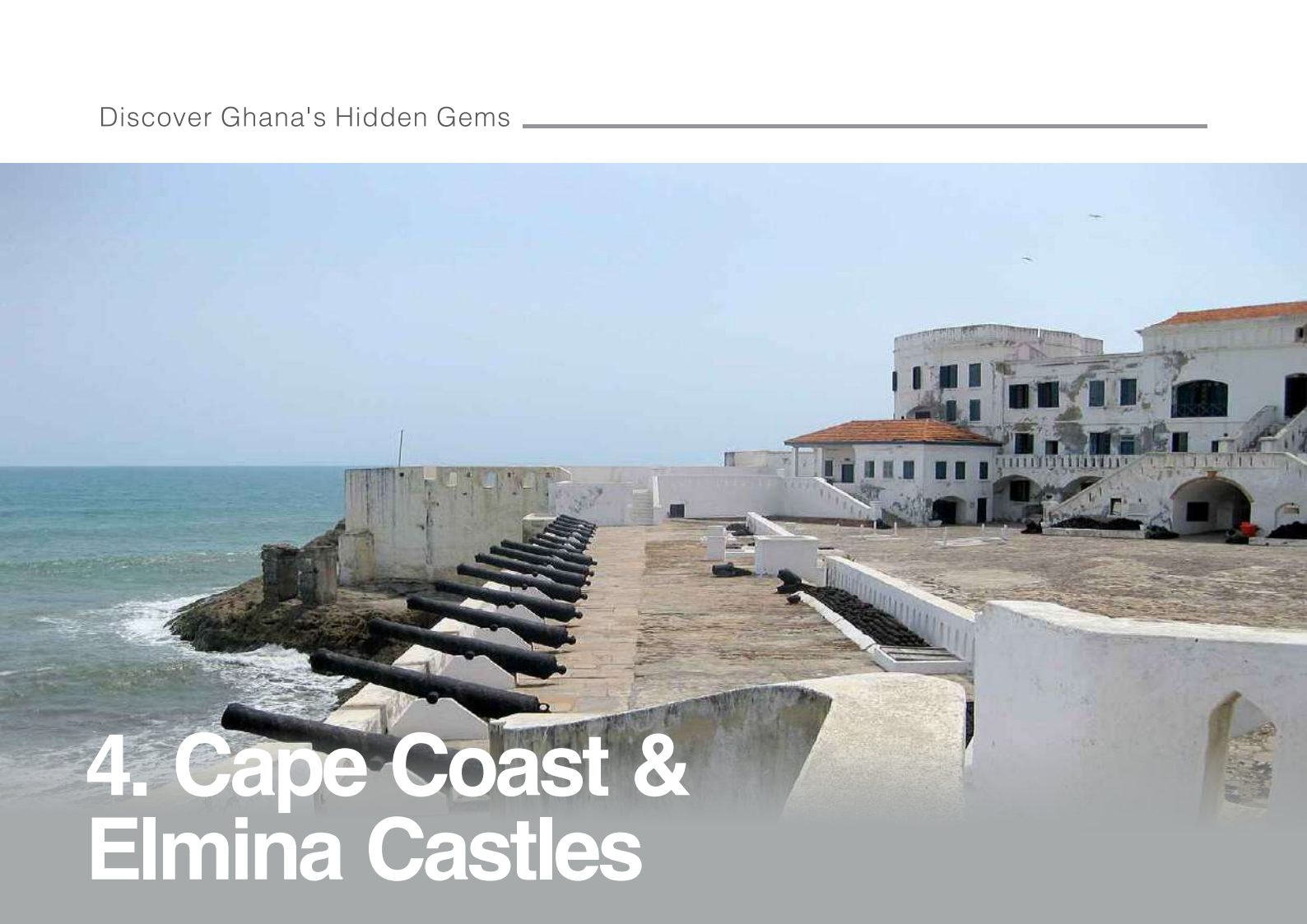


3. Jamestown & Lighthouse

The highlight is the red-and-white striped James Fort Lighthouse, built in 1871. If you climb the narrow spiral staircase to the top, you get an incredible 360-degree view. The fishing harbor on one side, the Accra skyline on the other, and the Atlantic stretching endlessly ahead. The view alone makes it worth it.

Why go? Because this is the soul of Accra. Not polished. Not curated. Just authentic. The fishing traditions here go back generations. The boxing culture (nearby Bukom has produced world champions) speaks to resilience and ambition. The street murals show modern Ghana expressing itself boldly.

If you want to feel the real heartbeat of the city, Jamestown is where you find it.



4. Cape Coast & Elmina Castles

Cape Coast Castle and Elmina Castle sit along Ghana's coastline, massive white stone fortresses built by European powers between the 1400s and 1700s. What started as trading posts became holding prisons for enslaved Africans before they were forced onto ships across the Atlantic.

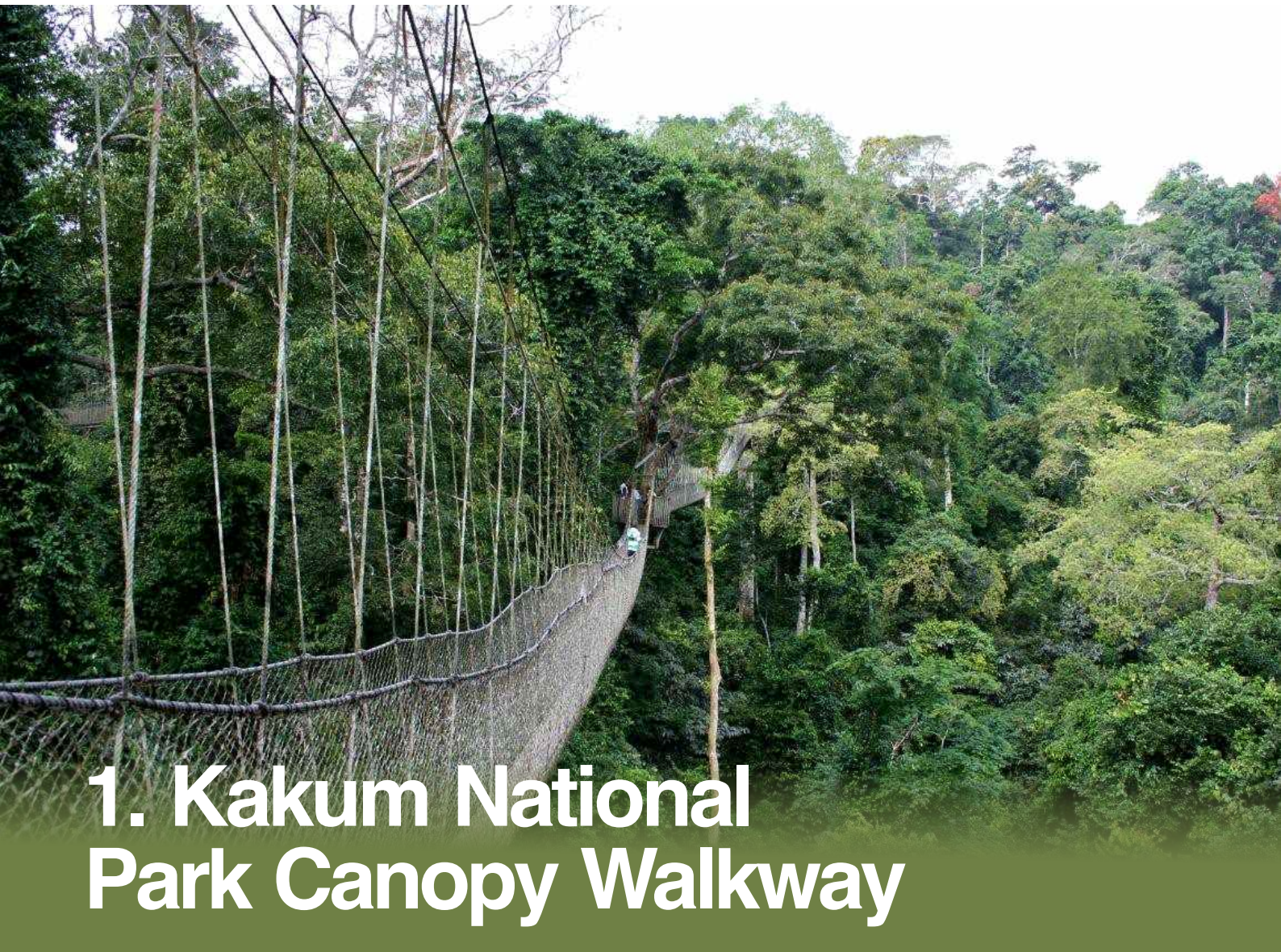
At Cape Coast Castle (built 1653), you'll walk through dark underground dungeons where over a thousand people were once held at a time, cramped, airless spaces directly beneath the governor's bright ocean-view quarters. Then you stand at the "Door of No Return," the final exit to the Atlantic where captives were loaded onto ships

Elmina Castle (built 1482) is even older and just as haunting. The guided tours walk you through the dungeons, punishment cells, and the brutal system behind the trade. The scale is staggering, over 12 million Africans trafficked through West Africa. Hearing it while standing inside those walls makes history painfully real. Many people cry. It's that powerful.

Why go? Because this is essential history. For members of the African diaspora, it's a pilgrimage. For everyone, it's a necessary reckoning. You see the physical infrastructure of the slave trade, not just stories in a book, but the actual spaces where it happened. It changes how you understand history, humanity, and resilience.

NATURE & ADVENTURE

A group of people are walking across a suspension bridge in a lush, green forest. The bridge is made of ropes and has a safety netting. The background is filled with dense foliage and trees. The title 'NATURE & ADVENTURE' is overlaid on the image in a large, red, serif font. The word 'NATURE' is split across two lines, with 'NATURE' on the first line and '& ADVENTURE' on the second line. The word 'TRE' is on the third line, partially obscured by the bridge structure. A yellow square is positioned to the right of the word 'ADVENTURE'.



1. Kakum National Park Canopy Walkway

Rangers guide you in small groups, explaining the ecosystem and pointing out wildlife. The park protects hundreds of butterfly species, over 250 bird species, and rare mammals.

Why go? Because it's one of the only canopy walkways in Africa and Ghana had the first. It's a rare chance to experience the rainforest from a bird's perspective. It's adventurous

without being extreme. The design itself is impressive too, carefully built to protect the forest while allowing visitors to experience it.

If you're pairing it with Cape Coast Castle, Kakum feels like balance. After the emotional weight of history, this gives you life, beauty, and fresh air. You leave feeling exhilarated instead of heavy.



2. Aburi Botanical Gardens

If Accra feels busy and hot, Aburi feels like a deep exhale.

Set in the Akuapem Hills about 370 meters above sea level, these 64-acre botanical gardens are noticeably cooler, often several degrees lower than the city. The space dates back to 1890 and still carries that calm, old-world charm. You'll find winding paths through palm groves, bamboo clusters, orchid houses, and towering shade trees. There's a small pond with lilies and

turtles, peacocks wandering freely, butterflies everywhere, and benches placed perfectly for quiet moments.

Why go? Because sometimes you need calm, not adrenaline. Aburi is Ghana's gentle nature escape, a place to slow down, breathe cooler air, and step away from the city's intensity. It also quietly tells history: originally established during colonial times for agricultural experiments, it's now a public park maintained and enjoyed by Ghanaians.



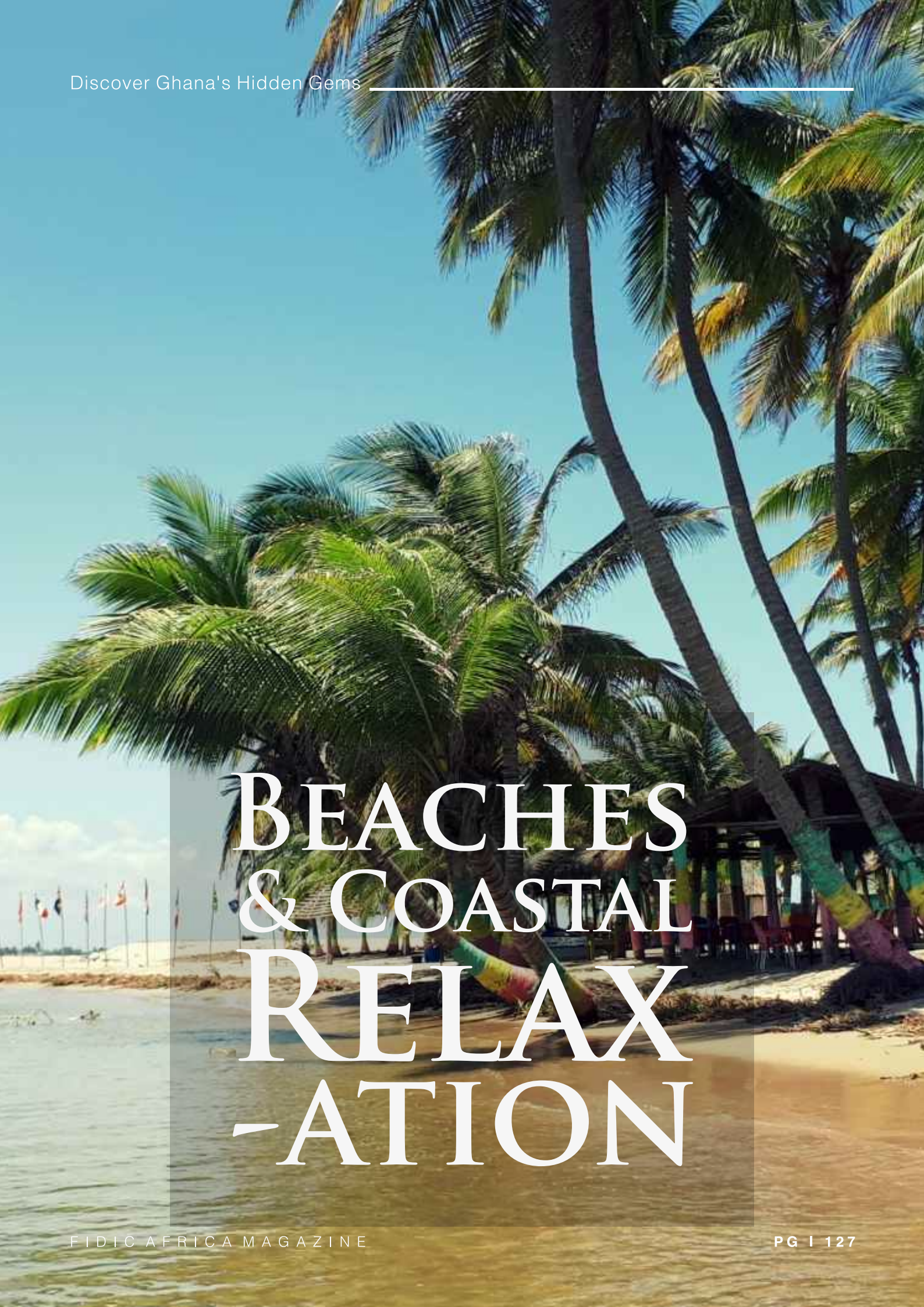
3. Shai Hills Resource Reserve

Just about an hour from Accra, Shai Hills is a savanna reserve where you can see zebras, baboons (almost guaranteed), antelopes, ostriches, monkeys, and tons of birdlife roaming freely across open grasslands and rocky hills. There are no dangerous predators, so it feels adventurous but not intimidating.

You can do a guided game drive in a 4x4 across the plains, and/or hike up to the Obonu-Tem Caves, sacred caves once used by the Shai people during 19th-century conflicts. The

hike involves some light scrambling over rocks, but it's manageable. At the top, you get wide, beautiful views of the savanna stretching to the horizon, dotted with baobab trees.

Why go? Because it gives you real African wildlife and landscape in just a few hours, no long safari required. It's nature plus culture. You're not just spotting animals; you're learning about the Shai people and how history is tied to the land. It's accessible, educational, and perfect if you're short on time but still want something adventurous.

A vibrant tropical beach scene featuring several tall palm trees with lush green fronds. In the background, a thatched-roof hut is visible on the sandy shore. The water is calm and reflects the sky. The overall atmosphere is serene and inviting.

BEACHES & COASTAL RELAX -ATION

Labadi *Beach*

This is Accra's most popular and energetic beach. It's lively, social, and full of music, Afrobeats playing, grilled tilapia sizzling, horses trotting along the shoreline, beach football happening, vendors calling out, people dancing and laughing. The Atlantic waves are strong,

the sunsets are beautiful, and the vibe gets bigger toward evening, especially on weekends.

Why go? Because this is how Accra relaxes. It's not a quiet resort, it's culture, music, food, and fun all in one place. Come late afternoon for sunset and peak energy.

(La Pleasure Beach)

Kokrobite *Beach*

About 45 minutes outside Accra, Kokrobite is more laid-back and artistic. Think reggae music, drum circles, fire dancers at sunset, musicians jamming under palm trees. It's slower, bohemian, and creative. You can eat fresh seafood, swing in hammocks, and just breathe.

Why go? Because it's peaceful and soulful. Less hype, more vibe. Perfect if you want to decompress, meet artists, and experience beach life at a gentler pace.



Bojo *Beach*

Bojo feels like a secret. You drive west, then take a short canoe ride across a lagoon to reach a quiet, beautiful beach. Fewer crowds, more space, fresh seafood grilled right in front of you, and long peaceful walks by the water.

Why go? Because it feels like discovering your own private paradise. The canoe ride makes it feel like an adventure, and the isolation makes it special.



Discover Ghana's Hidden Gems

Shopping & Markets





Arts Centre (Centre for National Culture)

A large open-air craft market with hundreds of stalls selling kente cloth, drums, beads, carvings, paintings, and more. It's colorful, lively, and bargaining is part of the experience.

Why go? It's the easiest place to buy Ghanaian souvenirs in one stop. You deal directly with artisans, negotiate prices, and leave with authentic crafts and good stories.



Makola Market

This is Accra's real commercial heart. Huge, busy, intense, locals buying food, fabric, spices, electronics, everything. It's colorful, loud, packed, and full of life.

Why go? Because this is everyday Ghana. Not curated. Not tourist-focused. Just real city energy. Go with a local or guide for the best experience.



Small, relaxed artisan workshops near Aburi Botanical Gardens. Here you actually watch bead makers, wood carvers, and weavers create their work before selling it.

Why go? Because seeing the craft being made makes it more meaningful. You're buying directly from the maker, hearing their story, and supporting traditional skills.

Food & Dining Experiences

*Must-Try
Ghanaian
Dishes:*



Jollof Rice – Ghana's pride (try the debate with Nigerian delegates!)

Waakye – Rice and beans with sides, breakfast of champions

Banku & Tilapia – Fermented dough with grilled fish

Fufu – Pounded cassava/plantain eaten with soup (use your hand!)

Red Red – Bean stew with fried plantain

Kelewele – Spicy fried plantain, absolutely addictive

Groundnut Soup – Rich peanut-based soup



BASIC PHRASES TWI

(IMPRESS THE LOCALS!)

Akwaaba	– Welcome!
Ete sɛn?	– How are you?
Me ho yɛ	– I'm fine
Medaase	– Thank you
Mepa wo kyɛw	– Please/Excuse me
Aane	– Yes
Daabi	– No
Ɛyɛ fɛ	– It's beautiful
Me pɛ bi	– I want some

Pronunciation tip: "ɛ" sounds like "eh", "ɔ" like "aw"

4 TOP RECOMMENDATIONS

1. Cape Coast Castle + Kakum Canopy Walk
2. Arts Centre + Jamestown Tour
3. Aburi Gardens + Craft Village
4. Labadi Beach Sunset.

Akwaaba to *Ghana!*

We hope
you'll experience
the warmth, beauty,
and innovation
that make
Ghana special.



INNOVATION *Word Search*

*Find And Circle
15 Keywords Related To
Engineering Innovation!*

Words can be Horizontal,
Vertical or Diagonal.

Words may
Overlap!

B	I	M	O	D	E	L	I	N	G	P	T	R	S	U
L	A	R	T	I	F	I	C	I	A	L	Q	O	W	S
U	M	O	D	U	L	A	R	X	B	E	P	B	N	T
E	S	E	N	S	O	R	S	D	O	R	A	O	A	A
P	M	R	G	U	N	T	Y	R	N	M	M	T	I	I
R	A	D	R	S	T	A	I	N	A	B	L	E	N	N
I	C	L	O	U	D	N	W	O	V	A	T	I	O	N
N	O	X	P	A	R	A	M	E	T	R	I	C	T	E
T	D	I	G	I	T	A	L	K	O	B	A	R	G	D
D	R	O	N	E	S	M	Q	H	P	T	I	M	I	I
S	M	A	R	T	G	R	I	D	U	Z	E	N	Z	T
O	P	T	I	M	I	Z	A	T	I	O	N	P	A	A
L	E	A	P	F	R	O	G	M	R	S	C	L	W	L
A	U	T	O	M	A	T	I	O	N	T	O	A	I	Y
R	E	S	I	L	I	E	N	C	E	N	W	L	N	S

WORDS TO FIND (15 total):

BIM (Building Information Modeling), **ARTIFICIAL** (AI/Artificial Intelligence), **MODULAR** (Modular Construction), **SENSORS** (IoT Sensors), **SUSTAINABLE** (Sustainable Design), **INNOVATION**, **PARAMETRIC** (Parametric Design), **DIGITAL** (Digital Tools), **DRONES**, **SMART** (Smart Infrastructure), **OPTIMIZATION**, **LEAPFROG** (Leapfrogging Technology), **AUTOMATION**, **CLOUD** (Cloud Computing), **RESILIENCE** (Climate Resilience)

Engineering Innovation Trivia

Test your knowledge
on African 
Engineering Innovation!

1. Which African country pioneered mobile money with M-Pesa, revolutionizing financial infrastructure?

- A** Ghana
- B** Nigeria
- C** Kenya
- D** South Africa

2. What does BIM stand for in modern construction?

- A** Basic Infrastructure Management
- B** Building Information Modeling
- C** Business Intelligence Module
- D** Blueprint Integration Method

3. Zipline operates the world's largest medical drone delivery network in which two African countries?

- A** Kenya and Tanzania
- B** Rwanda and Ghana
- C** Nigeria and South Africa
- D** Ethiopia and Uganda

4. Approximately how much does Africa need annually in infrastructure investment to meet development goals?

- A** \$50-70 billion
- B** \$80-100 billion
- C** \$130-170 billion
- D** \$200-250 billion

5. What percentage of time can drone surveys save compared to traditional surveying methods?

- A** 30-40%
- B** 50-60%
- C** 70-80%
- D** 85-95%

6. Which North African country leads the continent in renewable energy integration with the Noor solar complex?

- A** Egypt
- B** Morocco
- C** Tunisia
- D** Algeria

7. What is the typical error reduction achieved when using BIM vs traditional 2D drafting?

- A** 5-10%
- B** 15-20%
- C** 20-35%
- D** 40-50%

8. Ghana's mobile penetration rate is approximately:

- A** 80%
- B** 100%
- C** 120%
- D** 140%

12. Egypt's New Administrative Capital demonstrates AI use at scale for:

- A** Traffic management only
- B** Mega-project construction management
- C** Energy distribution
- D** Water treatment

9. What does 'leapfrogging' mean in the context of African infrastructure?

- A** Copying developed nations' systems
- B** Skipping outdated technologies to adopt newer ones directly
- C** Building infrastructure faster
- D** Using imported materials

13. What year is used as the target for African engineers to master the '7 Essential Technologies'?

- A** 2025
- B** 2026
- C** 2028
- D** 2030

10. Modular construction can reduce building time by approximately:

- A** 10-20%
- B** 30-40%
- C** 40-60%
- D** 70-80%

14. Parametric design allows engineers to:

- A** Draw faster
- B** Generate thousands of optimized design alternatives automatically
- C** 3D print buildings
- D** Manage projects better

11. Which technology allows infrastructure to monitor its own health and predict failures?

- A** GPS tracking
- B** IoT sensors and AI analytics
- C** Traditional inspections
- D** Drone photography

15. True or False: AI will replace all engineers within the next decade.

- True - engineers should worry
- False - AI augments engineers who embrace it

AnswerKey

- | | | |
|----|---|---|
| 01 | C | Kenya |
| 02 | B | Building Information Modeling |
| 03 | B | Rwanda and Ghana |
| 04 | C | \$130-170 billion |
| 05 | D | 85-95% |
| 06 | B | Morocco |
| 07 | C | 20-35% |
| 08 | D | 140% |
| 09 | B | Skipping outdated technologies to adopt newer ones directly |
| 10 | C | 40-60% |
| 11 | B | IoT sensors and AI analytics |
| 12 | B | Mega-project construction management |
| 13 | B | 2026 |
| 14 | B | Generate thousands of optimized design alternatives automatically |
| 15 | B | False - AI augments engineers who embrace it |

Scoring

13-15 CORRECT

Innovation Expert

10-12 CORRECT

Well-Informed Engineer

7-9 CORRECT

On the Learning Path

0-6 CORRECT

Time to Read the Magazine

Closing Message



Eng. George C. Okoroma

President-Elect, FIDIC Africa

The engineers, thought leaders, and practitioners whose writing fills these pages worked within the constraints that exist on this continent, and in many cases, those constraints are what produced the most interesting results. That is the Africa this magazine set out to document, and that is the Africa it found. What made that possible was not resources or perfect conditions. It was people.

Every magazine is an act of collaboration, and this one is no different. What you have just read came together because a group of people said yes to sharing their expertise, their time, and their thinking, so that the FIDIC Africa community could hold something worth keeping. Their contributions form the backbone of this inaugural edition that is a record of a profession in motion and a moment when the gap between what African engineering can do and what the world expects of it is narrowing faster than most people outside the continent have noticed.

Until Next Time

There is a particular kind of confidence that runs through this edition. The confidence of people reporting on systems already built, decisions already made and tested against reality. It is the kind of confidence that can only come from having done it.

The articles here are evidence of that. So are the organisations that chose to support this publication and the contributors who chose to share their thinking in it. We are grateful to each of them, and we look forward to what the next edition will document.

Our Contributors

We thank the following contributors whose work forms the backbone of this edition:

Eng. Sayed Rizwan Qadri [p. 06]
Ing. Benedicta Opokua Acherekoh [p. 08]
Pauline Phiri [p. 70]
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Keziah Quarshie [p. 108]
Knight Piésold [p. 105]
Turner & Townsend [p. 93]

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Knight Piésold [p. 105]



2027 EDITION:

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