

Trade, Technology and Transformation Conference 2025

Empowering Africa's Future: Unveiling Economic Growth and Technological Advancement



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Contents

Foreword	3
Connected Communities and Smart Cities in Africa: Digital Transformation for Sustainable Urbanisation	5
By Joshua C. Ngoma and Stella Muhoro, Enterprising Africa Regional Network (EARN)	
Understanding the potential of Digital Public Infrastructure on Growth in Sub-Saharan Africa: ODA Trends and Strategic Options	17
By Jayanthi Basdew and Katlego Nkgudi, National Treasury of South Africa	
Digital Engineering as a Necessary Capability to Facilitate AfCFTA.....	34
By Professor J E Amadi-Echendu, University of Pretoria	
Digitisation of the Simplified Trade Regime as a means of Trade Facilitation	43
By Sitshengisiwe Ndlovu, Customs and Revenue Expert	
India-SACU Economic Engagement: Opportunities, Challenges, and the Impact of Digital Trade.....	54
By Dr Animesh Kumar and Pooja Maurya, Centre for WTO Studies	
A Trade Negotiator's Perspective on Digital Trade as a Catalyst for Economic Integration in Africa ...	68
By Amshuly Chandran and Tathagata Choudhury, Center for Trade and Investment Law (CTIL)	
Non-Tariff Barriers Transparency and Elimination through Online Reporting Mechanisms in the Tripartite and the African Continental Free Trade Agreement	82
By Thembekile Mlangeni, South African Department of Trade, Industry and Competition	

Foreword

By Lesley Wentworth

On behalf of the institutional partners in this endeavour, I am pleased to present this publication from the Academic Conference themed **“Trade, Technology and Transformation: Empowering Africa’s Future.”** The papers gathered here reflect the depth of analysis, practical insight, and forward-looking ideas that shaped the event. Above all, they demonstrate a shared commitment to positioning Africa as an active and influential force in the global economic and political landscape.

We extend our sincere thanks to **Dr Kiru Pillay**, whose support and guidance were instrumental in making this conference possible. His belief in the value of knowledge partnerships and his commitment to its success provided the foundation for what has become a timely and impactful initiative.

Recognising the Editorial Committee

We also wish to recognise the **Editorial Committee**, under the able leadership of **Mr Thabelo Muleya of Tutwa Consulting Group**, whose oversight and dedication steered this publication to completion. The collective rigour of our reviewers ensured that each contribution was not only sharpened academically but aligned meaningfully to the overarching theme of the conference. Our thanks to **Professor Upasana Singh** from the University of KwaZulu Natal (UKZN) for her guidance in this first collaborative endeavour with the two academic institutions – UKZN and University of Mauritius (UoM).

To our reviewers—**Dr Deepak Kumar (UKZN)**, **Dr Jayrusha Ramasamy-Gurayah (UKZN)**, **Dr Neil Davies Evans (UKZN)**, **Dr Joseph Ntabeni Jere (UKZN)**, **Mrs Varsha Mooneeram-Chadee (UoM)**, **Dr Verena Tandrayen-Ragoobur (UoM)**, and **Professor Boopen Seetanah (UoM)**—we owe a debt of gratitude. Your generous investment of time, your valuable feedback, and your commitment to intellectual excellence have made this publication a reality.

Why This Theme Matters

The trio of *trade, technology, and transformation* lies at the very heart of today’s global debates. At a time when multilateralism is under strain, when supply chains are being redrawn by geopolitical rivalries, and when digital disruption is reshaping societies, Africa stands at a crossroads. Its ability to harness the transformative potential of trade and technology—anchored in resilient public digital infrastructure—will determine whether the continent’s future is characterised by dependency or empowerment.

- Trade remains Africa’s most direct link to the global economy. But its promise will only be realised if it is underpinned by productive capacity, competitive markets, and inclusive participation. Trade must become not just an exchange of goods and services, but a driver of equitable, transformative growth.
- Technology provides the tools to leapfrog development bottlenecks—from artificial intelligence to renewable energy systems—but without digital sovereignty, coherent regulation, and widespread access, these opportunities risk reinforcing inequality.
- Transformation goes beyond economics; it demands the societal reimagining necessary for Africa to turn opportunity into equitable development. Transformation is realised when inclusive growth, digital empowerment, and policy coherence converge.
- Public Digital Infrastructure (PDI)—digital identity systems, interoperable payment platforms, data exchanges, and secure connectivity—emerges as the invisible yet essential backbone linking trade, technology, and transformation. PDI makes possible cross-border trade facilitation, efficient public services, and digital participation by MSMEs, women, and youth. It ensures that trade integration is not an elite exercise but a truly inclusive, transformative process.

How the Papers Link to the Theme

The contributions in this volume collectively illuminate Africa's pathways for empowerment:

- Technology, Innovation, and the Digital Economy – Analyses of the Fourth Industrial Revolution, artificial intelligence, and digital platforms underscore the importance of building innovation ecosystems that serve development rather than extraction.
- Transformation through Inclusive Development – Discussions on gender equity, youth empowerment, and the knowledge economy reinforce that without broad participation, neither trade nor technology will yield sustainable transformation.
- Trade Integration and Regionalism – Papers on regional integration highlight the potential of the AfCFTA, but equally the risks of fragmentation if infrastructure and policy coherence are absent. Here, public digital infrastructure provides the connective tissue that makes integration real.
- Global Political Economy and Africa's Positioning – Cross-cutting reflections on supply-chain restructuring, climate finance, and Africa's voice in multilateral fora highlight that empowerment must be actively claimed, with PDI enabling the continent to participate in and shape the rules of global engagement.

Partnerships and Practice

We are honoured that this Conference was selected by the Infrastructure Technical Assistance Facility (ITAF) of the South African National Treasury, funded by the European Union, as its inaugural international Study Tour. This recognition underscores the crucial role of research, scholarship, and dialogue in bridging academia, policy, and practice. The ITAF mandate—to advance resilient, inclusive, and sustainable investment models—resonates strongly with the emphasis in these proceedings on building Africa's digital foundations for transformation.

Closing Reflections

This publication is therefore more than a record of conference proceedings. It reflects the spirit of partnership and the urgency of Africa's transformation, recognising that trade, technology, transformation, and public digital infrastructure are closely connected elements shaping the continent's future.

We trust that this volume will serve as both a resource and an inspiration for all who share the conviction that Africa's empowerment is not optional but essential to the global future we must build together.

We hope that you find these papers enlightening.

Sincerely,

- ✧ Tutwa Consulting Group
- ✧ University of KwaZulu Natal
- ✧ University of Mauritius
- ✧ WTO Research Chairs
- ✧ Hampton Group of Companies

The Partners: Trade, Technology and Transformation: Empowering Africa's Future Conference, 2025

Connected Communities and Smart Cities in Africa: Digital Transformation for Sustainable Urbanisation

By Joshua C. Ngoma and Stella Muhoro, Enterprising Africa Regional Network (EARN)

Abstract

Africa's rapid urbanisation and digitalisation are driving the rise of "connected communities"—city systems that integrate data-driven governance, advanced technologies, and sustainable infrastructure to foster inclusive growth. Using a qualitative multi-case approach, this study explores how African cities apply artificial intelligence, big data, and the Internet of Things to improve service delivery, optimise resources, and enhance quality of life. Examples include Nairobi's intelligent transport network and Kigali's sensor-based waste management. Recurring barriers—such as infrastructural gaps, fragmented regulation, limited digital literacy, and funding constraints—are shown to be mitigated through public-private partnerships, policy reforms, and digital skills programmes. Kenya's Konza Technopolis illustrates this trajectory, advancing from foundational infrastructure to a projected autonomous smart metropolis by 2050, expected to generate over 200,000 jobs. The findings demonstrate that connected-community strategies are not solely technological projects but critical pathways to low-carbon, resilient, and people-centred urban development, positioning African cities as global benchmarks for future-ready urbanisation.

Keywords - Connected Communities, Smart Cities, Digital Infrastructure, Sustainability, Public-Private Partnerships (PPPs), Digital Skills Development

1. Introduction

Urbanisation in Africa is accelerating at a pace unmatched elsewhere: cities that currently hold 47 percent of the continent's people are projected to absorb about 60 percent by 2050; a rate that UN-Habitat estimates is roughly twice the global average. Rapid growth strains transportation, energy, and social service systems, yet it also concentrates demand for new technologies and business models. The "connected community" approach, which embeds data networks, participatory digital platforms, and intelligent infrastructure in everyday urban functions, promises a holistic solution. Still, practical evidence is scattered and often misaligned with African realities such as widespread informality, limited fiscal space, and uneven connectivity.

To bridge that gap, this paper distils lessons from a cross-section of African initiatives, viewed through the analytical lens developed in Joshua C. Ngoma's recent book, *"It's Time for Africa: Embracing Our Ancient Roots and Charting a Prosperous Tomorrow"*. By integrating continental and selected global case studies, the

study focuses on smart mobility, renewable energy, and public safety systems, ultimately offering a context-sensitive roadmap for building resilient, inclusive, and technology-enabled African cities.

2. Research Aim, Question, and Methodology

Aim. This study examines how African cities utilise digital technologies to deliver inclusive, sustainable urban services and identifies the governance, financial, and skills conditions that enhance these efforts.

Central research question (RQ). Which combinations of governance structures, financing models, and human-capital strategies enable "connected community" projects in African cities to scale up and remain viable over time?

Hypothesis (H1). Projects that (i) embed a dedicated coordinating agency with decision authority, (ii) blend public, concessional, and private finance, and (iii) link infrastructure rollouts to locally run digital-skills programmes will exhibit greater longevity and reach than projects lacking one or more of these elements.

Multi-case design. A purposive sample of initiatives—selected for geographic spread, sectoral range, and differing maturity levels—forms the comparative base. Core sources comprise policy papers and project reports, triangulated with open datasets (such as those from the World Bank and UN-Habitat) and peer-reviewed research.

Konza Technopolis probe. To test H1 in depth, an explanatory single-case sub-study focuses on Konza Technopolis, a purpose-built “innovation city” with a seventeen-year documentary trail and a three-phase master plan. Primary evidence includes government white papers, master plan revisions, investor briefings, and semi-structured interviews with officials, private partners, and community representatives. Secondary material is derived from multilateral assessments, company filings, and the field notes of co-author Stella Muhoro, whose prior work at Konza provides contextual insight. All documents are publicly citable, and findings were cross validated against independent data where available.

3. Building Blocks of Connected Communities

A connected community is defined here as an urban ecosystem in which digital technologies enable inclusive growth, economic opportunity, and environmental stewardship. Its distinguishing feature is not merely the availability of Internet connections but the purposeful integration of digital tools into everyday activities so that all residents can learn, work, and participate in civic life.

The first requirement is a robust digital infrastructure that delivers affordable, high-speed connectivity to every household, business, and public institution. Equally important is digital literacy: citizens must possess the skills needed to navigate online services, access information, and engage in remote learning and employment. Without these competencies, even the most advanced networks fail to generate broad-based benefits.

Effective citizen participation constitutes a second pillar. Digital governance platforms—such as online budget portals or mobile feedback apps—give residents direct channels to influence policy and planning. In doing so, they enhance

transparency, strengthen accountability, and embed local knowledge into decision-making processes.

Third, connected communities function as laboratories for innovation and entrepreneurship. When cities support start-up incubators, makerspaces, and technology hubs, they stimulate job creation, diversify local economies, and build resilience against external shocks. These advantages are most widely accessible when support mechanisms are available to women, youth, and other underrepresented groups.

Finally, sustainability underpins the entire model. Smart grids, energy-efficient buildings, sensor-based water networks, and circular waste systems reduce ecological footprints while improving service reliability. Such measures also enhance the city’s capacity to adapt to economic or climate-related disruptions, thereby ensuring that progress remains durable.

In summary, the true test of a connected community is its ability to translate technological capacity into tangible benefits for humans, the economy, and the environment. Where digital infrastructure, literacy, participatory governance, innovation ecosystems, and sustainability practices converge, cities can create inclusive and future-ready environments for all residents.

3.1 Smart Infrastructure

Robust digital infrastructure is the cornerstone of any connected community, as it underpins communication, economic exchange, and efficient public services. Broadband, smart grids, intelligent transportation, and resilient data networks are all critical; yet, affordable high-speed Internet remains the primary enabler, especially in underserved areas.

3.1.1 Broadband connectivity: the Rwandan experience

Rwanda illustrates both the promise and the pitfalls of large-scale broadband roll-out. Under the National Broadband Policy (2013), the Government aimed for universal access by 2024 and, through a single wholesale network agreement with Korea Telecom Rwanda Networks, achieved 98 percent 4G population

coverage by 2019. The exclusive model, however, limited retail competition, kept data prices high, and suppressed take-up among low-income users. Fibre deployment also lagged, limiting digital literacy and further constraining effective use.

Recognising these shortcomings, policymakers introduced a market-driven regime in 2022 that permits multiple 4G/5G operators and encourages private capital. The ICT Sector Strategic Plan (2024-2029) complements this shift by targeting rural coverage and funding digital skills programmes. Early indicators suggest that 4G adoption is moving towards the Sub-Saharan average (MINICT, 2024).

Three lessons emerge. First, mobile and fibre networks should expand in tandem to balance reach and capacity. Secondly, competition at the retail level is essential for lowering consumer prices and boosting utilisation. Thirdly, infrastructure rollout must be coupled with sustained investment in digital literacy so that citizens can translate connectivity into social and economic gains.

3.1.2 Smart grids

Smart grids are digitally enabled electricity networks that combine sensors, automated controls, and two-way communication to improve the efficiency, reliability, and sustainability of power supply, capabilities that are vital for Africa's fast-growing yet fragile energy systems. The EU-funded Smart Energy Solutions for Africa (SESA) programme, launched in October 2021, illustrates current progress: working initially in Kenya, and ultimately in eight additional partner states (Ghana, Malawi, Morocco, Namibia, Nigeria, Rwanda, South Africa, and Tanzania), SESA pilots "living-lab" micro-grids and then replicates successful models across the region (CORDIS, 2024).

Digital monitoring allows operators to locate faults and reroute electricity within seconds, substantially reducing the blackouts that impede hospitals, schools, and industry (UNU, 2023). Real-time metering simultaneously lowers technical losses and theft, cutting costs for utilities and end-users. Because power can flow in both directions, smart grids also stabilise the

variable output of solar and wind installations, enabling households to export surplus energy and thus accelerating renewable-energy adoption.

The principal barriers are high initial investment requirements for digital equipment and network upgrades, as well as a shortage of engineers capable of installing and maintaining these advanced systems. Overcoming these obstacles will require blended finance, supportive regulatory frameworks, and dedicated workforce-development initiatives. If such measures are adopted, continent-wide deployment of smart grids could deliver a cleaner, more resilient, and more affordable energy future for Africa.

3.1.3 Intelligent transport

Intelligent Transportation Systems (ITS) deploy artificial intelligence sensors, adaptive traffic signals, and continuous data streams to reduce congestion, enhance road safety, and promote low-carbon mobility—an urgent priority as African cities outgrow their legacy road networks. Nairobi offers a current example. In November 2024, the Kenya Urban Roads Authority (KURA) awarded Phase 1 of the city's ITS to Samsung C&T, stipulating mobilisation in March–April 2025. Groundworks began in April 2025 at twenty-five pilot junctions and at the City Cabanas Traffic Management Centre, and by mid-June, ducting, power feeds, and mast foundations were reported on schedule (KURA, 2025). When operational, smart cameras, variable-timing lights, and a central control room will enable algorithms to adjust signal phases in real-time, reducing the lengthy queues that currently cost commuters hours each day.

Automated incident detection will accelerate emergency response and enforcement—critical in a region with some of the world's highest traffic-fatality rates—while the continuous flow data will inform bus-lane design, smart-parking policy, and non-motorised-transport planning, thereby lowering emissions and travel times.

The chief implementation barriers are high capital costs for digital equipment, uneven electricity and fibre coverage, limited cybersecurity capacity, and the need for tight

inter-agency coordination. Experience elsewhere suggests that blended public-private finance, targeted skills training, and clear regulatory frameworks are necessary to overcome these hurdles and scale ITS across the continent. If these conditions are met, projects such as Nairobi's could transform chronic congestion into safer, smoother, and more sustainable urban mobility.

3.1.4 Digital public services

By shifting transactions and records online, digital public services shorten queues, cut paperwork, and make governmental processes more transparent. South Africa's e-Services portal—initially announced in 2004 under the Batho Pele ('People First') programme—illustrates this transition (ITWeb, 2004; Parliamentary Monitoring Group, 2004). The platform now aggregates dozens of agencies on a single website, where residents can renew driving licenses, apply for passports or identity documents, register businesses, and submit tax returns. Personalised dashboards provide real-time status updates, reducing processing times from weeks to minutes (eServices, 2024).

The audit trail created by an end-to-end digital workflow helps curb corruption and builds public trust. Accessibility features, such as screen-reader compatibility, simplified navigation, and multilingual support, widen the reach. However, rural broadband deficits and low digital literacy still exclude many citizens. Additionally, cybersecurity, data privacy protection, and system reliability require ongoing investment and user education.

Future scalability across the continent will depend on broader broadband coverage, stronger cyber defences, more intuitive user interfaces, and the incorporation of emerging technologies such as artificial intelligence for automated verification and blockchain for tamper-evident records. Addressing these prerequisites can enable African governments to deliver faster, fairer, and more accountable public services.

3.2 Smart Governance

Digital tools are reshaping public administration

across Africa. Open-data portals, mobile feedback applications, and biometric identity schemes allow governments to deliver services more efficiently, curb corruption, and strengthen public trust. By making official information readily accessible, such platforms foster evidence-based policy and invite citizens to participate more directly in civic life.

3.2.1 Open-data platforms

An open-data portal converts government records—budgets, census tables, examination scores, health statistics—into machine-readable datasets that anyone can download, analyse and republish. This transparency supports investigative journalism, enables civic tech applications, and improves interagency coordination.

Kenya pioneered the model in Africa with the launch of its national portal on 8 July 2011 (opendata.go.ke). The site quickly became a resource for journalists exposing irregular expenditure, for civil-society developers building service-tracking apps, and for planners seeking cross-sector evidence. Subsequent evaluations, however, highlight persistent weaknesses: many datasets are updated only sporadically; some ministries withhold sensitive information; and limited Internet coverage and data analysis skills constrain public use (World Bank, 2022).

For open data to serve as a cornerstone of accountable governance, three conditions are necessary. First, mandatory and frequent dataset updates must be codified in law. Secondly, interfaces ought to be mobile-friendly and require minimal bandwidth. Thirdly, training programmes are needed so that citizens, journalists, and entrepreneurs can convert raw numbers into actionable insights. Meeting these requirements would enable open-data platforms to underpin a more transparent and innovation-oriented public sector across the continent.

3.2.2. Citizen engagement platforms

Digital feedback portals offer residents an immediate channel to communicate with municipal officials, allowing them to report service issues, track progress, and provide feedback on performance. Cape Town's City

Connect portal, for example, allows users to file “C3” requests for issues such as missed refuse collection or potholes, and then track each case on the same dashboard (City of Cape Town, 2024). The shared log makes officials visibly accountable and supplies managers with data on recurrent faults, thereby guiding resource allocation and policy revision.

Where response times fall, public trust tends to rise; conversely, gaps in internet coverage or digital skills exclude many citizens. To broaden participation, cities must add low-bandwidth channels—such as SMS, USSD, or walk-in centres—and couple the portal with digital literacy programmes.

3.2.2 Digital identity

A robust digital identity system allows individuals to authenticate themselves once and reuse that credential across multiple services, reducing fraud and administrative costs.

Nigeria’s National Identity Management Commission, created in 2010, issues every resident an 11-digit National Identification Number (NIN). More than 110 million people have enrolled, and banks, telecoms, and passport offices now require the NIN for transactions ranging from opening an account to linking a SIM card (NIMC, 2024; Arise News, 2024). Centralisation helps detect duplicates and forged documents.

However, implementation is hindered by a patchy power supply, slow rural enrolment, and concerns over data breaches. Many adults also lack foundational documents such as birth certificates. Mobile, offline-capable enrolment kits and stringent privacy safeguards are therefore essential. If combined with regular data audits and explicit legal protections, digital ID schemes could become a cornerstone of inclusive, data-driven governance across Africa.

3.3 Smart Economy

A smart economy takes shape when digital infrastructure, entrepreneurial support, and inclusive finance combine to enable citizens to create, market, and pay for new ideas. Three elements—technology hubs, skills pipelines, and mobile money—illustrate how this ecosystem is

emerging across Africa.

3.3.1 Technology hubs and incubators

Technology hubs serve as focal points for digital innovation, offering entrepreneurs shared workspace, mentorship, investment opportunities, and a peer community where ideas can flourish. Nairobi’s iHub illustrates this model. Established in March 2010 by Erik Hersman, Juliana Rotich, and David Kobia with seed support from the civic-tech platform Ushahidi, the centre was conceived as a collaborative venue for web and mobile developers (African Cube, 2024). Since then, it has evolved into a regional innovation powerhouse, having supported more than 450 start-ups. Its programme mix—co-working membership, investor-matching events, technical workshops, and targeted schemes such as the Women-in-Business initiative—aims to strengthen both hard and soft components of entrepreneurial capacity (iHub, 2024).

Global firms, including Google, Facebook, and the World Bank, have partnered with the hub, underscoring its international relevance and providing additional resources for resident ventures. iHub’s track record now serves as a template for other African cities seeking to anchor knowledge-based growth in locally rooted yet globally connected innovation ecosystems.

3.3.2 Digital-skills training

The growth of Africa’s digital economy has intensified demand for software engineers, prompting the rise of specialised training schemes. Andela—established in Lagos in 2014 by Jeremy Johnson, Iyinoluwa Aboyeji, and colleagues—illustrates how such programmes can align education with global market needs (Andela, 2024). The company recruits promising developers, mentors them in languages such as Python, JavaScript, and machine learning, and then places graduates in remote roles with international firms. Seeded by a USD 24 million Series B investment from the Chan Zuckerberg Initiative in 2016, Andela expanded to Kenya in 2015 and Uganda in 2017 and, by 2020, had adopted a fully remote model that sources talent in more than 135 countries.

Independent assessments show that the model closes skills gaps by combining project-based learning with exposure to international engineering practices. It has also demonstrated that physical location need not constrain participation in high-value digital work. With Carrol Chang appointed chief executive in August 2024, the organisation continues to position African developers as a significant resource for the global technology sector (IFC, 2024).

3.3.3 Access to finance

A smart economy cannot emerge unless entrepreneurs and households can obtain reliable, low-cost financial services. Mobile money has proven to be the most scalable solution to Africa's long-standing problem of economic exclusion. The leading example is M-PESA, launched in Kenya in 2007 by Safaricom and Vodafone, following a £1 million grant from the UK Department for International Development that supported the original concept of phone-based micro-loan repayment (Safaricom, 2024). User behaviour during the pilot quickly broadened the system's remit from loan servicing to person-to-person transfers, bill payment, and—later—digital credit and savings. The platform now operates in Tanzania, Mozambique, Ghana, Lesotho, Egypt, South Africa, and several non-African markets, and has introduced millions of previously unbanked citizens to formal finance (Vodafone, 2024).

By making transfers instantaneous, secure, and inexpensive, M-PESA enhances household resilience, reduces transaction costs for small businesses, and creates a data trail that can underwrite microcredit. Its success underscores the broader argument of this section: technology hubs such as iHub provide innovation spaces, skills programmes like Andela build human capital, and fintech solutions like M-PESA unlock capital flows. Together, these three pillars are laying the foundation for a resilient, innovation-driven African economy.

3.4 Smart Sustainability

Smart communities in Africa are leveraging digital technologies to reduce their ecological footprints and enhance urban resilience. Their efforts encompass the adoption of renewable energy,

data-driven water management, high-performance building design, and sensor-enabled waste systems, demonstrating how resource efficiency can be integrated into everyday urban practice.

3.4.1 Promotion of renewable energy

Access to reliable electricity remains uneven across much of rural Africa, making decentralised renewables—particularly solar power—a critical lever of sustainable development. Barefoot College's "Solar Mamas" programme offers a widely cited model of how off-grid solutions can be paired with community empowerment. Established in 1972 by Sanjit "Bunker" Roy, Barefoot College trains women from remote areas as solar engineers through a six-month, hands-on course that utilises visual instruction, making it suitable for participants with limited formal education (Barefoot College, 2024). Trainees learn to assemble and maintain photovoltaic home-lighting systems, LED lamps, and charge controllers, after which they return to their villages to install and service the equipment.

To date, more than 3,500 women from ninety-three countries, including Zanzibar, Burkina Faso, and Fiji, have completed the programme, bringing solar lighting to an estimated 2.5 million people. The scheme reduces greenhouse-gas emissions, expands energy access, and empowers women in technical leadership roles, thereby advancing several UN Sustainable Development Goals related to clean energy, gender equality, and climate resilience. Its replication across diverse socio-economic contexts suggests that locally grounded training, rather than donor-driven equipment drops, is fundamental to the long-term success of rural electrification efforts.

3.4.2 Smart water management systems

Climate-prone cities need real-time control of water. Cape Town offers a clear example. During the 2015–18 drought, the city faced the risk of "Day Zero," when taps might run dry. Officials partnered with national agencies, firms, and donors to act quickly (City of Cape Town, 2024). They installed about 450,000 smart meters that sent half-hourly consumption data. Pressure valves located leaks and reduced losses. Live

dashboards showed dam levels and daily use. An intensive media campaign urged households to save water.

The results were striking. Total demand fell from roughly 1.2 billion litres a day in 2015 to under 500 million litres at the crisis peak. Per-person use dropped to about 50 litres per day. Cape Town avoided Day Zero. The case demonstrates that data-driven tools can effectively manage extreme water stress and foster long-term resilience.

3.4.3 Green building practices

Green buildings reduce energy consumption, conserve resources, and enhance staff comfort. The EDGE office in Amsterdam, though not located in Africa, shows what is possible. Completed in 2015 by OVG Real Estate, PLP Architecture, and Arup, the block is classified as carbon-positive (EDGE Technologies, 2024). Roof and façade panels generate more power than the building needs. Smart LEDs run on Power-over-Ethernet and enable occupants to adjust the light and temperature using a phone app. An AI platform tracks occupancy and adjusts heating, cooling, and lighting in real-time. Flexible floor plates and large atria allow daylight to penetrate deeply into the workspace, providing a bright and inviting environment.

The EDGE holds a BREEAM “Outstanding” score of 98.4 per cent, one of the highest ever recorded. Post-occupancy surveys report higher worker productivity and satisfaction, linking sustainability to human well-being. By coupling renewables, sensors, and user control, the project offers a template for offices that meet environmental, social, and economic goals.

3.4.4 Waste-management technologies

Smart waste systems can cut collection costs and raise recycling rates. Kigali’s pilot, launched in November 2021 by the city council, the Ministry of ICT and Innovation, RISA, Smart Africa, and NORAD, shows the approach (MINICT, 2024). Bins equipped with IoT sensors report their fill level in real-time. A geo-tagged dashboard then plots the most efficient route for collection trucks. The city also adopted a three-colour scheme—green for organics, blue for recyclables,

and grey for e-waste—to improve source separation.

Early results are positive. Overflow incidents have fallen; fuel use and operating costs are lower; recycling volumes are up, supporting Kigali’s shift toward a circular economy. The experiment suggests that sensor data, route optimisation, and simple segregation rules can help other African cities move toward zero-waste goals.

Across Africa, technology-driven projects are showing how cities can grow while protecting the planet. Solar Mamas brings clean power to off-grid villages; Cape Town’s AI-guided meters help households reduce water use; Amsterdam’s EDGE office, although not in Africa, proves that smart buildings can generate more energy than they consume; and Kigali’s sensor-linked bins shrink landfill and fuel costs. Together, these examples demonstrate that data, renewables, and inclusive design can reduce emissions, enhance resilience to climate shocks, and make urban life healthier and more prosperous. By scaling such green, digital solutions, African cities are charting a path toward climate-smart growth that safeguards both people and the environment.

4. Case Studies of Connected Communities

This section examines a real-world case study of connected communities, showcasing the unique approaches, challenges, and outcomes.

4.1 Konza Technopolis, Kenya

Konza Technopolis, popularly branded “Silicon Savannah”, is the Government of Kenya’s flagship Vision 2030 initiative for fostering a knowledge-based, low-carbon economy (Ministry of ICT, 2024). The new city is being developed approximately 64 km south of Nairobi on approximately 5,000 acres (approximately 2,030 hectares). Its master plan integrates high-capacity fibre-optic networks, renewable energy generation, smart utility grids, and mixed-use zoning, allowing residential, commercial, and educational activities to be managed through a common, data-driven infrastructure layer. By analysing Konza’s planning logic, implementation sequence, and early performance, the present study derives transferable lessons for other

regions that seek to establish inclusive and sustainable “connected communities.”

4.1.1 Phase 1 (2013-2020): laying the digital foundation

Planning began in 2008–09, when Kenya requested that the International Finance Corporation prepare a private investment model for a new technology city (IFC, 2009). The State acquired 5,000 acres (approximately 2,030 hectares) at Malili Ranch in 2010–2012, and President Mwai Kibaki broke ground in January 2013 (All Africa, 2013).

Construction focused on basic infrastructure. Crews built access roads that linked the site to the Mombasa-Nairobi highway, laid a fibre-optic backbone, and installed power and water grids. The nine-storey Konza Complex opened in 2019 as the first office block (Konza, 2020). A containerised Tier-III National Data Centre was established in 2020, offering secure cloud space for government and private clients and demonstrating the site’s digital credentials (Kenyan Wall Street, 2020).

Intensive marketing attracted early interest from ICT firms, biotech start-ups, universities, and global tech companies. Feasibility studies projected thousands of jobs and strong GDP gains (Adrianople Group, 2018). Even so, late fund disbursements, slow regulatory approvals, and investor caution delayed several milestones (The Star, 2020; ResearchGate, 2021).

By the end of 2020, the essentials were in place, roads, utilities, fibre, a data centre, and an administrative hub, providing enough confidence for anchor tenants to reserve plots. With the physical spine complete, Phase 2 can focus on developing a central business district, green housing, university campuses, and AI-enabled transportation networks, transforming the groundwork into a functioning smart city (Konza, 2021).

4.1.2 Phase 2 (2021–2030): Expanding Konza into a Thriving Innovation Hub

Phase 2 focuses on filling the serviced land with economic and research activity. A central business district is taking shape around major tenants: Safaricom’s mobile-finance lab, Google’s

cloud and AI hub, Microsoft’s African Development Centre, and Huawei’s 5G R&D unit. Local firms such as Twiga Foods and M-KOPA, together with a satellite of Nairobi’s iHub, add a start-up dimension that has earned Konza the label “Africa’s Silicon Savannah.”

Residential quarters now under construction meet green-building codes and draw power from on-site solar arrays connected to a learning smart grid. Bus-rapid-transit lanes and cycle paths knit the precincts together, echoing the energy-saving and waste-sensor systems discussed earlier. A research zone, led by the Kenya Advanced Institute of Science and Technology, IBM Research Africa, and Strathmore’s @iLabAfrica, is expected to supply skills in AI, biotechnology, and cybersecurity (LinkedIn, 2025).

Fiscal incentives, African Development Bank loans, and World Bank urban-support grants have kept capital flowing. By 2025, the site had attracted more than seventy investors and generated several thousand ICT and construction jobs; projections still anticipate about 200 000 posts at full build-out (Citizen Digital, 2025; Nipashe Biz, 2025). The convergence of business space, housing, and R&D sets the foundation for Phase 3, which aims to deliver a carbon-neutral, fully automated metropolis.

4.1.3 Phase 3 (2031–2050): The Transformation into a Global Smart Metropolis

Phase 3 will convert Konza’s basic grid of roads and buildings into a fully integrated city. Homes, offices, laboratories, and parks will be situated in mixed-use blocks. A bus-rapid-transit spine, cycle lanes, and autonomous shuttles will enable most journeys to occur without the need for private cars.

Net-zero targets will shape every new structure. Rooftops will carry solar panels; wind arrays on the city rim will link to a smart learning grid; and waste-to-energy plants will close material loops.

A dense layer of sensors will act as the city’s nervous system. Artificial-intelligence software will balance power demand, guide traffic, spot water leaks, and dispatch emergency crews in real time. Blockchain ledgers will secure public

records, and tele-health apps will cut waiting times. Driverless buses are expected to reduce congestion and emissions further.

By 2050, planners expect Konza to house global research centres, multinational technology headquarters, and deep-tech start-ups. The aim is a knowledge economy that also meets strict climate-resilience standards, offering a model of walkable design, renewable energy, and circular waste management for other African cities.

4.2 Economic Impact and Opportunities

At completion, Konza is projected to generate about 200,000 jobs and attract sustained flows of domestic and foreign capital. Its fibre network, tax reliefs, and Tier-III data centre have already drawn data-hosting firms, software studios, BPO providers, and AI or cybersecurity labs, thereby strengthening Kenya's position in Africa's digital economy. The same infrastructure supports fintech ventures, e-commerce platforms, and cloud analytics companies that require secure, low-latency services.

Life-science facilities—including wet laboratories and a planned teaching hospital—are attracting pharmaceutical, biotech, and tele-health investors, establishing Kenya as a regional hub for drug discovery, AI-enabled diagnostics, and public health modelling. Parallel investments in solar farms, smart grids, waste-to-energy plants, and pilot nanotechnology lines underpin an emerging green-manufacturing cluster focused on low-carbon materials and automated production.

Venture funds and incubators are partnering with Konza's universities to accelerate early-stage firms, while streamlined permits and one-stop customs desks encourage multinationals to set up regional headquarters.

Together, these measures channel foreign direct investment, raise export competitiveness, and provide Kenyan entrepreneurs with a launch pad into global markets, confirming Konza's role as a leading engine of African innovation.

4.3 Key challenges and responses

Konza's schedule has slipped because finance, permits, and investor confidence have arrived

more slowly than anticipated in the master plan. Up-front costs depend heavily on foreign loans and PPP structures; delayed disbursements have stalled construction and incentives for anchor tenants. Land, environmental, and utilities approvals require multiple signatures, adding administrative drag. Early bottlenecks made some firms adopt a "wait-and-see" stance, further slowing momentum. In response, government and lenders have diversified funding channels, simplified approval workflows, and linked lease agreements to time-bound building milestones. These measures, together with continuing private interest and multilateral support, are gradually restoring pace and credibility.

4.4 Blueprint for Africa's Smart Cities

Konza Technopolis, the flagship of Kenya's Vision 2030, showcases how an African city can integrate artificial intelligence, the Internet of Things (IoT), and blockchain into its day-to-day urban operations. The project targets billions of Kenyan shillings in investment, and a research mix spanning ICT, biotechnology, fintech, and advanced engineering. Smart grids, water-efficiency systems, and net-zero buildings ground the development in climate resilience, while local universities and start-ups supply talent and innovation. As Konza moves toward full build-out in 2050, it demonstrates that Africa can define, rather than merely adopt, global standards for sustainable, technology-driven urban growth.

4.5 Cross-Case Analysis

The case studies reveal four recurrent success factors. Affordable last-mile connectivity is crucial; subsidised spectrum and community networks increase user uptake more effectively than single wholesale models, as demonstrated by Rwanda's mobile expansion. Fresh data is equally important; open-data portals that update at least quarterly sustain civic-tech activity, whereas infrequent refreshes erode engagement. Clear institutional ownership speeds up delivery; specialised bodies, such as the Konza Technopolis Development Authority, outperform ad-hoc, interdepartmental committees. Finally, talent pipelines yield the best results when training schemes, such as Andela, are paired with procurement rules that

allocate public contracts to domestic tech firms.

Persistent barriers remain, notably ambiguous regulations for cross-border data flows, fragmented project finance, and wide digital-literacy gaps among women and low-income groups.

4.6 Policy Recommendations

- i. **Blended finance for digital infrastructure.** Cities should combine green bonds with concessional loans from development-finance institutions (DFIs) and outcome-based grants. This mix lowers private-sector risk and enlarges the capital pool for broadband and smart-grid projects.
- ii. **Data-by-default legislation.** National laws should mandate the continuous, machine-readable release of all non-sensitive public datasets. Governments should pair this requirement with privacy-preserving AI sandboxes that allow researchers to test algorithms on de-identified data.
- iii. **Digital-skills compacts.** Corporate tax incentives should be linked to measurable contributions—financial or in-kind—to coding boot camps, vocational colleges and apprenticeships, with quota targets for women and youth. Such compacts align private training investment with national human-capital objectives.
- iv. **Resilience-first urban zoning.** Building codes should require water-recycling systems, rooftop solar arrays and circular-waste designs in new developments. Compliance can be rewarded through lower land-use fees and fast-track permitting, embedding climate resilience at minimal fiscal cost.

5. Conclusion: Towards an African Model of Inclusive, Smart Urbanisation

Africa's recent experiences in projects such as Konza Technopolis, Nairobi's AI-directed traffic network, Cape Town's data-driven drought response, and the SESA smart-grid pilots demonstrate that connected-community strategies can convert digital infrastructure into tangible gains in diversification, service efficiency, and climate resilience. These cases show that technology works best when it is

matched with participatory governance, phased blended finance and systematic skills investment. The continent's youthful population provides ample adaptive capacity, yet it also exposes the cost of patchy broadband and weak training pipelines.

Despite progress, three obstacles continue to stall scale-up. Firstly, the infrastructure financing gap, estimated at approximately USD 80 billion per year, cannot be bridged solely with domestic revenue. A clearer evidence base is needed on how combinations of municipal bonds, land-value capture, and outcome-linked concessional debt can reduce risk and attract institutional investors. Secondly, regulatory fragmentation inflates timelines as separate land, energy, and data-protection agencies demand duplicative approvals. Comparative research on one-stop permitting authorities, such as the Konza Technopolis Development Authority, could reveal a transferable design for integrated licensing. Thirdly, gendered digital divides persist; women and low-income youth remain underrepresented in tech work and are less likely to use e-government portals. A rigorous evaluation of quota-linked training vouchers and subsidised handset schemes would inform equitable interventions.

Several practical steps can address these shortcomings. National treasuries, working with development financiers, can pioneer green bonds secured against future increases in surrounding land value. Independent verification of environmental and social outcomes would lower coupon rates and mobilise pension-fund capital. Urban affairs ministries should introduce "data-by-default" laws that require agencies to publish non-sensitive datasets in machine-readable form on a quarterly basis, embed privacy assessments at the outset, and allow researchers to test algorithms on de-identified records within regulated sandboxes.

Public, private, and academic partners can negotiate competency-based skills compacts that tie tax incentives to measurable contributions, whether funding, curricula, or mentorship, made to coding boot camps and vocational colleges. Minimum female-enrolment thresholds and means-tested stipends would ensure that

opportunity is shared.

Looking to 2050, Africa can leapfrog carbon-intensive urban models if it institutionalises net-zero building codes, mainstreams AI-enabled service delivery, and embeds circular economy metrics in municipal dashboards. Failure to act decisively would lock fast-growing cities into high-emission, low-trust, and low-productivity trajectories at the very moment climate volatility intensifies. The window for strategic choice is

open now. By codifying lessons in regional standards under the African Continental Free Trade Area and aligning finance, governance, and skills at scale, Africa can transition from a consumer to a producer of digital-urban solutions. Demographic pressure, climate risk, and global digitalisation make such a course not merely desirable but imperative, and the evidence assembled in this study suggests that the continent has both the capability and the resolve to lead.

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Understanding the potential of Digital Public Infrastructure on Growth in Sub-Saharan Africa: ODA Trends and Strategic Options

By Jayanthi Basdew and Katlego Nkgudi, National Treasury of South Africa

Abstract

This paper explores the transformative potential of Digital Public Infrastructure (DPI) in driving inclusive growth and economic development in Sub-Saharan Africa. It examines demographic dynamics, theoretical frameworks, and the role of DPI in fostering innovation, governance efficiency, financial inclusion, and trade modernisation. Using Official Development Assistance (ODA) trends from 2017–2021, the study highlights the increasing role of Development Assistance Committee (DAC) donors, Multilateral Development Banks (MDBs), and private actors in financing DPI. Case studies from India, Estonia, Kenya, and Ghana illustrate the practical impact of DPI in accelerating digital adoption and enabling structural transformation. Despite progress, challenges remain, including funding gaps, digital literacy, and regulatory constraints. The paper recommends innovative financing models, harmonised standards, and public-private partnerships to scale DPI. Anchored in global initiatives such as the G20 Digital Economy Track, these strategies can enable Africa to harness its youthful population and leapfrog traditional development pathways toward a digitally inclusive economy.

Keywords - Digital Public Infrastructure, Sub-Saharan Africa, Official Development Assistance, financial inclusion, digital governance, G20

1. Digital Public Infrastructure: Driving growth and social development in the digital era

Africa's population was estimated to be over 1.48 billion people in 2024 and is projected to grow to over 1.7 billion people by 2030 (and more than double the current population by 2050). Roughly 400 million Africans are aged 15 to 35, making Africa the youngest population in the world. This level of growth also makes Africa the fastest-growing continent by population. For comparison, on the current population growth trajectory, where the population is expected to reach 4 billion people by 2100, Africa's youth will be equivalent to twice the population of Europe (Ogunleye, 2023). It is little wonder then that there have been clear calls to action for African countries to design and implement policies that exploit the youth dividend toward fostering economic growth and social development (Bekele-Thomas and Westgaard, 2024). Digital public infrastructure and the potential to

leverage the advantage of a young workforce to support the fourth industrial revolution, present an opportunity to African countries to leap forward in economic growth.

Moreover, the importance of digital public infrastructure (DPI) was underscored by the advent of the COVID-19 pandemic, where the ability of individuals to digitally communicate and trade, as well as for companies and governments to remain productive under *lockdown* conditions became all important. Since then, the focus on DPI has intensified, placing digital capability at the forefront of development discourse, as reflected in the G20 digital economy track (G20, 2023) and other multilateral development policy platforms. By providing dependable, secure, and fair access to digital goods and services, DPI systems serve as fundamental frameworks that enable individuals, businesses, and governments to create value through expanded digital

capabilities, inclusive participation, and enhanced service delivery.

While this paper presents the current landscape of investment into DPI globally by reviewing secondary data about official development assistance (ODA)¹, the intended value contribution is to deliver possible options and suggestions about how African governments can leverage development cooperation and ODA flows to drive rapid growth and utilisation of DPI. Within this, this paper will present an initial scoping of international development partners who are active in the DPI sector, elucidating opportunities for the global South and African countries. The paper also presents case studies illustrating how DPI has been used to improve e-government, trade modernisation, social development, and financial services, demonstrating its practical applications in driving economic growth.

1.1 Theoretical Framework: Innovation and Adoption Perspectives on DPI

Schumpeter's Theory of Innovation asserts that economic development is driven by a process called "creative destruction," where new technologies disrupt existing structures to create more efficient systems. DPI there act or can act as a disruptive force that can catalyse new sectors (e.g., fintech, e-health and e-commerce) and enhance productivity while replacing outdated governance and service delivery systems.

Schumpeter emphasised that innovation often emerges from entrepreneurial ecosystems and is enabled by investment in infrastructure, education, and institutions – all of which are critical components of effective DPI strategies. In the African context, this theory underscores the need for robust digital infrastructure and a regulatory environment that nurtures

innovation. Digital Public Infrastructure, when designed to be dependable, secure, inclusive, and interoperable, becomes a catalytic public good. It reduces entry barriers for young entrepreneurs and SMMEs, enabling them to innovate, scale, and compete in new digital markets. This reflects the kind of bottom-up, disruptive innovation that Schumpeter viewed as essential to long-term economic agility and structural transformation (Obiya, 2024). The *Technology Adoption Lifecycle* offers a perspective through which to view the potential impact of DPI on socio-economic improvements. This theory explains how different segments of a population adopt new technologies over time: innovators, early adopters, early majority, late majority, and laggards (Kolade et al. 2022). Applying this model to DPI, countries like Estonia and India represent early adopters, having developed interoperable systems across ID, payments, and data exchange.

In Africa, nations fall across the spectrum. Kenya, with M-Pesa, is a leading early adopter in financial DPI. Meanwhile, Nigeria's slower uptake of the eNaira illustrates challenges faced by early majority contexts — such as user mistrust, insufficient integration, and unclear use cases. The model suggests that successful DPI diffusion requires demonstrated value to users, robust technical infrastructure, public-private collaboration, and tailored user support strategies such as improving digital literacy.

This lifecycle perspective is crucial for understanding both the pace and pattern of DPI adoption across the continent and tailoring policy interventions to move countries from experimentation toward maturity.

While theoretical perspectives help clarify *why* Digital Public Infrastructure (DPI) matters — as both a catalyst for innovation and a product

¹ Donor Tracker provides data about Financing DPI for Inclusive and Sustainable Development

<https://donortracker.org/publications/financing-dpi-for-inclusive-and-sustainable-development>

shaped by adoption cycles — understanding *how* it is financed is equally critical. The realisation of DPI's potential in Africa depends not only on its design and usability but also on the scale and sustainability of investments flowing into these

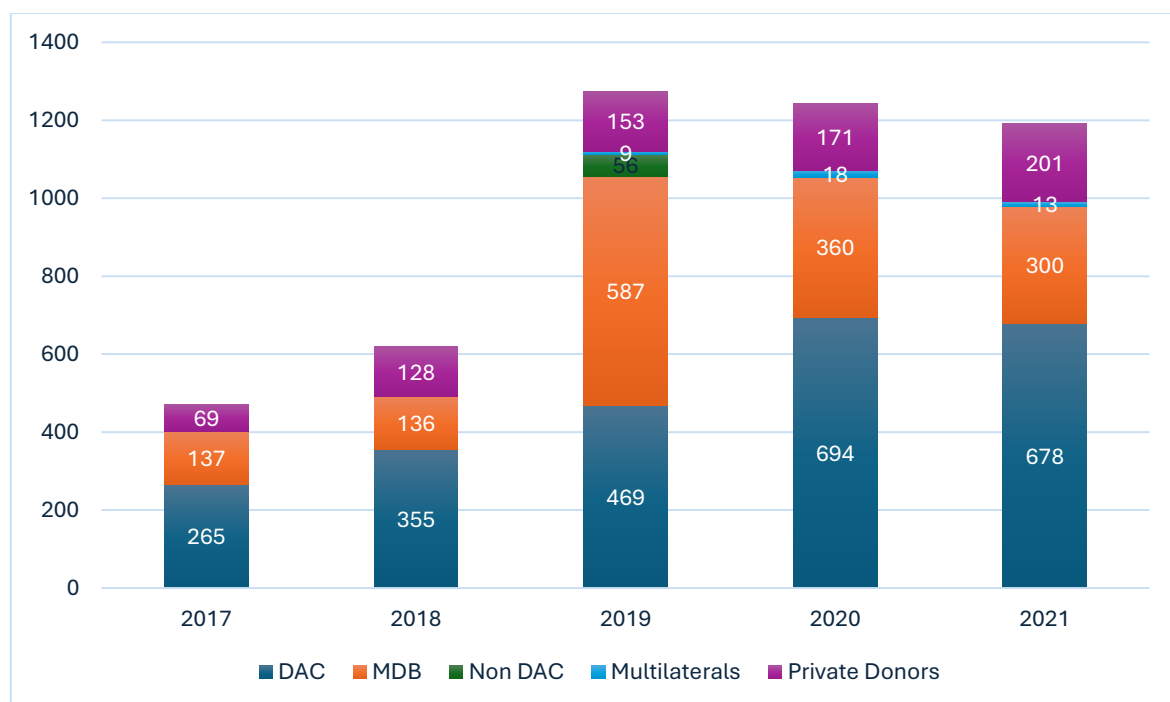
2. Funding Sources and Trends in Digital Public Infrastructure (DPI): An ODA Perspective

DPI has become an essential foundation for growth in this digital era, with a wide impact including economic development, social inclusion, to environmental management. The OECD CRS dataset shows that funding for DPI increased by over 150% between 2017 and 2021, with almost US\$1.2 billion disbursed in 2021 to DPI-related projects (Aleina, 2023).

systems. The section below explores the evolving landscape of Official Development Assistance (ODA) and other funding sources for DPI, offering insight into the trends, actors, and sectoral priorities shaping its rollout across the continent.

The data further shows that the main funders of DPI were Development Assistance Committee (DAC) member state donors. DAC donors provided around 60% of the total funding, while Multilateral Development Banks (MDBs) provided 23%. Private donors comprised mainly philanthropic organisations, provided 17% of ODA for DPI. Figure 1 shows funding trends over time from 2017 -2021.

Figure 1. DPI Funding trends over time, 2017-2021, US \$ millions



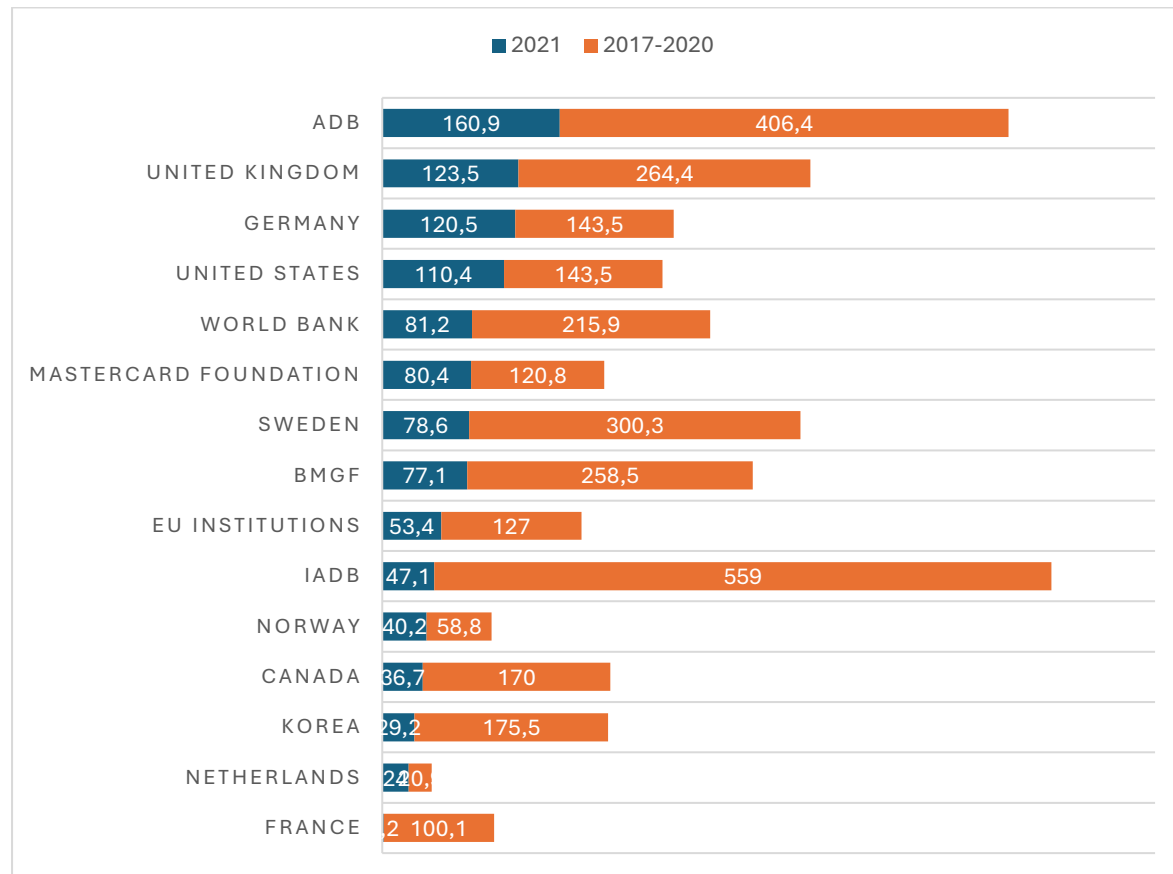
Source: OECD quoted in Aleina, F,C (2023) **Financing DPI for Inclusive and Sustainable Development**
Available from: <https://donortracker.org/publications/financing-dpi-for-inclusive-and-sustainable-development>

Figure 2 below shows the top donors for DPI-related funding. The DAC member countries funding the most to DPI are the United Kingdom

(UK), Germany, the United States (US), Sweden, and Canada. Together, these donors constituted 41% of total DPI funding and 72% of DPI funding

from DAC donors in 2021. South Korea, EU Institutions, France, Norway and the Netherlands are also important donor markets (Aleina, 2023).

Figure 2. Top donors for DPI-related funding, US\$ million



Source :OECD quoted in Aleina, F,C (2023) **Financing DPI for Inclusive and Sustainable Development** Available from: <https://donortracker.org/publications/financing-dpi-for-inclusive-and-sustainable-development> Accessed 13 February 2025

Bandura, McLean, and Girgvliani (2024), whose research focuses on the role of the private sector in driving investment in DPI, point out that the sources of domestic investment into DPI vary greatly between high-income developed nations and developing countries. In high-income countries, early-stage DPI investment and development is driven by government expenditure – as is the case in large public infrastructure initiatives where there are significant positive externalities for the economy, but without sufficient mechanisms for private

sector investors to recoup the full costs through the market. Developed nations have benefited from this advantage to become leaders in digital economies and technological innovation. This is exemplified by cutting edge technologies and digital products such as those emerging from Silicon Valley in the US. Major technology companies such as PayPal, Nvidia, Apple, IBM, Starlink and Microsoft have benefitted from DPI and become drivers of economic growth, not to mention companies in the entertainment and

social media sectors such as Netflix, Spotify and Twitter/X.

In contrast, low- and middle-income countries (LMICs) often face challenges in securing sufficient funding for DPI projects (Bandura, et. Al, 2024). These countries typically rely on funding from external and internal sources, such as multilateral organisations, private investors, and philanthropic entities. According to data from the Organisation for Economic Cooperation and Development (OECD), ODA continues to be a crucial funding source for DPI, along with loans from multilateral development banks (MDBs) and development finance institutions. Additionally, grants from members of the OECD DAC are used to provide technical assistance in designing DPI solutions for LMICs.

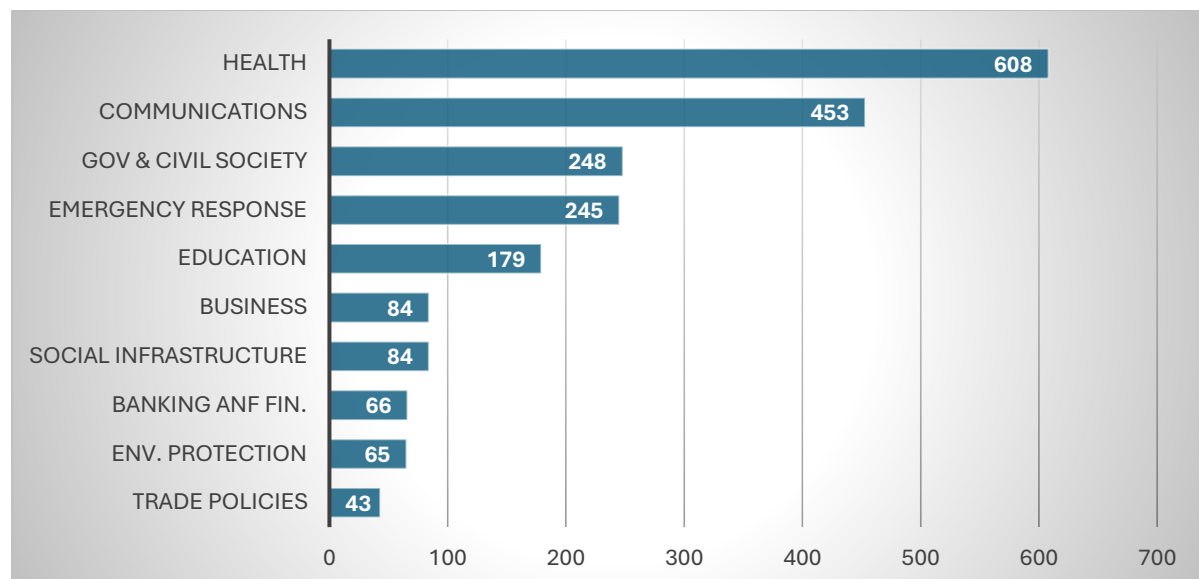
Data on ODA flows between 2017 and 2020 show that the top three sectors into which ODA for DPI was channelled were health, communication, and the public sector, while the rest of the funds for DPI span multiple sectors, including education, trade, and environmental

sustainability (OECD, 2023). Figure 3 shows top sectors for DAC DPI funding, 2017 -2021. At the time of writing, disaggregated sectoral data beyond 2021 was not publicly available. Future iterations of this research will track and incorporate updated data as it becomes accessible through OECD and donor reporting platforms.

Health DPI projects have been related to the support of platforms for digital health services and digital applications for disease surveillance and contact tracing related to HIV, tuberculosis, and malaria, as well as COVID-19. Communication projects have focused primarily on delivering digital financial inclusion through mobile internet, data security for digital payments, and digital banking (Aleina, 2023).

Funding DPI-related projects in other sectors has been primarily related to the use of big data for emergency response, such as missing person databases and platforms for humanitarian help, as well as data sharing platforms for e-government and e-learning (Aleina,2023).

Figure 3. Top sectors for DAC DPI funding, 2017 -2021, US\$ million



Source: OECD quoted in Aleina, F,C (2023) **Financing DPI for Inclusive and Sustainable Development** Available from: <https://donortracker.org/publications/financing-dpi-for-inclusive-and-sustainable-development> Accessed 13 February 2025

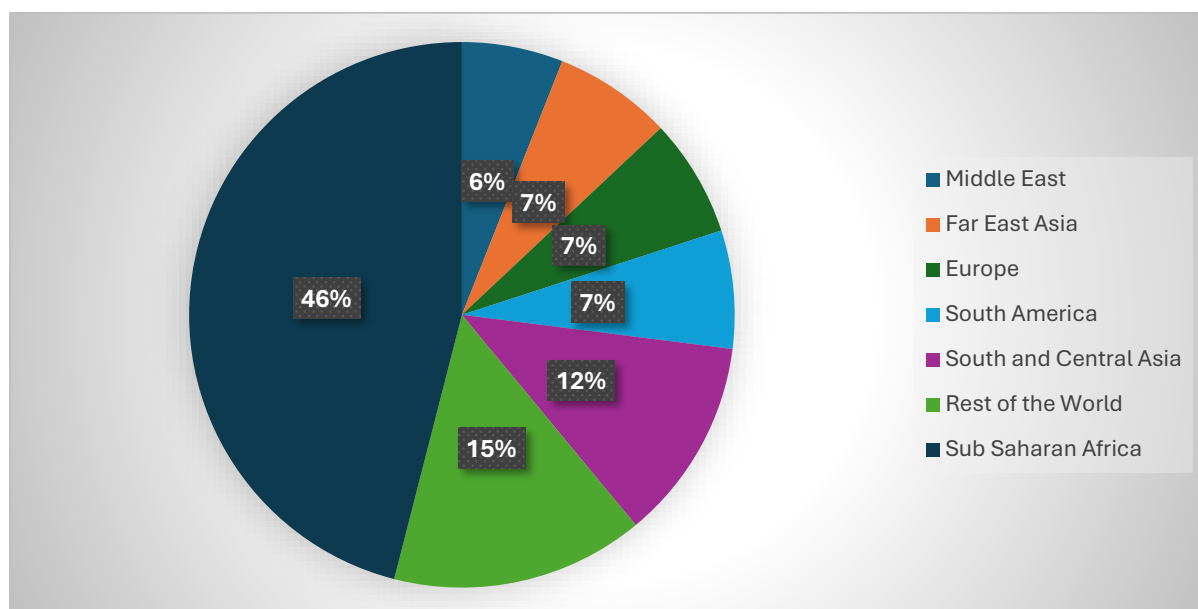
On the delivery of DPI projects, it is important to note that the type and scale of support varies by source. Overall, projects financed by DAC donors appear to be small, averaging less than US\$1 million each. This can be linked to the fact that projects are more focused on technical assistance and policy development as opposed to the implementation of large-scale digital infrastructure.

In contrast, MDBs have consistently supported broader in-country implementation. An illustrative example of this trend is a project financed by the IADB in 2019, which dedicated

over US\$300 million to the improvement of Colombia's economic connectivity, enhancing policies for digital economy and for digital transformation.

Figure 4 shows top regional recipients of DAC DPI funding, 2017 -2021. Funding from DAC countries has been geographically concentrated in Sub-Saharan Africa. Africa as a continent captured over 50% of DAC DPI funding between 2017 and 2021 (Aleina, 2023). Private donors are also largely focused on Africa, whereas regional MDBs financed more projects in South and Central America and Asia.

Figure 4. Top regional recipients of DAC DPI funding, 2017 -2021



Source: OECD quoted in Aleina, F,C (2023) **Financing DPI for Inclusive and Sustainable Development** Available from: <https://donortracker.org/publications/financing-dpi-for-inclusive-and-sustainable-development> Accessed 13 February 2025

DPI funding from DAC donors is disbursed mainly through international and donor-based NGOs (Aleina, 2023). More than 10% of DAC funding is channeled through central governments and non-profit institutions controlled and primarily financed by a central government. MDBs channel over 95% of their funding through central governments. On the other hand, private donors channeled a large amount of funds through universities and think tanks. Over 50% of DPI-related funding from private donors in 2021 was channeled in this way.

Digital transformation and DPI demand additional resources, making it essential to explore innovative financing models and foster new types of partnerships where each participant brings unique value (Bandura, et. Al, 2024). Public-private partnerships (PPPs) can be instrumental in driving significant investments towards achieving the UN Sustainable Development Goals (SDGs) and enhancing digital connectivity. These partnerships, especially those incorporating blended finance strategies, can attract a wide range of investors and help bridge the financial gap, particularly in developing nations. Additionally, PPPs can help localise development initiatives, tailoring solutions to the specific needs of local governments both now and in the future. Collaborative international ecosystems also promote the sharing of development benefits across stakeholders, making those benefits more accessible to all.

This shared objective was emphasised during the 2023 Group of Twenty (G20) summit in New Delhi, where nations committed to providing technical support and funding to implement DPI in low- and middle-income countries (LMICs), recognising its role in promoting inclusive and sustainable development. In addition, at the 2023 SDG Action Weekend, UN member states and other organisations made a major financial commitment to strengthen secure and inclusive DPI, collectively pledging \$400 million for the High Impact Initiative on Digital Public Infrastructure.

The implementation of DPI initiatives has already begun to show significant impact in various cases.

Significant progress has been shown by Estonia, which allocated around \$21 million specifically for open-source artificial intelligence (AI) solutions and digital public goods to great effect, as shown by the country's highly digitalised public services interface. Estonia has become a world leader in e-government, leveraging key innovations such e-citizenship to re-invigorate economic growth.

Spain's focus on DPI is exemplified by its introduction of the Green & Digital Fund for Technological and Knowledge Transfer for Latin America, a \$300 million fund aimed at advancing digitalisation, connectivity, and digital skills in the region.

The attention of the private sector on DPI has also been notable. An example of significant investment in this category is the Patrick J. McGovern Foundation's \$75 million pledge to support communities and civil society organisations in developing transformative DPI, with a focus on building trust and ensuring efficient service delivery (Bandura, et al, 2024).

What emerges from the above are signposts or markers that indicate the type of programme or arrangement that needs to be in place to effectively take advantage of the current investment landscape, which includes DAC donor funding and the private sector funding. In this way, the key partners in an ideal community-wide initiative to effectively and efficiently drive the rapid development of DPI to take advantage of its potential must include: governments – to develop DPI supportive policies, implement e-government, and drive collaborative international ecosystems; Universities and think-tanks – to leverage their expertise, research and development capabilities, as well as the funding they receive – to develop effective solutions and implementation plans; and private sector companies, including those in the telecommunication and finance sectors – to facilitate inclusive economic participation through widely available and affordable connectivity solutions and financial systems that enable small and quick minimal fee transactions.

A worthy example of well-organised and resource efficient initiative is a SADC-COMESA-ECOWAS initiative supported by MDBs, the private sector academia, to implement sea and land fiber-optic cable (with accompanying datacenters) to enable internet connectivity ‘anywhere’ in Sub-Saharan Africa.

While understanding funding flows is essential, the practical impact of DPI is most evident in the countries that have deployed these technologies to solve real-world challenges. The next section offers international case studies to illustrate how DPI directly affects economic growth and development outcomes.

3. The Potential Impact of DPI on African Development

The integration of Digital Public Infrastructure (DPI) into governance and financial systems has yielded measurable improvements in economic growth, social development, and trade efficiency across the Global South as evidenced in the wide literature around this area (Calderon and Cantu, 2021). Harnessing DPI to support economic growth, job creation, and poverty reduction hinges on strengthening five foundational pillars: digital infrastructure; digital platforms; digital financial services; digital entrepreneurship; and digital skills, as outlined in the World Bank's Digital Economy for Africa (DE4A) framework. Furthermore, these pillars are most effective when underpinned by a secure and trusted environment – one that prioritises data privacy, cybersecurity, and regulatory safeguards to protect against digital risks and exploitation (World Bank, 2020). A digitally enabled firm that draws on these pillars – particularly robust digital infrastructure – can function more efficiently, expand its reach, and better meet customer demand. Digital public infrastructure serves as a conduit between firms and their external environment, enabling seamless interaction with clients, suppliers, and markets. When implemented effectively, it presents a clear pathway for competitive advantage, allowing even smaller enterprises to innovate and scale rapidly.

The research conducted by Calderon and Cantu (2021) analysed data on 156 countries, observed in 5-year period from 1990 to 2019. They analyse the impact of DPI from different development metrics including growth, inequality of poverty, where the proxies for digital infrastructure are GSM Association (GSMA) indicators – mobile subscriptions; the percentage of broadband-capable mobile connections (3G and 4G connections); and the number of internet users. The significant outcome of this data is that while DPI holds significant potential to drive socio-economic development in Africa, coverage (the availability of an active network) and usage (number of 3G and 4G connections) remain a challenge, lagging other regions of the world. A pre-COVID-19 survey showed that only 26 percent of the population in Sub-Saharan Africa had access to the internet. This coverage gap was significantly higher when compared to other regions such as Middle East and North Africa 10 percent and South Asia (6 percent). In other words, 1 in 4 people in Sub-Saharan Africa live in a place with no internet connection. The usage gap is also significant, with 49 percent of the population in Sub-Saharan Africa living in a place with coverage but not being connected to the internet (Calderon and Cantu, 2021). Addressing these gaps can have a sizeable impact on growth through the effect of digital technologies on firm productivity, which has been shown to boost firm profitability. In addition to firm productivity, DPI has significant potential to improve various other sectors including government, education, health, financial services, and trade.

3.1 The Impact of Digital Public Infrastructure on Economic Growth

The evolution of the United States' digital landscape owes much to substantial government investments in Digital Public Infrastructure (DPI). In 1969, the Defense Department's Advanced Research Projects Agency (ARPA) initiated the ARPANET project, laying the groundwork for the modern Internet. This early investment exemplifies how public funding can catalyse

technological innovation and economic expansion (U.S Government White House Archives, 2024).

In recent years, the U.S. government has continued to prioritise digital infrastructure. The Infrastructure Investment and Jobs Act of 2021 allocated \$65 billion to ensure nationwide access to reliable, high-speed Internet services. This initiative aims to bridge the digital divide, fostering economic opportunities across diverse communities (U.S. Department of Commerce, 2024)

The synergy between public investment and private enterprise has propelled the growth of technology giants such as Apple, NVIDIA, IBM, Microsoft, and Netflix. These companies have become integral to both the national and California economies. In 2023, the U.S. tech sector contributed nearly \$2 trillion to the national GDP, accounting for approximately 8.9% of the total economy (Statista, 2023).

Focusing on California, the state's tech industry is particularly influential. In 2022, the tech sector contributed \$623.4 billion directly to California's Gross Regional Product (GRP). When considering indirect effects, this contribution approaches \$1 trillion, representing about 30% of the state's economy. Moreover, the tech industry supports approximately 4.2 million jobs, equating to 20% of California's employment (CFCE, 2024).

To illustrate the potential impact of similar tech enterprises in South Africa, consider that California's GRP is comparable to South Africa's entire GDP. The infusion of tech companies contributing significantly to the economy could transform South Africa's economic landscape. Establishing a robust digital infrastructure would be pivotal in this transformation, enabling the growth of homegrown tech firms and attracting international investments.

For African nations to harness such opportunities, investments in digital infrastructure, skill development, and entrepreneurial ecosystems are essential. By focusing on these areas, countries can foster innovation in sectors like e-hailing, last-mile

delivery, finance, retail, agriculture, and entertainment. Developing platforms tailored to the African market can stimulate economic growth, create jobs, and enhance service delivery across the continent.

In conclusion, the U.S. experience underscores the profound impact that strategic investments in digital public infrastructure can have on economic development. African countries stand to benefit immensely by adopting similar strategies, paving the way for a vibrant and inclusive digital economy.

Just as DPI has shaped economic transformation in leading digital economies, its impact on governance is equally transformative. From identity systems to digital tax administration, DPI is revolutionising how governments interact with and serve their populations.

3.2 Leveraging Digital Public Infrastructure to Improve Governance

The transformative impact of Digital Public Infrastructure (DPI) on governance is profound, offering governments the tools to enhance administrative efficiency, improve transparency, and strengthen citizen engagement. By digitising public services, governments can bridge information gaps, reduce bureaucratic inefficiencies, and foster greater accountability. The adoption of digital identity systems, data-sharing platforms, and e-government solutions mitigates information asymmetry and improves communication channels between governments and citizens.

A key benefit of DPI in governance is its ability to facilitate real-time information sharing, increasing the speed and accuracy of service delivery. Mobile technology plays a crucial role in this transformation by expediting the distribution of information, reducing communication barriers, and ensuring that services reach intended beneficiaries in a timely manner. The integration of DPI in governance not only enhances efficiency but also reduces the cost of public service delivery, making government operations more sustainable and inclusive.

India's Aadhaar system exemplifies the power of DPI in governance. As the world's largest biometric identity program, Aadhaar has significantly reduced leakages in social welfare programs, ensuring that subsidies reach the correct recipients while saving the government billions of dollars in fraud prevention and administrative costs (World Bank, 2023). Estonia's e-Governance model similarly demonstrates the benefits of digital infrastructure in governance. By digitising 99% of its public services, Estonia has cut bureaucratic overhead, improved government responsiveness, and increased public trust in state institutions (Global DPI Summit, 2023).

India's Aadhaar System: India's biometric ID system, linked to digital payment platforms like UPI, has streamlined subsidy delivery, reducing leakage by 24% and saving \$28 billion annually (World Bank, 2023). This has enabled inclusive access to financial services, with 80% of adults now holding bank accounts, up from 35% in 2011.

Estonia's e-Governance: Estonia's X-Road platform digitised 99% of public services, cutting administrative costs by 2% of GDP annually. This efficiency has attracted foreign investment, contributing to a 5% annual GDP growth rate in the tech sector (Global DPI Summit, 2023).

Colombia's Digital Tax System: A \$300 million Inter-American Development Bank (IADB)-funded project digitised tax collection, raising revenue by 15% and funding social programs that lifted 1.2 million people out of poverty.

Another example of DPI's impact on governance is Colombia's digitised tax system, which has streamlined revenue collection and increased government capacity to fund social programs. By leveraging digital infrastructure, Colombia has improved tax compliance, reduced corruption risks, and ensured better allocation of public funds toward social development initiatives (Aleina, 2023). These examples highlight how DPI strengthens governance frameworks, making public services more accessible, efficient, and transparent.

Governance gains through DPI extend naturally to another critical domain: financial inclusion. With a

focus on unbanked populations and SMEs, digital platforms like mobile money and CBDCs are redefining access to finance across Africa.

3.3 Enhancing Financial Inclusion through Digital Technologies

Digital technologies (DT) are critical for fostering financial inclusion, particularly in regions with limited access to traditional banking services. By leveraging DPI, financial institutions and fintech companies have been able to extend financial services to marginalised communities, empowering individuals and small businesses with new economic opportunities. Mobile money platforms, digital banking, and blockchain-based financial services are revolutionising how people access and interact with financial institutions.

Kenya's M-Pesa is a leading example of how mobile money can transform financial inclusion. By integrating digital payment systems with banking services, M-Pesa has enabled millions of previously unbanked individuals to participate in the formal financial sector. The platform has reduced dependency on cash transactions, increased economic participation, and provided a secure means of saving and transferring money (IMF, 2018).

Kenya's M-Pesa: Mobile money platforms have increased financial inclusion from 26% (2006) to 82% (2023), empowering women-led SMEs and reducing poverty by 2% in rural areas (IMF, 2018).

One of the key advantages of digital financial services is their ability to reduce transaction costs by eliminating intermediaries traditionally involved in financial transactions. The use of DPI in financial systems allows for more efficient, low-cost transactions, benefiting both consumers and businesses (Deichmann et al., 2016). Digital technologies have also facilitated innovative lending models, enabling microfinance institutions and fintech startups to assess creditworthiness using alternative data sources. This has expanded access to credit for low-income individuals and

small businesses that lack traditional banking history (Mbiti and Weil, 2006).

Furthermore, digital financial services can bridge the financial gap for rural communities that lack physical access to banking infrastructure. By leveraging mobile technology and digital wallets, financial institutions can provide services such as savings accounts, insurance, and credit to underserved populations, fostering economic growth and reducing inequality.

Nigeria is another early adopter of digital infrastructure for advancing financial inclusion. Launched in October 2021, the eNaira is Africa's first Central Bank Digital Currency (CBDC), introduced by the Central Bank of Nigeria (CBN). The initiative aimed to promote financial inclusion, lower transaction costs, and facilitate more direct government-to-person payments. While public adoption has been modest, the policy objectives remain significant: expanding financial services to over 38 million unbanked adults, reducing costly remittance fees, and formalising Nigeria's substantial informal economy. If achieved, these goals would have a transformative impact. Phase 2 of the eNaira rollout incorporates lessons from the initial implementation, with a renewed focus on downloadable mobile-based wallets, offline USSD access for users without internet connectivity, and deeper integration with existing mobile money platforms. Among the most critical lessons learned are the importance of interoperability and user-centric design to ensure greater adoption and functionality. (IMF Working Paper, 2023)

The integration of DPI into financial services underscores the importance of digital infrastructure, skills development, and policy support to create an inclusive financial ecosystem. As Africa continues its digital transformation, investing in DPI will be crucial for ensuring that financial inclusion reaches all segments of society, enabling sustainable economic participation and prosperity.

Financial inclusion is one facet of DPI's value. Another is its capacity to accelerate trade and regional integration. In a globally interconnected

economy, digital customs systems and real-time logistics platforms are transforming how nations trade.

3.4 Trade Modernisation through Digital Public Infrastructure

The integration of Digital Public Infrastructure (DPI) and digital technologies into trade facilitation has transformed global commerce by reducing bottlenecks, enhancing efficiency, and fostering economic growth. By streamlining processes, DPI has accelerated the movement of goods and services across borders, reducing operational costs and increasing the competitiveness of economies.

ASEAN Single Window: A digital trade platform connecting 10 Southeast Asian nations reduced cross-border clearance times from 10 days to 3, boosting intra-regional trade by \$34 billion annually (ASEAN, 2021).

Ghana's Paperless Port System: Digitising customs processes cut cargo clearance times by 70%, increasing export revenues by \$1 billion yearly (Bassa et al., 2020).

One of the most prominent examples of DPI's role in trade modernisation is the ASEAN Single Window. This digital trade platform connects ten Southeast Asian nations, allowing for real-time data sharing between customs agencies, expediting clearance processes, and minimising delays. Since its adoption, intra-regional trade has increased by an estimated \$34 billion annually, significantly boosting economic integration across Southeast Asia (ASEAN, 2021). The implementation of this system demonstrates how DPI facilitates seamless transactions, reduces bureaucratic red tape, and enhances the global competitiveness of regional markets.

In Africa, Ghana's Paperless Port System has illustrated how digital solutions can drive trade efficiency. By modernising its customs processes through a fully digitised clearance system, Ghana has reduced processing times, decreased corruption risks, and increased trade volumes. The initiative has enhanced Ghana's position as a

competitive trading hub and improved export revenues, creating more economic opportunities and fostering regional trade (UNDP, 2023).

These examples highlight the immense potential of DPI in trade facilitation. By digitising customs procedures, integrating real-time tracking systems, and leveraging big data analytics, economies can significantly enhance trade efficiency. DPI-driven platforms ensure greater transparency, reduce compliance costs, and minimise human errors, making international trade more accessible and inclusive.

From a development perspective, DPI's contribution to trade modernisation aligns closely with the United Nations' Sustainable Development Goals (SDGs). Specifically, it supports poverty reduction (SDG 1) by promoting economic activity, enhances productivity and economic growth (SDG 8) through efficiency improvements, and reduces inequalities (SDG 10) by increasing market access for small and medium-sized enterprises (SMEs).

For Africa, investing in DPI for trade modernisation is crucial to unlocking the continent's economic potential. As the African Continental Free Trade Area (AfCFTA) gains momentum, robust DPI systems will be essential to harmonising trade policies, reducing cross-border transaction costs, and ensuring seamless digital customs processes. With the right investments, Africa could see a similar trade transformation as witnessed in ASEAN, driving regional economic growth and facilitating integration into the global economy.

As DPI systems prove transformative in trade, finance, and governance, it becomes imperative to understand the broader landscape of actors shaping this space. The next section maps key development partners and their areas of focus.

4. Mapping Development Partners in Digital Public Infrastructure

The increasing recognition of Digital Public Infrastructure (DPI) as a driver of inclusive economic transformation has attracted support from a range of development partners, including

multilateral organisations, bilateral donors, and private sector initiatives. South Africa, along with other Sub-Saharan African nations, can position itself to leverage these resources for both regional and domestic DPI initiatives.

This initial scoping identifies key actors active in DPI funding and development support. However, further research is required to analyse the specific modalities and conditions associated with these financial flows. This would inform strategic alignment and maximise impact. Key development partners include:

- **European Union (EU) Initiatives:** The EU's Global Gateway Initiative has earmarked €150 billion for African infrastructure, including digital transformation, while the Digital4Development (D4D) Hub promotes partnerships for interoperable digital ecosystems (European Commission, 2024).
- **Multilateral Development Banks (MDBs):** Institutions like the World Bank's Digital Development Partnership and the African Development Bank's Digital Transformation Strategy provide grants and technical assistance for DPI implementation (World Bank, 2024).
- **China's Digital Silk Road:** Through the Belt and Road Initiative, China has invested in fibre optic networks, e-commerce platforms, and smart cities, expanding Africa's digital landscape (Foretia et. Al, 2024).
- **Middle Eastern Investment Funds:** Entities like the Abu Dhabi Investment Authority (ADIA) and Saudi Public Investment Fund (PIF) have shown interest in broadband expansion and cloud computing across Africa.
- **Private Sector and Philanthropic Initiatives:** Foundations such as the Bill & Melinda Gates Foundation and Google's Equiano Subsea Cable highlight the

growing role of public-private partnerships in DPI funding.

- By aligning national and regional DPI strategies with these funding sources, African governments can play a leading role in mobilising investment into digital transformation across Sub-Saharan Africa. South Africa's leadership of the G20 is a particular opportunity to begin to place some of the recommendations made in this paper on the continent's developmental agenda. Further work is needed to examine the modalities, conditionalities, and sustainability of these funding mechanisms to ensure long-term digital transformation.
- The breadth of support for DPI across donors and multilateral actors calls for greater policy coordination and bold implementation models. The next section outlines options for scaling DPI through global leadership and strategic investment.

5. Potential Options for Further Engagement in Digital Public Infrastructure

Given the increasing prominence of Digital Public Infrastructure (DPI) in global development discourse, there are several areas where deeper engagement and collaboration could enhance impact. While this paper has outlined key trends and examples, further exploration of implementation models, financing mechanisms, and regulatory frameworks could provide more nuanced insights. Therefore, to see progress in the area of DPI efforts must be directed toward strengthening investment and coordination mechanisms. The G20's 2023 New Delhi Leaders' Declaration emphasised DPI's role in achieving the Sustainable Development Goals (SDGs), reinforcing the need for structured financial and regulatory frameworks (G20, 2023).

To operationalise this commitment, the following actions are recommended:

5.1 Recommendations

• *Establish a G20-DPI Coordination Fund*

One approach to advancing DPI investment is the establishment of a G20-DPI Coordination Fund. By pooling resources from DAC donors, MDBs, and private investors, this fund could finance large-scale DPI projects in LMICs, mirroring successful models such as Spain's Green & Digital Fund for Latin America (Aleina, 2023). Blended finance strategies could further de-risk investments, encouraging greater private sector participation in DPI initiatives.

- Purpose: Pool resources from DAC donors, MDBs, and private actors to finance large-scale DPI projects in SSA and LMICs. The fund could mirror Spain's \$300 million Green & Digital Fund for Latin America, prioritising interoperable systems for public financial management (PFM).
- Mechanism: Utilise blended finance models to de-risk investments, as seen in the Patrick J. McGovern Foundation's \$75 million pledge for community-driven DPI (Bandura et al., 2024).

• *Harmonise DPI Standards via the G20 Digital Economy Track*

Harmonising DPI standards is equally essential. The G20 Digital Economy Track provides a platform for developing common frameworks on digital identity, payment systems, and data governance. Lessons from Estonia's open-source AI solutions suggest that standardised approaches can enhance cross-border compatibility, promoting efficiency in digital service delivery (Global DPI Summit, 2023).

- Action: Develop a common framework for digital IDs, payment systems, and data governance to ensure cross-border compatibility. Estonia's open-source AI solutions (funded with \$21 million) offer a replicable template (Global DPI Summit, 2023).

- Partnerships: Collaborate with the World Bank's Digital Development Partnership to align standards with the "DPI Map" insights, which highlight gaps in 78% of LMICs' foundational digital systems.

- ***Strengthen Public Financial Management (PFM) Digitisation***

The digitisation of public financial management (PFM) also presents a significant opportunity for DPI expansion. Under South Africa's 2025 G20 Presidency, priority should be given to fiscal transparency through DPI-driven budget tracking and procurement systems. Strengthening treasury capacity through targeted training programs could enhance the effectiveness of digital fiscal management tools.

- G20 Leadership: Under South Africa's 2025 Presidency, prioritise PFM digitisation in SSA by scaling tools like AI-driven budget tracking and blockchain-based procurement systems. The IMF's call for "fiscal transparency through DPI" aligns with this goal.
- Capacity Building: Channel 30% of G20-DPI funds to upskill treasury officials, leveraging UNDP's Digital Public Infrastructure Academy.

- ***Monitor Impact via the G20 Global DPI Dashboard***

Finally, monitoring DPI's impact through the G20 Global DPI Dashboard would enable policymakers to track progress and identify areas requiring further intervention. Metrics such as digital ID coverage and mobile payment penetration can provide insights into DPI's role in achieving financial inclusion and economic development goals (OECD, 2023).

- Metric: Track progress using indicators such as "digital ID coverage" and "mobile payment penetration," as proposed in the OECD CRS dataset.
- Accountability: Publish annual reviews at the SDG Action Weekend to ensure

alignment with the \$400 million pledged for the High Impact Initiative on DPI (Bandura et al., 2024).

By anchoring these efforts in the G20's multilateral framework, LMICs can overcome funding fragmentation and achieve systemic digital transformation.

A vital and practical component of modern enterprises is digital infrastructure. Businesses that understand its components, strategic value, and implementation challenges can better position themselves to seize emerging opportunities and build long-term resilience. By adopting effective digital modernisation strategies, firms can enhance their competitiveness, adapt to evolving market demands, and contribute meaningfully to inclusive economic transformation.

6. Conclusion

The transformative potential of Digital Public Infrastructure (DPI) in driving inclusive growth and economic transformation is undeniable, particularly in developing regions like Sub-Saharan Africa. As the continent experiences rapid population growth and a youthful demographic, DPI presents an opportunity to leapfrog traditional development pathways and catalyse economic expansion. The COVID-19 pandemic has only highlighted the urgent need for robust digital systems that can sustain governance and economic functions under extreme conditions, further underscoring the critical importance of DPI in modern development agendas.

This paper has examined the landscape of DPI funding and the significant role of Official Development Assistance (ODA) in supporting digital infrastructure initiatives across Africa. While funding trends show an encouraging increase in global investments for DPI, particularly from DAC donors and Multilateral Development Banks (MDBs), challenges remain for low- and middle-income countries (LMICs) in securing sufficient and sustainable financing. These challenges emphasise the need for more effective and innovative financing models, such as public-private

partnerships and blended finance, which can help bridge the funding gap.

Case studies from countries like Estonia, India, Kenya, Nigeria and Ghana illustrate the profound impact of DPI on governance, financial inclusion, trade modernisation, and economic growth. The adoption of e-governance systems, mobile money platforms, and digitised trade processes has not only streamlined government services but also improved access to essential services, enhanced transparency, and reduced inefficiencies. These examples highlight the broader potential of DPI in transforming economies and improving the quality of life for citizens.

To fully harness the benefits of DPI, African countries must focus on building the key pillars of digital infrastructure, skills development, digital platforms, and financial services. At the same time, a regulatory framework that prioritises data privacy, cybersecurity, and digital rights is essential to ensure that the growing digital ecosystem remains secure and inclusive. As African nations work towards achieving the UN Sustainable Development Goals (SDGs), DPI can serve as a catalyst for driving economic participation, reducing inequalities, and fostering sustainable development.

Considering the growing recognition of DPI's potential, the international community, led by development partners, must continue to foster collaboration and provide resources to support the digital transformation of LMICs. South Africa, as it assumes the G20 presidency in 2025, has a unique opportunity to lead the charge for DPI-related initiatives, aligning regional and global strategies to maximise impact. The proposed establishment of a G20-DPI Coordination Fund and harmonised standards for digital systems are essential steps toward building a more interconnected and efficient digital economy.

Ultimately, the widespread adoption of DPI has the potential to significantly enhance Africa's economic and social development, but this requires sustained investment, effective coordination, and a commitment to creating an

inclusive digital ecosystem. By leveraging the tools, partnerships, and resources available, African countries can position themselves as leaders in the global digital economy, unlocking new opportunities for growth, innovation, and prosperity.

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Digital Engineering as a Necessary Capability to Facilitate AfCFTA

By Professor J E Amadi-Echendu, University of Pretoria

Abstract

The Africa Continental Free Trade Area (AfCFTA) agreement takes effect not only as generations Z and Alpha attain legal capacity, but also during this era of human-centred society characterised by volatility, uncertainty, complexity, and ambiguity of supervening events, and where rapid evolution of frontier technologies of the digital age is inducing unprecedented economic transitions and societal transformations in human civilisation. Curiously, the capabilities that are required for AfCFTA tend to be assumed, muted, or not emphasised. Thus, the question arises as to whether the relevant capabilities are being concurrently developed to support practical implementation of the AfCFTA agreement. By adopting a qualitative approach, the content of this article contributes to the discourse about harnessing the transformative capabilities provided by digital age frontier technologies to facilitate the successful implementation, operationalisation, and management of the AfCFTA agreement. In this article, AfCFTA is considered as a multilevel complex network or a technologically abundant system of complex socio-economic cyber-physical systems. Based on the systems view, the author depicts two frameworks and posits that ‘digital engineering’ – a cross, multi-, and transdisciplinary capability is necessary to deliver the objectives of AfCFTA in alignment with the Society 5.0 context, African Union’s Agenda 2063, and the United Nations sustainable development goals.

Keywords – AfCFTA Digital Engineering Capability, AfCFTA Technology Advancement, AfCFTA Implementation, AfCFTA Operationalisation, AfCFTA Management

1. Introduction

With the globalisation of the world economy, a contentious issue in international trade remains how to minimise imbalances between trading countries. At the time of writing this article, the news and current affairs feature discourse regarding international trade tensions and instabilities in global supply chains instigated by the tariffs being imposed by the prevailing administration in the United States of America. Whilst volatility in stock markets represent immediate and transient responses to the unilateral imposition of tariffs by the USA administration, it remains unclear as to whether there will be any steady-state short, medium and lasting effects on (i) global supply chains, (ii) international and regional trade and investment, and on (iii) multilateralism in general. Curiously, the see-saw nature of the unilateral US tariffs amplifies existing poly crisis challenges that are already implicit in operationalising the multilateral ideals subsumed in the United Nations Sustainable Development Goals.

According to WTO Director General Ngozi Okonjo-Iweala (Le Poidevin and Blenkinsop, 2025), the emerging tariff war raises the fear of decoupling the largest trading economies (especially the USA and China), with the likelihood that global GDP could shrink by 7% in the long term. “The unprecedented nature of the recent trade policy shifts means that predictions should be interpreted with more caution than usual,” and “...forecasting a credible baseline scenario has become virtually impossible.” Hence, it will be interesting to see what future trade projections can be predicted by applying the World Trade Organisation’s Global Trade Model (Bekkers and Keck, 2024).

In the midst of the trade and investment tensions and supply chain instabilities, commentators, trade and investment pundits, and scholars are also discussing the increasing possibilities for regional trade blocs, considering that they ‘have historically been a key way of promoting regional relations and economic prosperity’ (Broom, 2023). For instance, regional trade agreements facilitate (i) reductions in tariff and non-tariff

barriers, (ii) increased capital flows, whilst (iii) easing financing constraints to export promotion (Zhang *et al*, 2024). With apparent fragmentations in multilateral globalisation, there are positive sentiments towards fostering regional trade to facilitate inclusive growth, reduce inequalities, and encourage transformations along sustainable development trajectories.

In financial terms, the AfCFTA ranks as the fifth biggest trading bloc in the world, notwithstanding the geographical fact that AfCFTA covers the world's largest contiguous area of land (Zhang *et al*, 2024). The AfCFTA agreement takes effect during this era of human-centered society characterised by volatility, uncertainty, complexity, and ambiguity (VUCA) of supervening events, and where the abundance and rapid evolution in digital age technologies are inducing unprecedented transformations in human civilisation. The AfCFTA also takes effect during this period in human history when the African continent is seemingly in a position to take advantage of the so-called demographic dividend characterised by a higher percentage of generations Alpha and Z digital natives, and the fourth industrial revolution millennials.

Given the advent of rapidly evolving digital age technologies, the question arises as to whether the relevant capabilities are being concurrently developed to support practical implementation, operationalisation, and management of AfCFTA. By adopting a qualitative approach, the content of this paper contributes to discourse about harnessing the transformative capabilities provided by digital age technologies to facilitate successful implementation of AfCFTA. In particular, the paper highlights the importance of 'digital engineering' as a cross-, multi-, and transdisciplinary capability that is necessary to deliver the objectives of AfCFTA in alignment with the Society 5.0 context, African Union's Agenda 2063, and the United Nations sustainable development goals.

Relying on a limited but broad review of extant literature, section 2 of the paper mentions the resiliency and sustainability of AfCFTA in the context of the human-centred idealism of Society 5.0. In section 3, the AfCFTA is briefly described

as a multilevel, technologically driven complex socio-economic cyber-physical system. The importance of 'digital engineering' capabilities for AfCFTA is explained in Section 4, followed by some concluding remarks in section 5. For logical coherence, a numbered list of references is provided according to the order in which literature is cited in the text.

2. Resiliency and Sustainability of AfCFTA within the Society 5.0 and UNSDG Contexts

In Africa, the legacy of colonialism still pervades even as it appears that the trend is decelerating. Despite emerging growth opportunities and new trade corridors, it is acknowledged that the intensity of trade among and between African countries still lags globalisation trends (Fofack, 2020). In this regard, the AfCFTA agreement is intended to facilitate trade between African countries, enhance integration of existing regional economic communities, and promote sustainable development in the respective countries. Citing other references, Debrah *et al* (2024) indicates that the scope of AfCFTA is intended to cover five dimensions of integration, viz: (i) free trade area; (ii) customs union; (iii) common market; (iv) economic and monetary union; and (v) political union (Mihalakas and Malkawi, 2024). The understanding is that the implementation of AfCFTA is currently focused on the free trade area dimension.

Noting that AfCFTA encompasses regional economic communities, Vambe (2024) argues that "the AfCFTA has drawn lessons—both positive and negative—from the efforts of African regional economic blocs to achieve flexible trade integration." Implicitly, the goal of AfCFTA is to promote sustainable development through prioritised attention (i) to resolve socio-economic (especially inclusivity) disparities, (ii) to implement green transition initiatives, whilst (iii) concurrently improving governance at various socio-political levels. As the implementation of AfCFTA gathers momentum, there is also the increasing need for policy and structural reforms – for example, the Secretary General of AfCFTA, HE Wamkele Mene states that the "harmonisation of trade laws and the removal of barriers to free movement across Africa's borders

remain critical to the success of the AfCFTA”.¹ Furthermore, the President of the Pan- African Parliament, Chief Fortune Charumbira, states that the success of AfCFTA “hinges on collective action, legislative support and sustained investment...” and emphasised the need to transform education systems (especially in terms of human capacity development) to enhance the implementation of AfCFTA.

The emphasis on transforming education systems is apt and pertinent because the AfCFTA agreement takes effect as the Gen Zs and Gen Alphas attain legal capacity. Furthermore, as mentioned earlier, the AfCFTA agreement takes effect in a world that is increasingly having to contend with both *casus fortuitus* (e.g., local, regional, and geopolitical tensions) and *force majeure* (e.g., climate change, epidemics, and pandemics) events that impose high volatility, uncertainty, complexity, and ambiguity (VUCA) stresses on just about every aspect of human endeavour. A good example of the VUCA characterisation is the ongoing see-saw tariff impositions of the prevailing USA administration, which is causing turmoil in stock markets, increased uncertainty regarding investment decisions, as well as tensions on trade relations, even within fully established and long-standing trade blocs. Thus, implementations of the terms of the AfCFTA agreement must cope with (i.e., *accommodate*) the continuously changing effects and shocks arising from VUCA stressors, irrespective of the location of the events.

The point here is that *resiliency*² becomes a precondition to achieve the sustainability transformations implied in the AfCFTA agreement. It is reasonable to assume that the AfCFTA institutional framework, the operational instruments (e.g., the AfCFTA Hub app, the Pan-African Payments and Settlement System, the Digital Trade Protocol, and action plans are all designed to provide means to operationalise sustainability principles in alignment with the

human-centric idealism of Society 5.0 and the United Nations Sustainable Development Goals. According to Fukuyama (2018), the aim of Society 5.0 is to achieve mid- and long-term economic growth, along with positive societal transformation, by incorporating innovations arising from digital age technologies into every industry and social life.

3. AfCFTA as a System of Complex Systems

Given that the AfCFTA is gaining momentum, it is essential to harness and incorporate the transformative capabilities provided by frontier technologies such as blockchain; bio-mimetic algorithms embedded in edge and generative AI, digital twin, 5G-IIoT, quantum computing, mixed, augmented, and virtual reality, 3D printing, and cyber-physical systems. In this regard, a key requirement is to maintain necessary digitised and digitalising connectivity, not only between the institutional frameworks, the protocols, and the operational instruments at the hierarchical levels of the AfCFTA but also between all actors, role players, and stakeholders involved at the various stages of implementation, operationalisation, and management of the AfCFTA agreement. In essence, the respective and various linkages and relationships between the institutional frameworks, the protocols, operational instruments, all actors, role players, and stakeholders of AfCFTA constitute a multilevel hierarchical network of complex socio-economic systems.

Given that the implementation, operationalisation, and management of the AfCFTA invariably involves physical assets, the natural environment, and deployment of frontier technologies, it is appropriate to consider that the AfCFTA describes a multilevel hierarchical network or a complex socio-economic system of cyber-physical systems as illustrated in Figure 1.

- AfCFTA as the top level of the hierarchy;

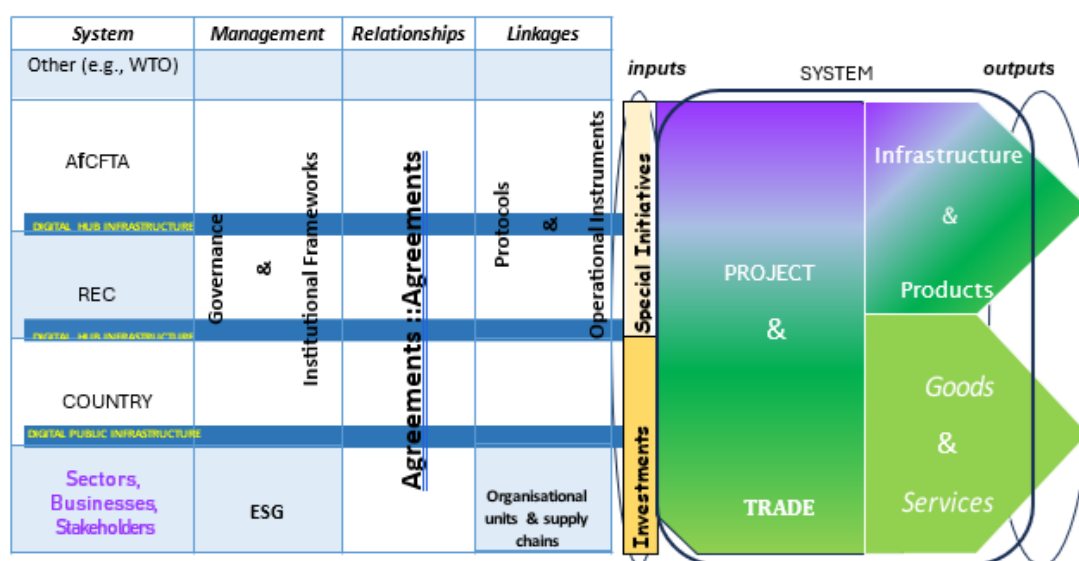
change) is used to refer to the plurality of terms like robustness, resourcefulness, adaptability, agility, and flexibility

¹ The 12th Annual Conference of Speakers of African National and Regional Parliaments. Press Release Sept 19, 2024.

² In this article, the term resiliency (ability to accommodate

- regional economic communities as secondary level subsystem nodes;
- countries as primary level subsystem nodes;
- agencies, business organisations, investors, traders, individual and collective stakeholders, etc, as micro-level subsystems and sub-subsystems nodes;
- various levels of protocols and operational instruments as linkages;
- various levels and types of agreements as relationships; with
- specific initiatives, investments, projects, and trade as activities, resulting in infrastructure, products, goods, and services.

Figure 1. A multilevel systems view of AfCFTA (source: Author)



From a jurisdictional point of view, the practical operation of the AfCFTA system majorly takes place at the country level, where the respective conducts of various business organisations transform investments via infrastructure and non-infrastructure projects into tradeable goods and services. The reality is that a significant percentage of the connectivity between the constituent nodes, actors, and activities of AfCFTA will be maintained through the backbone of information and communications technologies; namely, digital hub infrastructure (DHI) and digital public infrastructure (DPI). Such digital connectivity, that is, the DHIs at the regional level and the DPIs at the country level, not only facilitates the supply chain logistics but also accentuates business, investment, and trade facilitation activities.

Whereas DPI is an enabler at the country level, DHI enables and facilitates alignment and

collaboration beyond the country level. The operationalisation of the linkages and relationships between the nodes, role players, actors, and activities of AfCFTA requires both asynchronous and synchronous exchanges, plus the sharing of various multimodal forms of data generated by humans, digital models (e.g., digital twins), the operations of physical assets, and from the supervening events of the natural environment. Thus, the data-driven operationalisation of the AfCFTA will require 'digital engineering' capabilities!

4. Digital Engineering as a Necessary Capability for AfCFTA

The concept of 'digital engineering' (DE) arises from the critical need to harness the abundance plus exponential capabilities of digital technologies to seamlessly connect the various actors, role players, and stakeholders involved throughout the whole-of-life management of

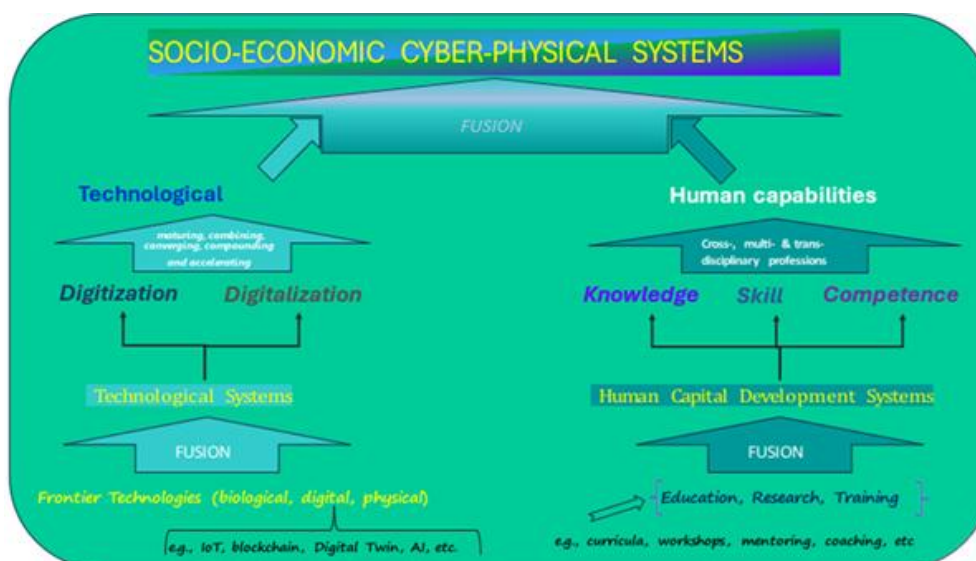
infrastructure, product, service, system, or infrastructure/product/service/system combinations. A primary goal of DE is to achieve seamless and transparent connectivity to, and integration across all authoritative sources of multimodal data about a cyber-physical asset such as a facility, infrastructure, product, service, or cyber-physical system. This implies connectivity between legacy islands of automation to minimise or remove the seams between the various workflow processes of the disparate groups of role players and stakeholders linked in socio-economic cyber-physical systems. By happenstance, DE also arises as a positive consequence of the increasing convergence between engineering, humanities, and management tools/disciplines and domains, and the knowledge area forms a bridge between systems engineering, business process management, communications, and decision science (Tao *et al*, 2024).

For brevity, 'digital engineering' has emerged as a broad field of knowledge and practice that leverages digital technologies and data analytics tools (i) to build active and sophisticated digital models of the various components and constituents of complex socio-economic cyber-physical systems; (ii) to provide data connectivity between the various components, constituents and processes of complex socio-economic cyber-physical systems; and (iii) to facilitate collaboration amongst the nodes, actors, role players, and stakeholders linked in the complex

socio-economic cyber-physical systems. Most importantly, digital engineering integrates various disciplines to design, develop, and manage the life stages and phases of complex socio-economic cyber-physical systems in a manner that facilitates collaboration among all the actors, role players, and stakeholders involved in the value network of the complex socio-economic cyber-physical systems.

The picture in Figure 2 contextualises human and technological capabilities as the foundational pillars of socio-economic cyber-physical systems anchored within physical assets and the natural environment. Within this context, there is the current understanding that frontier technologies are dominant drivers for the transitions and transformations that are manifesting in various forms within delineations of complex socio-economic cyber-physical systems such as the AfCFTA (UNCTAD, 2023). Although for the ease of explanation, the human and technological capabilities are deliberately depicted as two pillars in Figure 2, the capabilities are completely interdependent in a push-pull manner. That is, the development of human capabilities leads to the development of technological capabilities, which further enhance human capabilities, consequently providing the impetus for rapidly evolving technological transitions (cf: Adão *et al*, 2024; Ramirez, 2021) and societal transformations (cf: for example, Schweizer *et al*, 2023).

Figure 1 - Figure 2. Fusion of Human and Technological Capabilities (source: Author)



With the rapid pervasion of artificial intelligence into every facet of governance, commerce, industry, and human ways of life, there are suggestions that advances in technological capabilities may be increasingly disconnected from human capabilities within certain demographic groups, particularly in the least developed and developing economies that are already encountering worsening effects of the digital divide. Discourse regarding the possible disconnection between technological and human capabilities exacerbates concerns about the exclusivity of certain demographic groups, especially along the lines of gender. Curiously, evidence from population statistics (UNECA, 2024) and human development data (Osakede *et al*, 2023) indicates that AfCFTA geography, which comprises mostly least developed and developing countries, and emerging economies, has the advantage of higher percentages of generations Alpha and Z digital natives plus the fourth industrial revolution millennials. The suggestion here is that actors, role players and stakeholders within the AfCFTA system should take advantage of the so-called demographic

dividend (e.g., Turbat, 2017); Woldegiorgis, 2023) to ensure that human capital development activities also produce a higher percentage of digital engineering professionals with the requisite cross-, multi-, and trans- disciplinary knowledge, skills and competences to exploit the technological capabilities arising from the ongoing fusion of frontier technologies. It is worth stating a current conundrum, which is that generation X and late baby boomers, with many of them probably overwhelmed by the abundance and rapid evolution of digital age technologies, do constitute a significant number of the policy and decision makers at the hierarchical levels of the AfCFTA system.

5. Concluding Remarks

The 'action plan to accelerate global business and investment in Africa' includes commitments by various agents, companies, groups, and organisations to specific initiatives, projects, and investments (World Economic Forum, 2024). It is assumed that the institutional framework of the AfCFTA will manage these activities by applying the protocols¹, operational instruments², DHIs,

¹ Protocols to the Agreement Establishing the AfCFTA include: The Protocol on Trade in Goods; The Protocol on Trade in Services; The Protocol on Rules & Procedure on the Settlement of disputes; The Protocol on Investment; The Protocol on Intellectual Property Rights; The Protocol Competition Policy

² The Rules of Origin; The Tariff concessions; The Continental Online Tool/Mechanism for monitoring, reporting and elimination of Non-tariff Barriers (NTBs); The Pan-African Payments and Settlement System (PAPSS); The African Trade Observatory; The AfCFTA Hub; etc.

and DPs, which themselves require the deployment of digital engineering capabilities. Thus, digital engineering is a necessary area of knowledge, skill, and competence for the implementation, operation, and management of the AfCFTA agreement. The capabilities required to harness and incorporate frontier technologies cannot be assumed; the requisite digital engineering capabilities must be developed and sustained.

In conclusion, it is remarkable that the Secretary-General of the AfCFTA received a delegation from the Africa Engineering Organisations on 25 March 2025, and “both parties reaffirmed their commitment to deepening collaboration in fostering an enabling environment for industrialisation and infrastructure-led growth under the AfCFTA framework.”

Extrapolating from the President of the Pan-African Parliament’s expressed need to transform education systems in alignment with AfCFTA agreement and Agenda 2063 aspirations, the recommendation will be to include ‘digital engineering’ in the curricula at various levels of human capability development, especially for generations Alpha and Z, the millennials, and even actively engaged generation-Xs.

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Digitisation of the Simplified Trade Regime as a means of Trade Facilitation

By Sitshengisiwe Ndlovu, Customs and Revenue Expert

Abstract

This paper examines the digitisation of the Continental Simplified Trade Regime (STR) under the AfCFTA, here referred to as the Guided Trade Initiative STR, as a catalyst for trade facilitation, inclusivity, and regional integration. By streamlining cross-border processes, a digitised STR can reduce waiting times, lower costs, and harmonise customs procedures, particularly benefiting Informal Cross-Border Traders (ICBTs) and MSMEs while advancing the gradual formalisation of African economies. The study explores the low adoption of STRs, despite the AU's Boost Intra-African Trade blueprint, and considers how digitisation can address overlapping trade agreements, drawing on the WTO Trade Facilitation Agreement, WCO recommendations, AfCFTA's Digital Trade Protocol, and Protocol on Women and Youth in Trade. It highlights behind-the-border obstacles such as bureaucratic registration, costly permits, and regulatory fragmentation across RECs, compounded by gendered digital divides and COVID-19 disruptions. Grounded in the uBuntu philosophy, the paper advocates a human-centred approach to resilient, inclusive, and equitable regional trade.

Keywords - STR, AfCFTA, trade facilitation, digital trade, digital gender disparities, Ubuntu Philosophy

1. Introduction

The African Continental Free Trade Agreement (AfCFTA) is one of the AU's flagship projects set to turn around the economies of Africa through increased intra-African trade and achieve economic integration within the continent. Economic integration within Africa has been relatively slow compared to integration in other continents. The slow progress can be traced to numerous borders in Africa, accompanied by numerous customs administrations and varied customs procedures exacerbated by the land-locked bad neighbour trap (Hoffman 2017).

The AfCFTA aims to enhance intra-African economic growth through trade liberalisation, which gradually reduces tariffs on goods and services. Conversely, studies by UNCTAD indicate that economies worldwide are gendered structures, and trade liberalisation without consideration of gender may exacerbate gender inequalities (UNCTAD Trade & Gender Linkages 2017). The effects of gender-blind trade policies that support trade agreements tend to be disproportionately experienced by micro, small

and medium-sized enterprises (MSMEs) and informal cross-border traders, who represent a significant portion of the continent's economic activity (Amrita Bahri).

The AfCFTA is a complex agreement focused on using trade as a means to development and sustainability that will leave no one behind. The AfCFTA addresses gaps in the past FTAs that benefit huge corporate businesses, excluding MSMEs and Women-Owned Businesses (Vera Songwe: Women Shaping Global Economic Governance 2021).

Customs-related Annexes 4 and 5 of the AfCFTA Protocol on Trade in Goods, covering Trade Facilitation and Non-Tariff Barriers, respectively, are critical to instituting the Guided-Trade Initiative Simplified Trade Regime, premised on harmonising customs procedures and promoting the ease of movement of goods under preference while overcoming other barriers that mitigate certainty in trade.

The Guided-Trade Initiative¹ (GTI) Simplified Trade Regime is built on the existing STR within the EAC, COMESA, and Tripartite STR. Notably,

launched by the AfCFTA Secretariat

¹ Term is associated with the Guided Trade Initiative

the facility has low trade volumes despite being in existence for over 10 years, with 39 of the African Union member countries signed up to the GTI. One of the reasons for this can be traced to the lack of harmonisation in the administration of the STR between countries, the varied thresholds within the different Regional Economic Communities (RECs) with varied local content, the lack of awareness of the STR procedure (David Luke 2023), and the limiting Common List of goods. The bureaucracy associated with the manual application of permits, such as phytosanitary permits for agricultural goods, makes the STR procedure not only expensive but also time-consuming, with the extensive amount of paperwork involved.

A digitised GTI-STR will greatly reduce the bureaucracy, the paperwork required, and the need to accompany the goods cleared under STR, as it would be possible to conduct the business using smartphones. Establishing a digitised GTI-STR requires the inclusion of cross-border trade, MSMEs, and women-owned businesses within the business ecosystem and interventions aimed at promoting regional trade integration. The GTI study conducted on various State Parties should not be viewed in isolation; rather, it should be seen as a valuable resource of inputs concerning goods that can be included in the Common List of goods identified by the study. Furthermore, the findings of the GTI indicate an urgent need to prioritise freight and logistics for small consignments traded across borders (The Guided Trade Initiative 2024)

This intervention can facilitate the movement of goods under the STR, as such consignments can be consolidated and shipped as unaccompanied goods. The African Trade Observatory Goods has free market intelligence for use by the MSMEs and Women-Owned Businesses (WOB) that can be easily accessed online. The digitally enabled landscape also makes it easy to analyse the value chains where MSMEs and WOBs can make their strategic entry.

Goods cleared under the existing STRs benefit from reduced customs duty rates between FTA countries, while other tax heads apply at normal rates. The payment of VAT and excise duty serves as a disincentive that hinders increased use of the

STR. As stated by the World Customs Organisation, customs revenues significantly contribute to African governments' finances; however, trade facilitation reforms, such as a digitised GTI-STR, could provide even greater contributions by fostering a trade environment that promotes the growth of MSMEs and WOBs engaged in cross-border trade.

Considering the above, this paper will discuss how and why a digitalised STR will address the *behind-the-border* and *at-the-border* challenges to improve the effective participation of women under complex regional trade agreements that often overlap, drawing insights from the findings of the GTI. Central to this discussion is the realisation of the potential transformative strength of digital technologies on the trade landscape that is emerging in Africa. Notwithstanding challenges of connectivity, including power supply and the gender digital divide, the digitisation of processes in Africa, including the STR, has become urgent.

The Simplified Certificate of Origin is the legal document that facilitates clearance of the goods appearing on the Common List, under preferential treatment. The Simplified Certificate of Origin has been done away with based on the Common List of Goods that has been agreed upon by the Regional Economic Communities.

Customs Declaration. This is a legal declaration under the STR and not like the normal customs declaration or Customs Bill of Entry that is presented to the Customs Administration clearing commercial consignments.

Threshold refers to the total value of the consignment that can be cleared under the STR. This is largely varied among the Regional Economic Communities. The varied thresholds have been the source of uncertainty, presenting a non-tariff trade barrier.

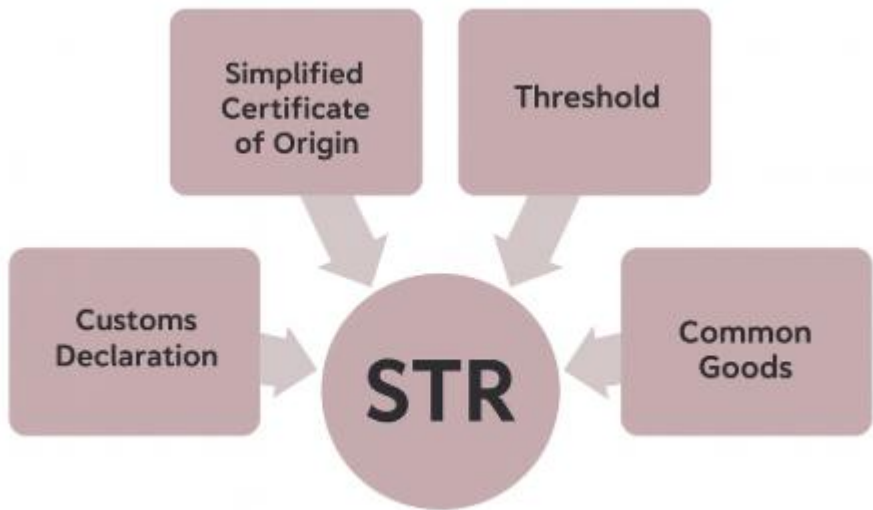
Common Goods. This is also referred to as a Common List. This covers wholly produced goods and some goods that have undergone transformation while complying with the laid-down local content percentage thresholds.

Figure 2 shows that the **Simplified Trade Regime (STR)** relies on these four pillars—a simplified

certificate of origin, a trade value threshold, a common goods list, and a simplified customs declaration. Together, these make it easier for MSME traders (especially women and youth in

border communities) to legally benefit from regional trade agreements.

Figure 2. Components of the Simplified Trade Regime



2. Trade Landscape in Africa

The STR, pioneered in the COMESA region in 2010 and later duplicated in the EAC and SADC Regions, was an intervention to address the *at the border* challenges experienced by women, youth, and some MSMEs. These challenges range from limited knowledge about the intricacies of invariably complex border posts to a lack of understanding of customs procedures, including the presence of unscrupulous elements that exploit these vulnerable groups.

The STR is linked to FTAs. Member States need to belong to the same Free Trade Agreement (FTA) to operationalise the Simplified Trade Regime

(STR) for traders to enjoy preferences through the FTAs. The spaghetti bowl effect brought by the overlapping FTAs, which is both *at the border* and *behind the border*, poses an enormous challenge for customs officers in the application of trade preferences. The interpretation of the preferential agreements is even more problematic for traders, including women and MSMEs, due to the technical aspects of FTAs, which are further compounded by the overlapping element characterising FTAs (Isaac Turner et.al, 2019). This has contributed to rent-seeking opportunities from either side as traders find compliance burdensomely costly, while the other side is incentivised not to enforce compliance (Christabel Phiri 2017).

Table 1. The diagram below illustrates the trade landscape in Africa.

Issues Affecting Trade & AfCFTA

Issues	Description	Impact on Trade & AfCFTA
Landlocked/Overlapping trade agreements	Over 165 borders	Fragmented Customs Procedures and Regulations
High Trade Costs	Delays at border posts caused by overlapping trade agreements compounded by varying thresholds between RECs	Delay in the uptake of preferential agreements key to growth of MSMEs and Women-Owned Businesses

Harassment of traders	Limited knowledge of trade related issues and procedures	Lack of predictability, accountability, and transparency impacts the effective participation of MSMEs and Women-Owned Businesses. It forms part of NTBs that inhibit the growth of trade vis-à-vis economies
Informality	Over 80% of MSMEs in Africa are unregistered entities (McKinsey Report). This sector has become a source of major employment in Africa	30%–40% of trade within SADC is from ICBT; COMESA is at 30%; 30–72% in the ECA. It has had both negative and positive impacts on trade
Limited coherent Continental approach to Digital Trade	Only 30 countries out of 54 countries have ratified the Malabo Convention	Delayed regional cooperation and countries' agency in the guided growth of the digital economy through the AfCFTA Digital Trade Protocol
Absence of a Continental STR to stimulate trade within the AfCFTA	Continental STR premised on existing STR, however there is no STR in SADC	Instruments of CSTR in place but trade under same has not taken place

There are occasions where FTAs are negotiated bilaterally between two neighbouring countries rather than as regional economic blocs. This fragmented approach of the STR has negative effects on trade certainty and predictability, including differing trade costs determined by the point of entry of the consignment.

Furthermore, some FTAs incorporate the direct consignment rule for goods eligible for clearance under the preference. Africa, as the most landlocked continent, has the inherent landlocked bad neighbour trap that can interfere with the application of preferences (Hoffman 2017). A unilateral continental-based approach on the digitisation of the STR will promote trade certainty and predictability (Imani Development 2022).

Table 2. Landlocked Countries: 16 countries in Africa are landlocked

Botswana	Chad	Malawi	South Sudan
Burkina Faso	Eswatini	Mali	Uganda
Burundi	Ethiopia	Niger	Zambia
Central African Republic	Lesotho	Rwanda	Zimbabwe

(WTO 2021) ¹

The STR has been continuously reviewed through upward adjustments of thresholds, the elimination of the production certificate of origin, and an enhanced List of Common Goods. These improvements have relatively increased the uptake of STR at the borders; however, accessing accurate data has been challenging, and the uptake rates of the STR vary across different

¹ WTO Report 2021 Easing Trade Bottlenecks in Landlocked Countries

borders (David Luke 2023). The Customs Administrations process these STR documents and should be able to provide the data; however, they are bound by national regulations on the treatment and sharing of such data, contributing to the scarcity of data on the subject.

Where the uptake of the STR is high, such as at the Chirundu OSBP, this compliance has been attributed to the location of the border post, which is demarcated by the mighty Zambezi River and is also situated within a nature reserve, with dangerous animals, compelling traders to comply with all the formalities (David Luke 2023). This narrative will be transformed through a digitally revolutionised digitised Guided-Trade Initiative-STR as a component of trade facilitation reform that will focus on investing in both hard and soft infrastructure, covering border management and technological innovation, to promote MSME and WOB participation in digital trade (UNCTAD Trade

Facilitation Series) while lowering trade costs and bridging the digital divide. Moreover, digitisation has been identified as a strategy poised to transform Africa's economies (WTO Digital Trade for Development).

3. Overview of the Digital Landscape in Africa

The digital landscape in Africa, which is critical for regulating and promoting the digital economy, is quite complex, as countries struggle to align their domestic data protection laws and other regulations with international standards, such as the European Union's General Data Protection Regulation (GDPR). In addition, issues of trust surrounding data storage have led many African countries to be reluctant to participate in cross-border data exchange, a situation that impedes trade and economic development (Kholofelo Kruger, 2022).

Table 3. Distribution of the number of countries with Cross-Border Data Restrictions in Africa

Number of African countries with no conditions on cross-border data exchange	26
Number of African countries with conditional cross-border data exchange	26
Countries in Africa that have no conditions on cross-border data exchange but restrict data ex-post export	2
Total	54

The above statistics represent a mixed approach towards digitisation regulation. This openness is at 50 per cent, and with much more advocacy, the above position can be improved to facilitate the digitisation of trade processes including the STR. 40 countries in Africa have laws on data protection and privacy (UNCTAD Report of 2025), this represents 18 per cent against a global average of 34 per cent (ITU Report Measuring Digital Development 2025). Although Africa lags, it fares well in comparison with developed countries that are advanced in regulation and communication technology (ITU Report Measuring Digital Development 2025)

Table 4. The countries and the representative Regional Economic Bloc reflecting an encouraging trajectory towards embracing the digital economy

REC	# of Countries
AMU	3
CEN-SAD	15
COMESA	10
EAC	4
ECCAS	7
ECOWAS	8
IGAD	4
SADC	14

Source: UNCTAD Data Protection and Privacy Legislation Worldwide

The table above illustrates the presence of digital activity within the eight Regional Economic Communities, which, when enhanced and extended into an ecosystem, will enable digital inclusivity and sustainable economic growth within Africa through a digitised STR. Stable connectivity and interoperability are of essence in a digital trade environment. Internet based access systems that can interface between different entities such as Customs Administrations, Immigration, Banks, Government Agencies, and other Border Agencies at entry points contribute immensely to facilitate predictable trade nevertheless greatly reducing the clearance time framework. This will be a hallmark of an effective digital Guided-Trade Initiative STR.

The AfCFTA Digital Trade Protocol adopted by State Parties in 2024, includes a five-year development plan to incorporate findings that will promote the digitisation of Africa's economies (Kholofelo, 2024). This Protocol although still in draft form, aligns with the 2018 Comprehensive and Progressive Trans-Pacific Partnership Agreement (CPTPP) and the Digital Economy Partnership (DEPA), with the latter gleaning a lot from CPTPP. These agreements try to address fragmentation and will therefore be of value to Africa with its fragmented economies. In addition, the plurilateral approach engaged by these agreements will be ideal in Africa's situation and adaptation within defined parameters may be effective in addressing Africa's fragmentation challenges.

Katrin Kuhlman (2023) warns that trade laws remain aspirational in achieving sustainability and inclusivity, lacking binding language and concrete mechanisms for implementation. These two agreements mentioned have deliberate provisions to be inclusive, ensuring the participation of MSMEs and women in digital trade. Globally, the rate of implementation of trade facilitation measures that include digitisation is 38 per cent (UNESCAP Digital and Sustainable Trade Facilitation: Global Report 2023), and the digitisation of the STR becomes crucial as part of trade facilitation.

The AfCFTA Digital Trade Protocol (DTP)

comprises 52 articles on digital trade. The following sections of the AfCFTA DTP text should be leveraged by State Parties in a coordinated way to achieve a digitised Guided-Trade Initiative STR: **Part III:** Facilitating digital trade; **Part VI:** Digital trade inclusion; **Part X:** Technical assistance, capacity building, and cooperation.

Blockchain technology is an ideal tool for engaging in the design of the digitised continental STR due to its attributes, which allow RECs or countries to consider various options. National Trade Facilitation Committees (NTFC) should steer the dialogue on the available options of blockchain technology with other critical continental stakeholders on the application of blockchain technology in preferential trade agreements. Through Customs Cooperation and Technical Assistance, both laid out in the WTO TFA, blockchain technology can achieve harmonised trade across borders. Automation of processes including the adoption of blockchain technology can reduce trade costs by 4.5 per cent and boost trade. There has been a slow uptake of automation of processes, as observed by OECD (WTO Digital Trade for Development 2023) including the implementation of the WTO Trade Facilitation Agreement because countries lack the necessary capacities and funding for such trade reforms.

The Customs Cooperation and Trade Facilitation outlined in Annex 3 and Annex 4 of the AfCFTA Protocol on Trade in Goods, together with the WCO Immediate Release Guidelines, serve as tools that support the design of the digitised Guided-Trade Initiative STR. Adapting the WCO Immediate Release Guidelines establishes consistent thresholds for consignment values, promoting predictability and transparency in the prompt clearance of goods.

The AfCFTA Protocol for Women and Youth in Trade, adopted in February 2024, along with the other previously discussed instruments, serves as another tool that empowers efforts to address the digital literacy gaps for women and youth, enhance digital entrepreneurship, strengthen the resilience of MSMEs, and achieve inclusivity and sustainability in creating a favourable environment for accessing the Guided-Trade

Initiative STR.

3.1 Ubuntu Philosophy -African Values System

The principle of UBuntu Philosophy, premised on community, solidarity, and connectedness, is the impetus that will drive the Guided -Trade Initiative STR. The uBuntu Philosophy mirrors the United Nations Sustainable Development Goals (SDGs) to move communities as a bloc so that no one is left behind. The notion of sustainable development has fundamentally shifted towards becoming a global core principle in policy development to 'catch-all' human beings, the environment and economic well-being to achieve a just society (Paul R Baker, 2021) and this echoes uBuntu.

The fragmented economies within Africa and divergent views on the regulatory framework for digitisation inherently carry the risk of delaying consensus on a digitised Guided-Trade Initiative STR and the uBuntu Philosophy, through the principle of solidarity, can overcome the divergent views delivering an outcome that goes beyond economic commitment ushering an organic just society encompassing gender equality, a preserved environment, culture, and human rights. Ubuntu prism, therefore, presents a significant potential to achieve inclusive sustainable development in a digital economy (Mishra and Kugler, 2023).

3.2 Gaps

The above proposals are not without challenges. The digital regulation framework has problems rooted in the nature of international or regional trade agreements that are negotiated and concluded at the international level, while their application takes place at the domestic level. Included in this is the disconnect between sustainability and inclusivity. The alignment with domestic regulation is difficult and may cause varied approaches across State Parties. Consequently, digital fragmentation,

unpredictability and uncertainty characterise the digital trade regulation framework compounded by the confusion already caused by the spaghetti bowl effect. The relief is that the AfCFTA takes precedent over other agreements already in place within the RECs or State Parties.

Africa has the lowest internet use penetration at 38 per cent in 2024 in comparison with the global rate of 68 per cent (ITU Report Measuring Digital Development 2025). High internet costs, unstable connectivity, and intermittent power cuts disproportionately affect women and MSMEs, who often lack the means to afford internet services and alternative sources of power, such as solar energy. In the absence of more rigorous interventions to improve the situation, the uptake of the digitised Guided - Initiative STR could be hampered.

35 of the 40 African Member States in the WTO have ratified the WTO TFA (Tralac). The digitisation of the Guided-Trade Initiative STR is closely linked to the WTO TFA in order to achieve inclusive, simplified trade and harmonised procedures. Ideally, all countries should be part of the WTO TFA. However, this is not the case, which can pose challenges to a digitised Guided-Trade Initiative STR.

The AfCFTA Protocol on Women and Youth in Trade (PWYT) covers MSMEs that operate formally, leaving out ICBT that operate informally under simplified trade regimes as cross-border traders. According to the McKinsey Report of 2020, 80 per cent of MSMEs in Africa are not registered; nevertheless, these entities contribute 50 per cent of Africa's GDP (Acha Leke 2020). It is prudent for governments to invest into the digitisation of the Guided-Trade Initiative STR as a strategy towards the registration and formalisation of ICBT. The apparent gap in the PWYT should be addressed so that the instrument can achieve an inclusive digital trade framework.

The table overleaf shows some of the instruments associated with digital landscape in Africa.

Table 5. Digital Landscape in Africa

Name of Instrument	Authority
AfCFTA Protocol on Women and Youth in Trade	AU-AfCFTA
AfCFTA Digital Trade Protocol	AU-AfCFTA
African Society Information Initiative	UNECA
The Policy and Regulation Initiative for Digital Africa	AU/EU/ITU
The African Union Digital Formulation Strategy: Vision 2030 Policy Framework for Africa	AU
Africa Union Trade Observatory-ATO	AfCFTA
Pan-African Payment and Settlement System (PAPSS)	AFREXIMBANK
NTB Mechanism	AfCFTA
eTradehubs	ICC

The Guided-Trade Initiative study conducted by the AfCFTA Secretariat in 2022 identified traded merchandise in the scope countries, and such merchandise can be regarded for inclusion under the Common List. The AfCFTA Protocol on

Women and Youth in Trade, alongside the AfCFTA Digital Trade Protocol and five other digital operational instruments, fosters a conducive digital environment for launching the digital Guided-Trade Initiative Simplified Trade Regime.

Table 6. Proposed Digitised Guided-Trade Initiative Simplified Trade Regime

Digitisation Area	Description	Benefits	Challenges	Proposed Intervention
Digital Customs Declaration incorporating the Certificate of Origins covering different FTAs	Transition from paper to digital certificates, allowing online submission and verification.	Reduces time and costs associated with manual processing; improves security and traceability; aligns with AfCFTA provisions for e-Cook. Opportunity to capture additional FTAs within the 8 RECs Opportunity to factor in blockchain technology and innovation Overall harmonisation and interoperability	Requires standardised regulations, customs procedures and reporting standards to achieve predictability. Recognition of Digital Customs Declaration across countries. Data Security and Privacy & Compliance	Originating Products: Link GTI findings in designing Common List that will be digitised. Suspend Excise duty and VAT Eliminate the need to accompany goods that are cleared under the digitised Continental STR

Common List of Goods	Capturing of common lists of goods as guided by Guided Trade Initiative: Must be included in the agreed list of products eligible for Guided-Trade Initiative STR treatment. Value Threshold: Consignments must be below the set value of \$5000	Saves time and resources for both Customs Administration and traders streamlines border clearance; contributes to reduced transaction costs. Deliberate creation of regional value chains and ready stop gap measure to mitigate against food shortages.	Originating goods require a certain level of local value addition. Preference will be afforded on qualifying goods. Physical Examinations to detect any false declarations may result in delays of consignments and traders or push them to informality Reliable Connectivity	Risk profiling of goods by the Customs Administration through ASYCUDA and other tools Sensitisation and continuous education of traders Public-Private Dialogue & Stakeholders Engagement to increase the uptake of the digitised Continental STR
Online Trade Information Portals	Centralised digital platforms providing access to trade information (rules, regulations, procedures, training materials)	Improves access to information, particularly for MSMEs; reduces information asymmetry; provides guidance on compliance; can be in different languages for easy access by different traders. Improves transparency and credibility	Requires consistent and up-to-date information management; platform must be user-friendly and accessible; needs infrastructure for internet access. Slow build-up of trust in the systems Numerous government agencies in this area tend to negatively affect areas of responsibility by the different agencies Use of technical jargon associated with different regulators	Public-Private Partnerships may address the challenges Continuous engagements and communication with traders Simplified trade language that can be understood and interpreted correctly by the traders.
Mobile Payment Systems	Integration of mobile money platforms and digital financial services for cross-border transactions	Reduces risks and inefficiencies of cash transactions; enhances access to finance for MSMEs; facilitates secure and easy cross-border payments.	Requires interoperability of mobile money systems across different countries and regulatory frameworks to support these	Acceptable Currencies: PAPSSs ¹ ,PIX ² and other acceptable e-wallets transactions Factor the de minimis principle on agreed threshold of VDP. Intentional reduction of transactional costs by financial institutions

¹ <https://papss.com/>

² https://www.bcb.gov.br/en/financialstability/pix_en

Digitalisation of Permits & Certificates	Moving away from physical permits/certificates, adopting digital formats	Reduces physical contact at borders; simplifies processes, reduces paperwork and processing times.	Requires a robust IT infrastructure, standardisation of documentation and training of relevant personnel to support adoption. Resource outlay is huge	PPPs and wider consultations required Sanitary and Phytosanitary (SPS) Compliance: For agricultural products, digital certificates must be easily verifiable. Safety and Quality. Blockchain technology can address challenges
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As outlined above, conventional trade has not really benefited women and MSMEs; however, digital trade is set to benefit women once the WTO Trade Facilitation Agreement and the World Customs Organisation recommendations are deliberately leveraged by State Parties in collaboration with other interventions, as demonstrated above.

4. Recommendations

This paper is a preliminary assessment requiring further research to align it with the Guided-Trade Initiative already underway. This paper considers the development of the GTI Simplified Trade Regime in a dispensation where trade in small parcels has escalated, while informal cross-border trade within Africa remains difficult and unpredictable. The AfCFTA Protocol on Women Youth in Trade should extend its provisions to cover women in cross-border trade. Payment modalities such as PAPSS and PIX should be explored to include the informal traders. PIX, an inclusive payment system in Brazil, has been instrumental towards the digitisation of the informal economy while simplifying trade. Digitisation of the STR should be linked to markets such as Sokukoo¹ that have realised to develop organic e-commerce platforms that enable participation of women and youth in international trade.

5. Conclusion

The Simplified Trade Regime as a trade facilitation measure has been in place for a very long time with limited engagement by cross-

border traders, however, with the AfCFTA operational digital instruments in place bolstered by the AfCFTA Protocol on Women and Youth in Trade, a digitised continental STR is set to increase its uptake while transforming economies through MSMEs and Women-Owned Business that conduct business across the borders.

Africa's digital regulation framework is fraught with opportunities and challenges in adapting to existing progressive data laws. The challenges include aligning digital regulations among State Parties with varying levels of economic growth, building trust, ensuring interoperability, developing payment systems, and digital markets.

The rise of the digital economy in Africa has created opportunities to pioneer new pathways to digitisation that are rooted in the essence of African humanism (Neha and Mishra Kholofelo Kluger 2023) and this should also be linked to payment systems that have worked in an informal setting to achieve an inclusive ecosystem characterised by community solidarity, and connectedness, known as uBuntu. The uBuntu perspective becomes instrumental in complementing the WTO Trade Facilitation Agreement, the WCO, the AfCFTA Protocol on Women and Youth in Trade, and the AfCFTA Digital Protocol on Trade through the establishment of the digitised GTI-Simplified Trade Regime, which will include MSMEs and WOB, ensuring that no one is left behind- an aspect of African values.

¹ <https://au.int/en/pressreleases/20200707/african-union-and-african-electronic-trade-group-launch-sokukuu>

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India-SACU Economic Engagement: Opportunities, Challenges, and the Impact of Digital Trade

By Dr Animesh Kumar and Pooja Maurya, Centre for WTO Studies

Abstract

This study explores the evolving trade and economic relationship between India and the Southern African Customs Union (SACU), focusing on trade in goods and services, investment flows, and the transformative role of digital trade. It examines historical linkages, sectoral complementarities, and policy frameworks underpinning bilateral cooperation. Using trade data and partial equilibrium analysis, the research identifies significant trade potential, with projected gains from tariff liberalisation for both regions. The analysis also highlights opportunities in critical sectors such as automobiles, pharmaceuticals, energy, and digital services. Despite progress, challenges persist, including regulatory barriers, limited product diversification, and digital infrastructure gaps. The paper argues that digital trade could act as a catalyst for modernising the India–SACU partnership, fostering innovation, resilience, and inclusive growth. Policy recommendations stress the need for an integrated trade agreement encompassing goods, services, and digital trade to strengthen South–South cooperation and leverage the African Continental Free Trade Area (AfCFTA) framework.

Keywords - India–SACU trade, South–South cooperation, digital trade, tariff liberalisation, investment flows, AfCFTA

1. Introduction

Cross-border investments, trade liberalisation, and the establishment of bilateral and regional trade agreements have all contributed to the acceleration of global economic integration. Smooth trade flows and supply chain connectivity are now essential as economies grow more interconnected. Simultaneously, digital trade is becoming a revolutionary force that permits businesses, particularly SMEs, to more effectively reach international markets. E-commerce, digital services, and data-driven supply chains are all contributing to this change and changing conventional trade paradigms.

In this study, we attempted to understand the trade relationship of India with Southern African Customs Union (SACU); sectoral trade potential for both; role of digital trade in reshaping trade dynamics between the two. This study also attempted to forward policy opportunities and challenges in reshaping the present trade dynamics.

SACU, one of the oldest customs unions in the world, comprises five member states: Botswana,

Eswatini, Lesotho, Namibia, and South Africa. The foundation for formal trade negotiations between India and SACU was laid in 2000, during a meeting between the trade ministers of India and South Africa. This led to a Framework Agreement signed in 2002, aimed at establishing a Preferential Trade Agreement (PTA). Subsequently, a Joint Working Group was formed, and the draft text of the PTA, which initially included limited tariff concessions, was finalised in 2004. These concessions were expected to evolve into a more comprehensive Free Trade Agreement (FTA) addressing emerging trade issues.

Despite an MoU being signed and negotiations formally commencing in 2008, progress has been limited. In 2020, efforts to revive the dialogue were initiated under the spirit of South-South

cooperation.³ Despite this intent, no substantive progress has occurred. Nonetheless, SACU's 2023 Annual Report⁴ reaffirms the bloc's view of India as a strategic trading partner, with ongoing efforts aimed at finalising negotiation modalities.

These developments highlight the potential for enhanced trade cooperation between India and SACU in the near future.

Table 1. Economic Characteristics of SACU countries and India

Country	GDP USD Mn (2023)	Real growth rate (%) (2023)	GDP Per Capita USD 1000 (2023)	Inflation % (consumer prices)	Population (Mn)	Human Development Index (HDI)
Botswana	19.4	2.7	7.2	5.1	2.7	0.7
Eswatini	4.6	4.9	3.8	4.9	1.2	0.6
Lesotho	2.0	2.2	0.9	6.3	2.3	0.5
Namibia	12.3	4.2	4.7	5.9	2.6	0.6
South Africa	377.8	0.7	6.3	6.1	60.4	0.7
India	3550.0	8.2	2.5	5.6	1428.6	0.6

Source: IMF

There are striking similarities as well as notable contrasts between the economic characteristics of India and the countries of Southern Africa. India, which has a population of over 1.4 billion people and a GDP of USD 3.55 trillion, is far larger than the countries of Southern Africa. However, its GDP per capita is only USD 2,500, which highlights its stage of development compared to countries such as Botswana (USD 7,200) and South Africa (USD 6,300). There is a certain amount of similarity in terms of standard of living as represented by HDI: Botswana and South Africa dominate the region with an HDI of 0.7, Lesotho trails at 0.5, and India's HDI of 0.6 closely resembles that of Eswatini and Namibia. These

trends highlight the possibility of shared learning and cooperative participation in areas like inclusive growth, social development, and economic resilience. They also represent different economic performance scales but similar developmental aspirations.

2. India–SACU Economic Relations: A Strategic Pillar of South–South Cooperation

The economic partnership between India and the SACU represents a vital dimension of South–South cooperation. With India's growing economic influence and SACU's strategic position as a customs union, bilateral economic ties have strengthened through expanding trade,

³ http://www.investsa.gov.za/wp-content/uploads/2022/04/SACU-Insights-15-Year-Journey-2004_to_2019-002.pdf

⁴ https://www.sacu.int/uploads/documents/SACU-Annual-Report-2023_Digital-130324-092829.pdf

investment, and collaboration across various sectors. The evolution of India–SACU relations has been shaped by historical and strategic imperatives. India's post-independence foreign policy laid the foundation for strong ties with African nations, emphasising solidarity and mutual development. SACU, established in 1910, originally focused on harmonising tariffs and customs among its members. However, bilateral economic interactions began to deepen notably from the 1990s onwards, when India diversified its foreign policy under the "Look East" and "Africa Policy" initiatives. Scholars such as Batra (2009) and Sinha (2014) attribute this engagement to both India's quest for new economic partners and SACU members' aspirations to integrate more closely with emerging economies. With the review of existing literature, we observed that India and Africa are in a natural connection with historical linkages and colonial imprints in their social and political underpinnings.

A key institutional milestone was the signing of the Trade and Economic Cooperation Agreement (TECA) in 2008, aimed at enhancing trade and investment flows. The agreement emphasizes tariff liberalization, improved market access, and technical cooperation, which have collectively contributed to growing commercial ties. Basu and Nandi (2019) underscore the potential to further enhance trade by addressing non-tariff barriers and leveraging SACU's Economic Partnership Agreement with the European Union. India has been pursuing similar frameworks to facilitate access to SACU markets and position itself as a leading economic partner on the continent.

Trade between India and SACU has expanded considerably in the 21st century, driven by sectoral complementarities and institutional frameworks (Mohammad and Nayyar, 2015; Sahoo, 2016). Major sectors contributing to bilateral trade include minerals, automotive products, pharmaceuticals, and agricultural goods. India's primary exports to SACU consist of machinery, chemicals, textiles, and pharmaceuticals, while its main imports from

SACU—particularly from South Africa—include mineral resources, metals, and agro-based commodities.

Investment flows have also witnessed a significant rise, particularly from India into SACU. Indian firms have invested heavily in infrastructure, information technology, and energy sectors, especially in South Africa's automotive and telecommunications industries. Conversely, SACU's investments in India—though comparatively limited—are gradually increasing, particularly in mining, renewable energy, and financial services. As per the Indian Ministry of Commerce and Industry (2021), India's outward foreign direct investment (FDI) into SACU countries has grown markedly, with cumulative investments in South Africa reaching USD 3.4 billion by 2020. Bedi and Sethi (2017) argue that India's FDI is often driven by strategic goals such as securing access to natural resources, especially minerals and energy. The South African Reserve Bank (2020) has noted a rise in South African companies targeting India's consumer market, signalling mutual investment interest.

Beyond trade and investment, India and SACU have initiated several sector-specific collaborations aimed at inclusive development. Energy has emerged as a critical area, with SACU countries seeking India's technical expertise in renewable energy, particularly solar power. Joshi and Pillay (2018) highlight India's support for South Africa's renewable energy initiatives, both financially and technically. Agriculture is another area of strong cooperation, where India has offered support in irrigation, crop management, and agro-processing. Scholars such as Pandey (2016) and Rajan (2021) see India's agricultural know-how as a strategic asset for enhancing food security and rural livelihoods in SACU countries.

Additionally, cooperation in education and tourism has deepened, strengthening people-to-people connections. An increasing number of South African students are opting to pursue higher education in India, while India remains a favoured tourist destination for SACU citizens. Kumar (2018) observes that such exchanges have

contributed positively to public diplomacy and laid a cultural foundation for sustained economic partnership.

The India–SACU economic relationship reflects the growing importance of South–South cooperation in the global economic landscape. Continued engagement across trade, investment, energy, agriculture, and human capital is expected to shape a resilient and mutually beneficial partnership in the years to come.

3. Merchandise Trade between India and SACU

India's trade with SACU has increased from USD 13.68 billion (2013) to USD 20.52 billion (2022). Total trade witnesses 33% increase from 2013-2022, whereas trade balance has observed a continued favour to SACU from 2013 to 22. In 2023, nearly 40% of India's export orders came from just six countries.⁴ Therefore, diversification of Indian exports is crucial as its global exports

are more susceptible to external shocks. Trade agreement with a union of five countries of Southern Africa could give a leg up to both regions.

Table 2 provides the trade profile of SACU and its member nations. Followed by South Africa, Namibia is noted as the second most important export destination for India, and Botswana ranks second as an import source for India. Significant change is witnessed for Eswatini and Lesotho as India observed reduced trade with both nations. South Africa remains the primary trade partner, followed by Namibia, which ranks as India's second-largest export destination within SACU. Botswana emerges as the second-largest import source for India in the region. Notably, a significant decline in trade has been observed with Eswatini and Lesotho, indicating reduced bilateral engagement with these two nations.

Table 2. Bilateral Trade between India and SACU member nations (in million USD)

Partner	2013				2022				% Change (2013-22)	
	Export	Import	Total Trade	Trade Bal.	Export	Import	Total Trade	Trade Balance	Export	Import
Botswana	59.3	190.6	249.9	-131.3	223.1	473.1	696.2	-250.0	276%	148%
Eswatini	27.4	30.2	57.6	-2.8	19.9	4.9	24.7	15.0	-27%	-84%
Lesotho	28.5	3.5	32.0	24.9	15.1	0.0	15.1	15.1	-47%	-100%
Namibia	230.1	14.3	244.4	215.8	329.2	25.6	354.9	303.6	43%	79%
South Africa	5742.5	7351.8	13094.2	-1609.3	8265.8	11166.5	19432.3	-2900.7	44%	52%
SACU	6087.7	7590.4	13678.2	-1502.7	8853.1	11670.1	20523.2	-2817.0	45%	54%
World	336611.4	466045.6	802657.0	129434.2	452684.2	732566.0	1185250.2	279881.8	34%	57%

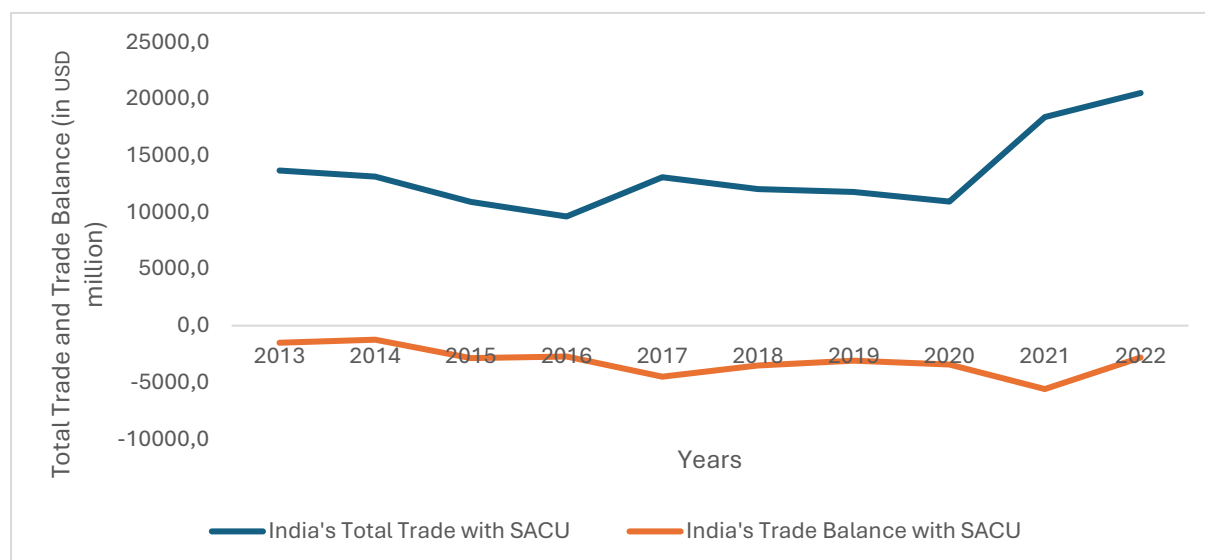
Source: World Integrated Trade Solution (WITS)

Figure 1 presents the overall trend in India's total trade and trade balance with SACU. India's total

trade with SACU group has recorded a continued increment since 2020. Trade balance entirely favours SACU group from 2013-22.

⁴ USA, China, Germany, UK, Japan and France.

Figure 1. Trend in India's Total Trade and Trade balance with SACU (2013-2022)



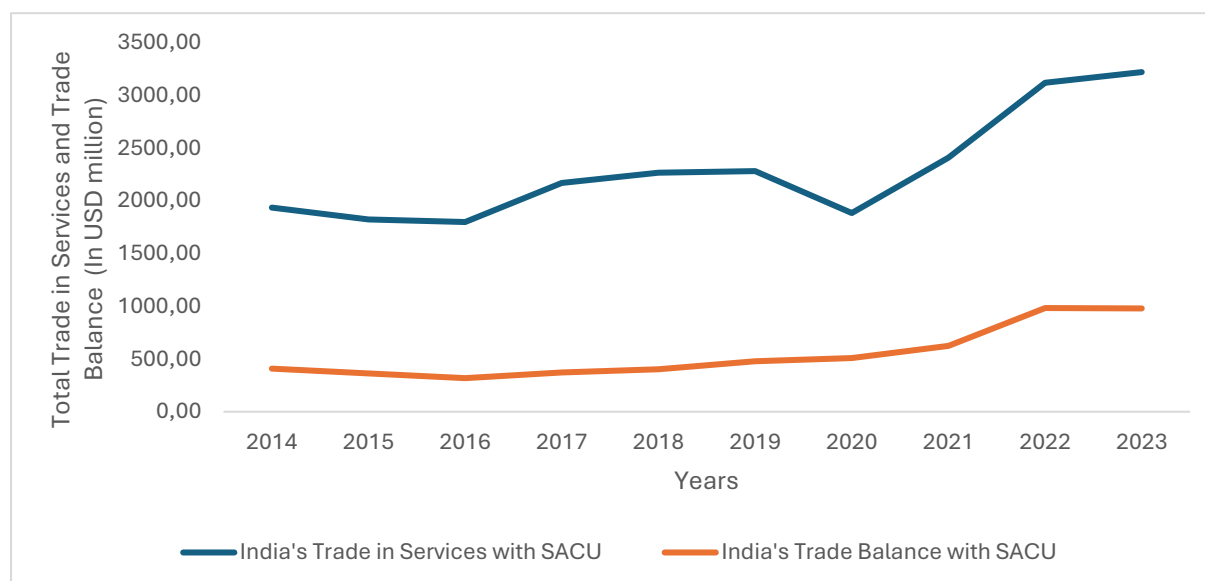
Source: WITS

3.1 Trade in Services between India and SACU

India's trade in services with SACU reached USD 3.2 billion in 2023, rising from USD 1.9 billion in 2014 (OECD-WTO Balanced Trade in Services). The trade balance in services has consistently favoured India, standing at USD 978.63 million in 2023. That year, India's services exports to SACU were valued at USD 2,099.06 million, while

imports totalled USD 1,120.43 million. Among SACU members, South Africa emerged as India's largest services export partner, accounting for USD 1,682.49 million, followed by Namibia at USD 261.78 million. Lesotho recorded the lowest volume of imports from India among the five SACU nations. On the import side, South Africa also ranked as the largest source of India's service imports from the region, followed by Namibia in 2023.

Figure 2. Trend in India's trade in services and trade balance with SACU (2014-2023)



Source: Balanced trade in services (BaTIS), OECD

Figure 2 illustrates the trend in India's trade in services and trade balance with SACU from 2014 to 2023. The data reveals a steady upward trajectory in services trade, with a brief decline observed around 2019–2020, likely attributable to the COVID-19 pandemic. Post-2020, services trade resumed its growth, and throughout the period, the trade balance in services consistently remained in India's favour.

3.2 Services Trade between India and SACU

Between 2014 and 2023, India experienced the

highest percentage growth in exports of goods-related services, which rose by 80.22%, followed by construction services (68.45%) and personal, cultural, and recreational services (60.36%). On the import side, the most significant increase was observed in personal, cultural, and recreational services (68.10%), followed by telecommunications, computer, and information services (65.79%) and goods-related services (60.19%). Table 3 highlights the top ten exported and imported service categories between India and SACU in 2023.

Table 3. Top Ten Exported and Imported Services (2023)

Rank	Top 10 exported services from India to SACU	USD Million	Top 10 imported Services from SACU	USD Million
Total	Services	2099.06	Services	1120.43
1.	Memo Grouping ⁵ - Services; Commercial services	2096.44	Memo Grouping - Services; Commercial services	1110.39
2.	Other services - Total services excluding Manufacturing services on physical inputs owned by others, Maintenance and repair services, Transport and Travel	1775.17	Travel	462.04
3.	Other commercial services - other services excluding Government goods and services n.i.e	1772.55	Other services - Total services excluding Manufacturing services on physical inputs owned by others, Maintenance and repair services, Transport and Travel	357.09
4.	Telecommunications, computer, and information services	1111.16	Other commercial services - other services excluding Government goods and services n.i.e	347.05
5.	Other business services	481.72	Transport	293.01
6.	Transport	192.66	Other business services	136.50
7.	Travel	122.23	Telecommunications, computer, and information services	120.02
8.	Construction	69.51	Personal, cultural, and recreational services	37.21
9.	Insurance and pension services	41.78	Insurance and pension services	27.93
10.	Financial services	31.4	Financial services	12.1

Source: *Balanced trade in services (BaTIS)*, OECD

⁵ Commercial services, which cover all categories except government goods and services, are presented as a memo item.

3.3 Trade Barriers in Services

As services increasingly flow across borders via digital means, commercial presence, or movement of service suppliers, regulatory fragmentation and market access constraints have emerged as major barriers. These constraints can impact the availability, cost, and quality of services. According to the OECD Services Trade Restrictiveness Index (STRI), barriers to trade in services have become more restrictive and fragmented over the last decade, especially in transportation, professional, and communication services. High regulatory barriers are associated with increased trade costs and reduced service flows.

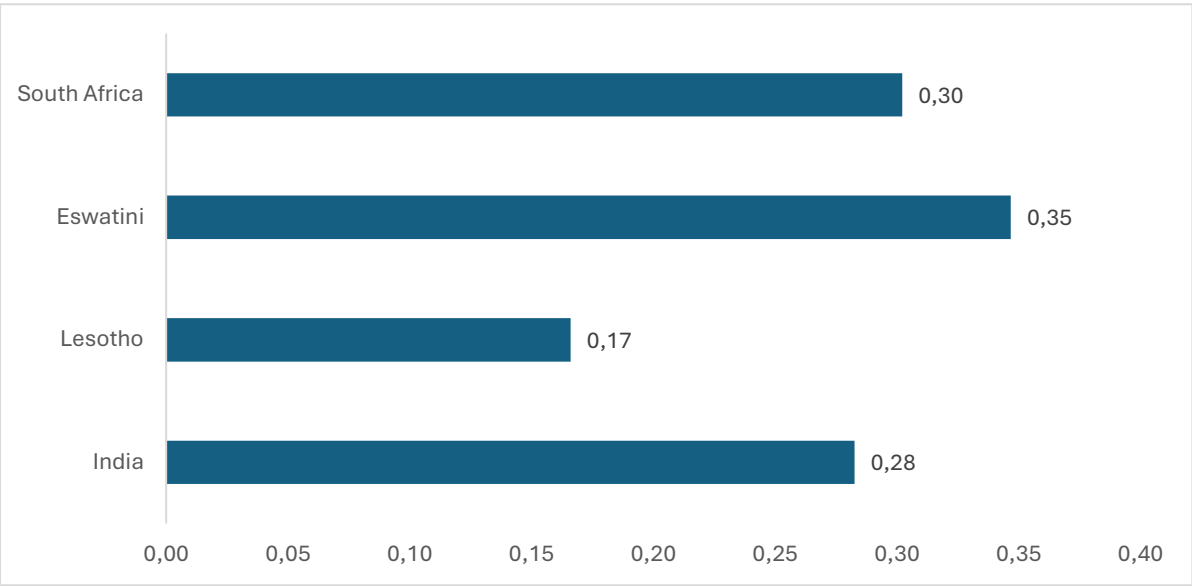
India is among the countries that have adopted the most extensive liberalisation reforms, positioning itself favourably in terms of openness. According to the 2024 STRI, Japan, the

United Kingdom, and the Netherlands recorded the lowest average regulatory barriers, while India also demonstrated a strong liberalisation profile.

Digital transformation is reshaping international trade, enabling services that once required physical presence to be delivered remotely. Online platforms now play a vital role in facilitating service transactions. By 2020, digital trade accounted for approximately 25% of global trade, totaling nearly USD 5 trillion.

The Digital Services Trade Restrictiveness Index (DSTRI) captures this evolving dynamic, where a value of 1 indicates complete restrictiveness and 0 indicates full openness. Figure 3 shows that Lesotho has the lowest digital trade restrictiveness among SACU nations, while Eswatini exhibits comparatively higher barriers to digital service trade.

Figure 3. India and SACU nations’ Digital Services Trade Restrictiveness Index (2014)



Source: OECD, Digital STRI

4. Investment and Digital Trade Perspective

Since India and Africa are natural partners, as mentioned above, Indian investors are not new to the land of Africa. As per reports, Indian companies have significantly invested in the African economic landscape. Substantial investment has been made by Birla Group in

Africa since the early 1960s. Since then, there has been no looking back with the growing opportunities in Africa. As per the CII report, Indian investment in Africa could reach USD 150 billion by 2030.

Large Indian firms are already present in several sectors of the South African economy, including

mining, financial services, IT, pharmaceuticals, automobiles, and the green economy. In 2007, the Indian company Dr. Reddy's Laboratories made its market debut in Southern Africa in partnership with a South African laboratory, according to a joint report by the Confederation of Indian Industry and PwC. It stood among the top ten suppliers of generic drugs in South Africa.⁶

The State Bank of India has expanded to serve all South Africans as clients, according to the same source, and has grown throughout Africa. The State Bank of India contributes directly and indirectly to the creation of job opportunities across the country. The bank supports job creation in South Africa by hiring South African nationals and providing financial services and loans to a significant number of corporate clients. Zensar Technologies has been operating in South Africa for over a decade, delivering IT infrastructure, cloud solutions, and digital transformation services to banks, telecoms, and government sectors, reflecting India's growing IT engagement with Africa. Indian MNCs have a significant and diverse impact on the employment promotion of both locals and the sizable Indian diaspora in Africa. Indian MNCs' participation in technology transfer, community development initiatives, and ethical business practices significantly contributes to the creation of a favourable narrative for the economic relationship between India and Africa. These companies must uphold their dedication to openness, commitment to the environment, and social responsibility throughout the partnership in order to ensure that the advantages of their presence reach the local population, promote shared prosperity, and support inclusive growth.

Digital trade is reshaping global economic partnership, including India and SACU. There is immense opportunity for India and SACU to engage and capitalise on digital trade. Among SACU, particularly South Africa, has a nascent digital trade economy and seeks support in strengthening its digital infrastructure, as conveyed in the AFCFTA. The potential of digital

trade through India-SACU economic relations opens up new possibilities for collaboration beyond traditional goods-based trade. E-Governance, Education, Healthcare, SMEs, etc, are among the numerous areas of collaboration. An India-SACU FTA which includes digital trade measures, such as data governance, e-commerce facilitation, and digital service standards, may boost and modernise the trading relationship and keep it in line with global trends. However, there are concerns in terms of digital infrastructure gaps, regulatory divergence, and cybersecurity.

Digital trade has the potential to significantly strengthen the India-SACU collaboration. By encouraging collaboration in digital services, infrastructure, and regulation, both areas may achieve inclusive economic growth, innovation, and resilience. Strategic communication and the incorporation of digital trade frameworks into bilateral agreements are crucial to realise this promise.

5. Potentials in Trade in Goods and Services

The study has analysed the tariff profiles of India and SACU nations for 2023 (see Table A2). Overall, India has the highest simple average MFN applied tariff of 17%, indicating a more protectionist behaviour. Whereas SACU nations hold a very similar tariff profile with a simple average MFN tariff of approximately 7.5%, and 60.6% of non-ad valorem duties, indicating a moderate level of liberalisation. The uniformity in the maximum duties and structure indicates policy coordination among SACU nations. In terms of tariff escalation scenario, India shows the highest concentration of duties of more than 15% (30.9%). Whereas SACU, especially South Africa, has high maximum duties up to 636%, which implies that some sensitive products are kept under a highly protected category. In the agricultural category, the study observed that SACU countries (except Lesotho on some metrics) apply a harmonised and moderate MFN structure. Whereas India's structure shows a relatively more protective and concentrated approach. Given India's larger market size and

⁶ [https://raisinahouse.org/africa-rising/f/examining the-](https://raisinahouse.org/africa-rising/f/examining-the-impact-of-indian-investments-in-africa)

[impact-of-indian-investments-in-africa](https://raisinahouse.org/africa-rising/f/examining-the-impact-of-indian-investments-in-africa)

relatively higher protection, SACU is expected to benefit more in terms of gaining market access from the agreement than India.

The study has analysed trade potential for India and SACU under a partial equilibrium framework. Using TINA tariff simulations outcomes, we observed that there will be trade gains for India of USD 2.45 billion. This includes a trade creation of USD 1.95 billion and trade diversion of USD 494.96 million. We also noted that 3525 imported commodities by SACU increased by 39.93% (by trade value). SACU's total imports from India increased by 29.79%. We have further observed that products belonging to major sectors like vehicles, electronics, textiles, and processed food may gain significantly (see Table A1).

We observed trade gains for South Africa worth USD 4.55 billion, consisting of a trade creation of USD 3.58 billion and trade diversion of USD 964.21 million. It has been noted that there is an increase of 42.28% (by trade value) of Indian imports of 810 commodities from South Africa, representing an increase of 40.02% in total imports of India from South Africa. In the context of Namibia, the study noted trade gains of USD 7.48 million, including a trade creation of USD 3.22 million and trade diversion of USD 4.27 million. An increase of 17.53% (by trade value) of imports of 22 commodities by India from Namibia. This represents an increase of 4.87% in total imports of India from Namibia. For Botswana and Eswatini, the trade gains are found to be USD 3.51 million and USD 1.61 million, respectively. While we have considered the most optimistic scenario of 0% tariffs for the partial equilibrium analysis, even a partial liberalisation of 50% could lead to substantial gains for both parties.

6. Challenges, Opportunities, and the Way Forward

While the economic partnership between India and SACU has seen notable growth, several challenges still hinder the full realisation of its potential. Both India and SACU countries face barriers that restrict market access, including regulatory challenges, inadequate infrastructure, and complex customs procedures. Additionally,

SACU economies, particularly South Africa, continue to be heavily dependent on mining and commodity exports. Lack of export diversification also exposes SACU to vulnerabilities, especially in the face of global price volatility (Dlamini, 2019).

Although both sides aimed to strengthen economic cooperation through a Preferential Trade Agreement (PTA), negotiations stalled. Despite these setbacks, there remains a strong mutual interest in advancing the trade and economic relationship. Both parties have expressed their desire to deepen ties with each other, with Namibia explicitly recognising the benefits of accessing India's vast market. India, in turn, has indicated its willingness to support industrial development in areas like ICT, pharmaceuticals, medical supplies, renewable energy, irrigation, and agriculture.

There is also substantial potential for bilateral cooperation in the mining sector, given the mineral wealth of SACU countries. Currently, India imports critical minerals from numerous countries. The top supplying countries to India are China, Australia, Argentina, Chile, Indonesia, USA etc. SACU exports various minerals to the world, which are critical to India. South Africa supplies PGMs, manganese, and Chromium; Namibia exports Uranium, Zinc, and Copper; Botswana exports Nickel and Copper. Majorly, South Africa supplies 25% of nine critical minerals to the USA and EU, and ASEAN countries. Significant potential for collaboration exists with Botswana for copper, Namibia for tin, and South Africa for a range of strategic minerals, including copper, zirconium, titanium, cobalt, vanadium, tungsten, and sulphides. Moreover, SACU remains a major global supplier of raw and semi-processed commodities. India is highly committed to meeting renewable energy targets, and along with this, is highly involved in embracing advanced manufacturing. Given this, there will be a growing demand for semiconductor and other mineral inputs. SACU is a strategic partner in global supply chains of critical minerals. This is creating a natural synergy between the two.

Looking ahead, the economic partnership between India and SACU is poised to deepen, particularly with the growing emphasis on

innovation and sustainable development. The African Continental Free Trade Area (AfCFTA) offers a strategic platform to reinforce India-SACU ties. Further, AfCFTA's regional market integration could enable Indian enterprises to gain broader access to the African market, boosting intra-continental trade and investment (Mose, 2021). In parallel, both India and SACU are investing in the digital economy. India's thriving technology sector and SACU's interest in digital transformation pave the way for collaboration in fintech, e-commerce, cybersecurity, and digital trade infrastructure. Such initiatives could substantially elevate bilateral relations (Mehta and Pillay, 2022).

The India-SACU economic relationship holds immense promise for the coming decades. While significant attempts have been made in trade, investment, and sectoral collaboration, key challenges remain, particularly non-tariff barriers and a lack of product diversification. Moving forward, digital trade emerges as a game changer. It can eliminate traditional barriers, stimulate innovation, and foster inclusive growth. Ultimately, the future of the India-SACU relationship will depend on how effectively both parties capitalise on new opportunities in digital transformation, sustainable development, and regional integration.

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Appendix

Table A1: Tariff analysis: India's Top 10 Sectoral Gains (in million)

Codes	Product Label	Actual SACU' s Imports from India	Current Tariff	Simulated Tariff	Simulated SACU' s Imports from India	Change In US\$ Value of SACU' s Import from India in Simulation	Change In % Value of SACU' s Imports from India in Simulation Compared to Actual Value
870322	Vehicles sparkignition internal combustion reciprocating piston engine cylinder capacity exceeding 1000cc but not exceeding 1500cc	666.88	18.82	0	1464.15	797.28	119.55
870321	Vehicles sparkignition internal combustion reciprocating piston engine cylinder capacity not exceeding 1000cc	449.88	18.82	0	738.53	288.65	64.16
271012	Petroleum oils and oils from bituminous minerals not containing biodiesel not crude not waste oils preparations nec containing by weight 70 or more of petroleum oils or oils from bituminous minerals light oils and preparations	3019.50	2.63	0	3204.78	185.28	6.14
870323	Vehicles sparkignition internal combustion reciprocating piston engine cylinder capacity exceeding 1500cc but not exceeding 3000cc	157.93	18.82	0	309.37	151.43	95.88
870829	Vehicles parts and accessories of bodies other than safety seat belts	25.61	20.00	0	140.79	115.18	449.76
870421	Vehicles compressionignition internal combustion piston engine diesel or semidiesel for transport of goods of a gvw not exceeding 5 tonnes nec in item no 87041	53.37	13.13	0	106.01	52.64	98.65
190531	Food preparations sweet biscuits whether or not containing cocoa	11.23	21.00	0	51.79	40.56	361.23
870331	Vehicles compression ignition internal combustion piston engine diesel or semidiesel cylinder capacity not exceeding 1500cc	18.75	18.82	0	56.64	37.90	202.15
610910	Tshirts singlets and other vests of cotton knitted or crocheted	12.75	45.00	0	49.13	36.38	285.34
851712	Telephones for cellular networks or for other wireless networks	252.58	1.82	0	288.86	36.28	14.36

Source: TINA

Table A2: Summary of Tariff Profiles of India and SACU Nations																							
Country	Binding Coverage (%) All products	Simple Average Bound (%)	Binding Coverage (%) Non-agri	Simple Avg MFN Applied (%)	Simple Average MFN Applied (%) agri	Simple Average MFN Applied (%) non agri	Duty-Free Share (%)	Duty-Free Share (MFN, % HS6) agri	Duty-Free (MFN, % HS6) nonagri	Non-Ad Valorem Duties (MFN, %) agri	Non-Ad Valorem Duties (%) Non agri	High Duties >15% (MFN)	Duties > 15% (MFN, % HS6) agri	Duties > 15% (MFN, % HS6) non-agri	Max MFN Duty (%)	Max MFN Duty (%) agri	Max MFN Applied Duty (%) Non-agri	Distinct Duty Rates	Distinct MFN Duty Rates agri	Distinct MFN Duty Rates non-agri	MFN Tariff Lines	MFN Applied Tariff Lines agri	MFN Applied Tariff Lines (Non-agri)
Botswana	93.8	36.5	92.9	7.5	8.5	7.4	14.1	21.9	12.8	12.9	0	20.2	22.3	19.8	141	597	141	56	80	41	8,367	1,216	7,151
Eswatini	93.8	39	92.9	7.5	8.5	7.4	14.2	22.5	12.8	12.9	0	20.2	22.4	19.8	401	597	401	58	80	41	8,418	1,219	7,199
India	74.3	113.1	70.1	17	39	13.5	2.2	3.4	2.6	0.3	5.7	30.9	92.2	21.3	379	300	379	198	20	149	12,302	1,566	10,736
Lesotho	100	199.1	100	7.5	8.5	7.4	0	0	0	12.9	0	20.2	22.4	19.8	111	200	60	3	80	41	8,427	1,219	7,208
Namibia	93.8	39	92.9	7.5	8.5	7.4	14.2	22.5	12.8	12.9	0	20.1	22.2	19.8	136	597	136	58	80	41	8,418	1,219	7,199

Table A2: Summary of Tariff Profiles of India and SACU Nations																							
Country	Binding Coverage (%) All products	Simple Average Bound (%)	Binding Coverage (%) Non-agri	Simple Avg MFN Applied (%)	Simple Average MFN Applied (%) agri	Simple Average MFN Applied (%) non agri	Duty-Free Share (%)	Duty-Free Share (MFN, % HS6) agri	Duty-Free (MFN, % HS6) nonagri	Non-Ad Valorem Duties (MFN, %) agri	Non-Ad Valorem Duties (%) Non agri	High Duties >15% (MFN)	Duties > 15% (MFN, % HS6) agri	Duties > 15% (MFN, % HS6) non-agri	Max MFN Duty (%)	Max MFN Duty (%) agri	Max MFN Applied Duty (%) Non-agri	Distinct Duty Rates	Distinct MFN Duty Rates agri	Distinct MFN Duty Rates non-agri	MFN Tariff Lines	MFN Applied Tariff Lines agri	MFN Applied Tariff Lines (Non-agri)
South Africa	93.8	39	92.9	7.6	8.5	7.4	14.2	22.5	12.8	12.9	0	20.1	21.9	19.8	636	597	636	58	80	41	8,419	1,219	7,200

A Trade Negotiator's Perspective on Digital Trade as a Catalyst for Economic Integration in Africa

By Amshuly Chandran and Tathagata Choudhury

Abstract

This paper examines digital trade as a catalyst for economic integration in Africa, focusing on its potential to enhance trade efficiency, foster inclusive growth, and reduce structural barriers. It analyses how digital technologies—such as e-commerce platforms, digital payments, and blockchain—can address Africa's logistical and infrastructural challenges, enabling participation in global value chains. The study explores the role of regional trade agreements, notably the African Continental Free Trade Area (AfCFTA) and its Digital Trade Protocol, in harmonising rules for cross-border data flows, cybersecurity, and consumer protection. Key opportunities include empowering women entrepreneurs, MSMEs, and youth through digital marketplaces, while critical constraints such as inadequate digital public infrastructure, financing gaps, and cyber risks persist. The paper argues that strategic investments, regulatory convergence, and public-private partnerships (PPPs) are crucial for leveraging digital trade to support Africa's sustainable development and integration into the global digital economy.

Keywords - Digital trade, AfCFTA, economic integration, e-commerce, digital public infrastructure, Africa

1. Introduction

Digital Trade is gaining importance at a rapid pace in the Global International Market. Developed Countries like the UK, those in the EU, USA, and China have made fast progress in digital trade, but it is also important to note that, to truly achieve economic integration, the needs, wants, and challenges faced by the developing and least developed countries (LDCs) also need to be taken into consideration.

This research paper is a modest attempt to examine the manner in which digital trade can help unlock Africa's trade potential and to assess the development and challenges faced by Africa in unlocking its Digital Trade potential. Africa faces challenges like the lack of digital public infrastructure (DPI), adequate internet access, methods to finance digital trade, and last-mile service-related connectivity problems within the subcontinent. This research further delves into the steps that can be taken to empower Women Entrepreneurs and MSMEs that drive digital trade in Africa and globally across continents. Further, Africa faces a high level of cybercrime and lacks integration between trading blocs.

The present research examines the role of digital trade agreements, domestic and international initiatives that play a role in empowering Africa's digital trade and enhancing the cooperation between different trading blocs that form the African subcontinent.

Africa has taken important steps in the last few years to ensure greater economic integration through the establishment and implementation of the African Continental Free Trade Area (AfCFTA). AfCFTA would especially help in the development of regional value chains while also moving towards improving infrastructure, especially transportation and digital connectivity, which would incidentally be crucial for facilitating trade and supporting integration in Africa. In addition to increasing market efficiency and reducing the cost of doing business by offering opportunities for economies of scale, the AfCFTA could ease trade and investment flows and shift the composition and direction of foreign direct investment flows into Africa.

2. What Role Can Digital Trade Play in Fostering Africa's Economic Growth?

Digital trade has the potential to play a crucial role in advancing Africa's economic growth and integration, because of the structural and developmental characteristics of African economies. Digital technologies can significantly boost trade efficiencies in Africa. For example, e-commerce platforms, digital payment systems, and digital public infrastructures like electronic single window systems for customs can significantly reduce trade costs and increase transparency.

Firstly, digital technologies facilitate stronger connections between African producers and consumers, on a pan-African level and global scale. This is crucial for the 54 African countries, as they have found it difficult to participate in global trade due to factors like limited transport infrastructures and high logistical barriers. Tapping into the digital service sector can help Africa explore a lucrative market which accounts for half of the global services exports and around 12% of total exports (Joint WBG - WTO Policy Note, 2023). This can also help African countries reduce their reliance on natural resources-based exports, which are vulnerable to price volatility, and explore opportunities in new markets and products.

In this regard, the role of e-commerce and digital marketplace is crucial. Examples can be cited of African platforms like *Jumia* (Namunwa, 2021) and *iSOKO*, which are helping businesses to sell their products beyond their immediate locations, which, when combined with digital payment systems, facilitate seamless transactions and encourage online shopping. Therefore, the growth of e-commerce will be a major driver of digital trade in Africa, especially for MSMEs, women, and vulnerable communities. In this respect, an integrated digital payment system is crucial for ensuring streamlined transactions, which will propel the growth of e-commerce platforms and help in improving cross-border trade. Additionally, the development of digital payment platforms can help in reducing the reliance on traditional banking infrastructure and associated challenges of increasing access to credit, which many African countries continue to face. For example, the Pan-African Payment and

Settlement System, one of the key operational instruments of the AfCFTA, is a centralised system for processing, clearing, and settling of cross-border trade and commerce payments among African countries and provides a real-time gross settlement for cross-border payments in distinct local currencies which can support inclusive and digital payment system across the Pan-African continent (KPMG, 2021).

Secondly, as per the WTO Trade Cost Index, improving digital connectivity helps to reduce costs for both goods and services (Namunwa, 2021). For example, increased mobile broadband connectivity across Africa can help reduce Africa's average trade costs from 7% to 9% in business and professional services (Joint WBG - WTO Policy Note, 2023). Additionally, Africa has high dwell times with custom processing delays in most countries, averaging up to 8 days for a majority of the 54 African countries. As per the United Nations Economic and Social Commission (UNESCO) for Asia and the Pacific, full implementation of digital trade facilitation measures in Africa can help reduce trade costs by 26.2% or save USD 1,200 billion in international transaction costs (Duval *et al*, 2018). Similarly, a report released by the World Economic Forum (WEF) estimates that digital reforms of customs can help Africa reduce its non-tariff barriers, including those related to border and customs administration, leading to trade gains of USD 20 billion per year in Africa (Joint WBG - WTO Policy Note, 2023). If digital connectivity is coupled with a comprehensive regulatory environment, the potential to reduce trade costs will rise from 10 to 25% (Joint WBG - WTO Policy Note, 2023).

Digital technologies can help improve efficiencies in African trade. For example, an automatic identification system, which is an automatic tracking system designed to enhance navigation safety, can also be useful in providing insights into maritime trade flow, allowing active monitoring of shipments (Reyes *et al*, 2024). Shipment and goods tracking technologies prevent diversion of exports by traders into the internal market that are seeking to reap the benefits of tax credits on goods and services trade. Besides generating increased tax revenues,

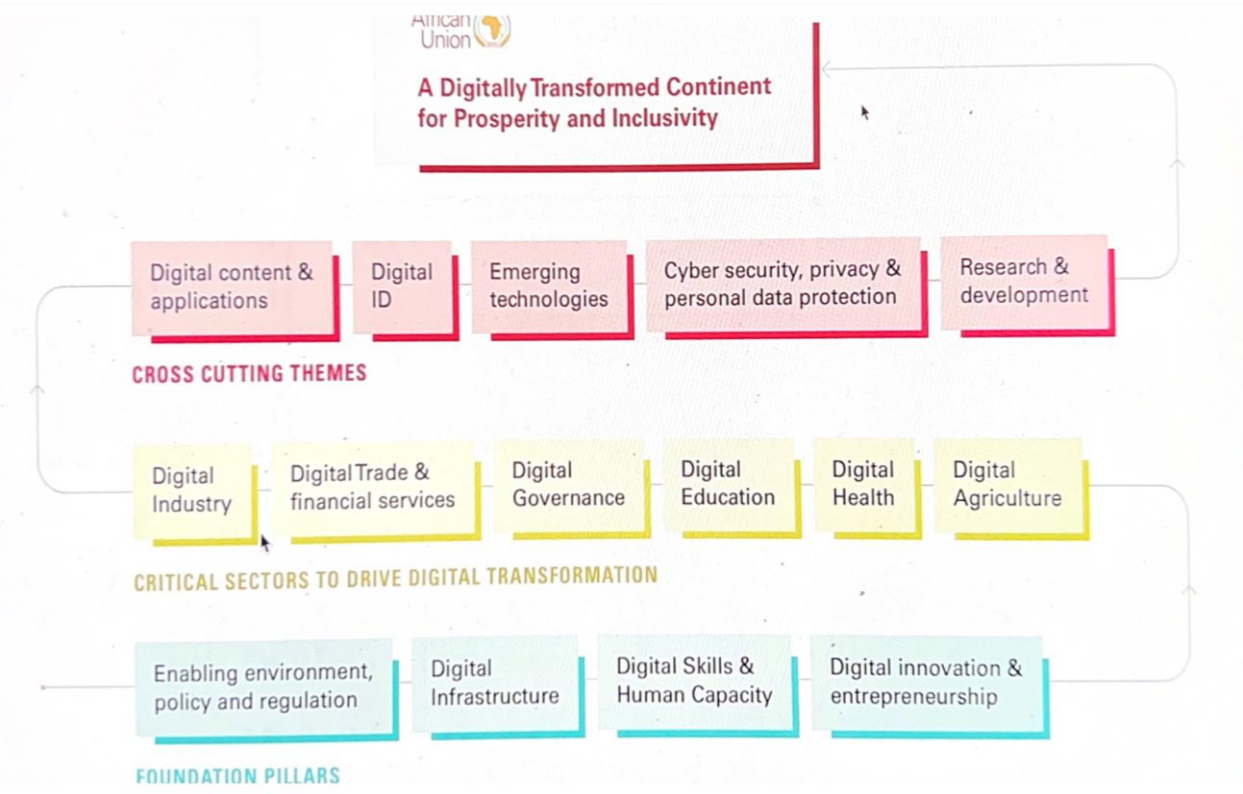
tracking technologies have also increased efficiencies by reducing turnaround time for trucks in Kenya (J. K., *et al*, 2010). The most obvious benefits of the digitisation of trade and the development of digital public infrastructure can be seen in the administration of Customs for digital trade in goods and services. For example, the development of an electronic single window system can streamline customer clearance and document preparation, making trade faster and more transparent.

Further, digitisation allows for pre-arrival data submission, which helps customs officials to verify documents before goods reach ports or borders and reduces the time in waiting for customs clearance at borders. Digitisation can also improve trade efficiency through high-risk identification through AI, where it analyses vast amounts of data to identify high-risk shipments, allowing focused attention. Tracking and tracing of ships can be made easier by ensuring transparency, enhancing accountability, and decreasing storage costs through decreased

clearance times and limits on storage units. Real-time ship tracking enhances supply chain visibility, enabling faster responses to disruptions and building resilience. Additionally, blockchain can improve transparency by securely recording transactions.

Digital trade can also help Africa access trade financing. Firstly, it helps improve access to new sources of funding, such as crowdfunding sites, which enable investors to finance sustainable products, including those in sustainable agriculture (Crus, 2024). Further, the use of technologies like blockchain can help reduce processing times for issuing *letters of credit* (LOC). This can not only help reduce costs but can also help free up working capital for farmers and traders, shorten the length of payment terms, reduce counterparty risks, and increase cash flows (Tripoli, n.d). The diagram in Figure 1 below shows the various stages that the African Continent needs to go through to achieve digitisation of trade and promote economic integration.

Figure 1. Digitisation of trade stages



3. Growth of MSMEs and Women Entrepreneurs

Digital trade would also help foster inclusive growth for Africa by tapping into the potential of its youth, women, and MSMEs – important drivers for African economic growth. A survey conducted by the International Trade Centre (ITC) shows that women's ownership of businesses significantly increases when trade moves from offline to online cross-border e-commerce modes. A great anecdote in this regard is how African women are the owners of 3 out of 4 exclusive e-commerce firms in Africa (Tripoli, n.d). Additionally, e-commerce platforms can help African women overcome time, mobility, and financial constraints while managing household obligations. Online trade also reduces face-to-face interactions, which can be a major challenge in a male-dominated trade network. Estimates show that e-commerce can potentially create 3 million new jobs across the African continent by 2025 (Tempest, 2021). Similarly, digital trade opens opportunities for the African youth to reach out to the global audience and sell their products or services online. For example, artists can use basic devices to record songs and promote them on *YouTube* and *Spotify* or distribute them on *iTunes* for a low price (Waldfoegel, 2017).

Lastly, the regulatory arbitrage of the present WTO rules offer Africa a benefit from a system which has not always given Africa high returns. Under GATS, members can specify restrictions on the supply through mode 3 (commercial presence) and mode 4 (movement of natural persons). However, this opens opportunities to supply low-cost services using mode 1 even where members have not committed to full liberalisation, as there are practical challenges in curbing cross-border services. Current regulatory developments on the issue of technology neutrality are in crosshairs and offer opportunities for Africa to expand its service delivery globally in low-cost service delivery. For example, till recently, engineering services have been delivered mainly through Mode 3

consultancy services. However, with the advancements in 3D printing, it is possible to carry out actual construction remotely via Mode 1. Digital Trade is currently leading to porous borders, and there is talk of a Mode 5 at the WTO in Geneva, to quantify and liberalise the same. Conducive regulatory frameworks would enable Africa to attract investments by attracting investments in digital infrastructure. These would include drafting streamlined regulations, promotion of competition, and regulations in the background of cybersecurity.

A robust regulatory framework would provide a stable and predictable atmosphere in Africa, which would address key concerns of business in areas like data management, including cross-border data flows, tax protection, electronic transactions, and consumer protection. An element in this is the harmonisation of digital regulations, as it would entail greater economic integration among African countries by eliminating inconsistencies and ensuing lesser complexities that can hinder trade. Cybersecurity, including regulations and standards, can help safeguard digital systems and data from cyberattacks, protecting both businesses and individual entrepreneurs. Additionally, there is a need to create a supportive investment regime to enable investment in digital infrastructure that helps attract investments in broadband and telecom infrastructure.

Considering the opportunities offered by digital trade and technologies, there is a need for Africa to develop quality Digital Public Infrastructure (DPI), reliable, affordable high-speed internet to benefit from the comparative advantages offered in a digital world. Additionally, it needs a robust regulatory regime which not only increases efficiencies for trade and offers protection for stakeholders but also is embedded in how these technologies will be deployed in the future.

4. Role of Trade Agreements in Building Cooperation

The study focuses on trade agreements like

AfCFTA (African Continental Free Trade Area), SADC (Southern African Development Community), COMESA (Common Market for Eastern and Southern Africa), EAC (Economic African Community), ECOWAS (Economic Community of West African States), SACU (Southern African Customs Union), TFTA (Tripartite Free Trade Area), with a specific focus on the involvement of the African Union to promote digital trade. These trade agreements build on market access, electronic transactions, data protection, cross-border data flows, intellectual property, trade in services, trade facilitation, and development cooperation to boost digital trade in Africa. Trade agreements promote international guidelines on AI governance before witnessing a *national or regional silo-approach* to AI regulation. Regulatory convergence will integrate the use of AI technologies in international trade to prevent the creation of more barriers.

Trade agreements play a key role in creating an ecosystem to drive global adoption and scalability. It creates coordination amongst international policies and coherence in the international trading system. Trade agreements are generally technology-neutral and are good at dealing with issues like non-tariff barriers (NTBs), national treatment (NT), most favoured nation (MFN) treatment, etc. *TradeTech* issues are relatively new in trade agreements, and various existing trade rules apply *mutatis mutandis* to digital trade. Trade agreements can support global and inclusive *TradeTech* adoption in the following ways.

- (i) **MFN and NT in digital Trade:** These prevent governments from introducing discriminatory measures favouring local providers or measures that are unnecessarily trade restrictive;
- (ii) **Ensure Transparency measures:** Ensure the transparency of regulatory requirements and procedures for facilitating market access by foreign companies, through following the notification requirements, capacity building, etc.

- (iii) **Building International Cooperation:** To prevent a fragmented technological environment by encouraging international regulatory cooperation and promoting regulatory harmonization and coherence.
- (iv) **Create Data Sharing Mechanisms:** Trade agreements could encourage governments to exchange best practices on existing data-sharing mechanisms and on addressing related legal and technical challenges.
- (v) **Foster Dialogue and Create Good Regulatory Practice:** Furthermore, trade agreements also encourage governments to foster dialogue between their regulatory bodies and trade policymakers and to encourage the exchange of good regulatory practice. This would help to set a common vision, enhance coherent implementation and coordination, deliver value from data, and lower trade costs. This is especially important where there are several regulators pursuing data regulation, which could inadvertently result in new obstacles to trade.
- (vi) **Trade Agreements promote the use of AI:** Trade agreements could promote international guidelines on AI governance before witnessing a national or regional silo-approach to AI regulation. Regulatory convergence would support the global adoption and use of AI technologies in trade. Otherwise, regulatory fragmentation will lead to more barriers.

5. Initiatives to promote Digital Trade in Africa

Africa's youthful population and minimal legacy constraints present a unique opportunity to fast-track digital transformation. In this digital era, embracing technology is key to innovative, inclusive, and sustainable growth—driving job creation, reducing poverty and inequality, improving service delivery, and advancing Agenda 2063 and the sustainable development

goals (SDGs). The continent's rapid adoption of digital solutions offers a rare leapfrogging moment to transform traditional socio-economic sectors. Recognising the efforts of the continent's leadership to prioritise and accelerate digital transformation, and building on the vision of many African leaders, African countries are ready for a comprehensive digital transformation strategy to guide a common, coordinated response to reap the benefits of the Fourth Industrial Revolution.

6. Bilateral Trade Initiatives to promote Digital Trade in Africa

The Digital Trade Protocol (DTP) of the AfCFTA Agreement is Africa's flagship framework for building a unified digital market, one of the world's largest by population. Finalised in 2023 and adopted in early 2024, it harmonises digital trade rules across all 54 African countries. The DTP enables secure cross-border data flows, sets legal standards for consumer protection, contracts, and e-commerce, as well as promoting interoperable digital IDs and payment systems. It fosters continent-wide cybersecurity cooperation and digital trust frameworks to ensure a safe and reliable trading environment. Crucially, it seeks to bridge the digital divide, empowering women, youth, and SMEs to participate fully in Africa's digital economy.

The AfCFTA Agreement entered into force on 21 March 2019. As a mega-regional trade agreement, the AfCFTA establishes a pan-African trade bloc with the potential to unite 1.2 billion people and create an economic area worth approximately USD 3.4 trillion. The International Monetary Fund (IMF) has described the AfCFTA as an economic game-changer for the continent, with the potential to address the historic fragmentation of African economies and unlock significant investment and trade opportunities for both domestic and foreign investors. Article 6 of the AfCFTA outlines its scope, covering trade in goods, trade in services, investment, intellectual property rights, and competition policy. Article 20 sets out the rules governing the standing appellate body within the dispute settlement

mechanism.

The Smart Africa Alliance is a coalition of 39 African countries dedicated to advancing sustainable socio-economic development through digital transformation. Its initiatives include the *One Africa Network*, which seeks to eliminate roaming charges across national telecom systems; the *Data Policy Framework*, which promotes data protection, sovereignty, and secure cross-border data flows; and *E-commerce and Innovation Hubs*, which support start-ups and foster digital entrepreneurship across the continent.

COMESA has introduced the Electronic Certificate of Origin (eCO), a flagship initiative under its Digital Free Trade Area (DFTA) designed to modernise trade facilitation. The eCO replaces manual certificates with a secure digital system, streamlining processes, improving efficiency, and reducing trade barriers. It certifies that goods originate from a COMESA Free Trade Area (FTA) member state, thereby granting them preferential tariff treatment.

7. Africa's National Digital Strategies

The **Digital Transformation Strategy** for Africa is built on foundational pillars—enabling environment, policy and regulation, digital infrastructure, digital skills, and innovation and entrepreneurship—supported by critical sectors such as digital trade, finance, government, education, health, and agriculture. Cross-cutting themes include digital content, digital IDs, emerging technologies, cybersecurity, data protection, and R&D. Guided by principles of solidarity among African Union (AU) member states, strengthened cooperation with regional and international partners, and alignment with Agenda 2063 and the SDGs, the strategy outlines policy actions drawn in part from the AU–EU Digital Economy Taskforce report.

A SWOT analysis of the Digital Trade Initiative highlights its strengths, including driving momentum for Africa's digital strategy, enabling most AU members to develop ICT policies, and initiating efforts with national governments to

harmonise laws and regulations. Rising mobile phone penetration and internet use are accelerating e-commerce, while the initiative provides a continental coordination framework, boosts international recognition, and

strengthens regulatory capacity. It supports financial sector transformation, expands internet access, and contributes to GDP gains of up to USD 200 million—enhancing productivity and narrowing Africa’s digital divide.

Figure 2. A SWOT Analysis for the Digital Transformation Strategy for Africa.



The Digital Trade Initiative faces weaknesses such as poor coordination among continental and regional institutions, limited cohesion in policy and regulatory frameworks, and inadequate data protection and infrastructure supervision. Cross-border network interconnection is hindered by insufficient reforms, while digital entrepreneurs face shortages in finance, mentoring, and training. Weak monitoring and evaluation mechanisms, along with high technology costs,

further constrain progress. Addressing these challenges is essential to advancing Africa’s digital trade.

8. Africa’s Multilateral Trade Initiatives

Since its inception, the United Nations Commission on International Trade Law (UNCITRAL) has developed a comprehensive framework to facilitate electronic transactions in commercial activities, beginning with the UNCITRAL Model Law on Electronic Commerce

(1996). Adopted by over 100 states, this foundational text established the principles of non-discrimination against electronic means, functional equivalence, and technology neutrality—granting electronic communications the same legal status as paper-based transactions. Complementary instruments followed, including the UNCITRAL Model Law on Electronic Signatures (2001) and the United Nations Convention on the Use of Electronic Communications in International Contracts (2005), the latter providing the first binding treaty to ensure legal certainty for electronic contracting in international trade.

In 2017, UNCITRAL extended these principles to transferable documents and instruments with the Model Law on Electronic Transferable Records, enabling electronic versions of bills of lading, bills of exchange, promissory notes, and similar instruments. Subsequent work addressed emerging challenges in the digital economy, including the 2019 Notes on the Main Issues of Cloud Computing Contracts and the 2022 Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services—the first globally agreed framework for identifying persons online and ensuring the integrity of cross-border electronic data. UNCITRAL also published a taxonomy of legal issues related to artificial intelligence, data governance, online platforms, digital assets, and decentralised systems, guiding future legislative work on digital trade.

Most recently, in 2024, UNCITRAL adopted the Model Law on Automated Contracting, providing legal certainty for electronic contracting through automated and artificial intelligence systems. Maintaining its role as a central legal standard-setter within the United Nations, UNCITRAL continues to address the legal dimensions of emerging technologies and their trade applications, spanning dispute resolution, security interests, insolvency, and the international transport of goods. Collaborative efforts with partners such as the United Nations ESCAP have produced practical tools, including the Readiness Assessment Guide for Cross-

Border Paperless Trade, advancing global progress toward paperless and digitally enabled commerce.

8.1 The G20 on Digital Trade

The G20 is actively promoting mechanisms within trade agreements to increase business awareness and encourage their effective use in boosting international trade. Coordinated action at the multilateral level is essential to avoid fragmented, siloed approaches to data transfer. A notable example is the Osaka Track, launched in 2019 under Japan's G20 presidency, which advances international cooperation on cross-border data flows. Central to this initiative is the principle of "data free flow with trust," which outlines a multidimensional framework for collaboration between governments and the private sector, with recommendations to enhance governance trust and promote openness through trade rules and related policy tools (World Economic Forum, 2020b).

South Africa's G20 Presidency is preparing for its second round of meetings in April, guided by its ambitious National DPI Roadmap and the 2025 theme, "*Solidarity, Equality, and Sustainability*." The G20 Troika Declaration of India, Brazil, and South Africa, together with the Global Digital Compact endorsed by 193 UN Member States, builds on this presidency to advance discussions on Digital Public Infrastructure (DPI) and Artificial Intelligence. By placing Africa and the priorities of the Global South at the centre of the global digital agenda, these initiatives not only drive inclusive digital transformation, but also contribute to reshaping global governance frameworks to reflect a more equitable, multipolar world order.

9. Challenges in International Economic Integration

Digital trade initiatives in Africa face significant structural and institutional constraints. Weak coordination among the African Union Commission (AUC), Smart Africa, AUDA-NEPAD, and the United Nations Economic Commission for Africa (UNECA) limits the optimal use of resources and hinders the effective delivery of

the continent's digital agenda. Limited supervisory capacity to identify and mitigate risks, many of which are amplified by digital technologies, leaves Africa's digital trade vulnerable to cyberattacks, fraud, and over-indebtedness. A persistent gender gap in mobile phone ownership and use further exacerbates inequality, particularly for women entrepreneurs who represent a substantial segment of the digital marketplace. Emerging areas such as fintech, cybersecurity, and cryptocurrencies present additional challenges, deepening the divide between technologically connected populations and those without access to the tools that facilitate participation in digital trade.

On the infrastructure side, Africa continues to grapple with limited access to affordable, reliable internet and suffers from inadequate digital and physical infrastructure. Frequent power outages disrupt the operation of online platforms and services, while poor transport networks impede the timely delivery of goods purchased digitally. The alignment of national legislation with the AfCFTA Digital Trade Protocol remains uneven, raising concerns about regulatory coherence across member states. These structural weaknesses risk undermining the benefits of continental digital integration.

Human capital constraints compound these challenges. Africa faces acute shortages of skilled professionals in high-demand fields such as cybersecurity and data science, alongside a broader skills deficit that prevents large segments of the population from fully participating in online markets. Weak banking infrastructure and the high cost of credit across the continent restrict the ability of individuals and businesses—especially SMEs—to invest in digital technologies. These financial and skills-related barriers not only limit e-commerce adoption but also threaten to widen existing socio-economic disparities, ultimately constraining Africa's ability to harness digital trade as a driver of inclusive growth.

10. How to foster Innovation in Africa

For Africa to truly capitalise on the transformative potential of digital trade and technologies, it must invest in building a robust and enabling digital ecosystem, which would allow innovation to thrive. There are 3 components of this ecosystem. Firstly, there is a need to develop a robust public infrastructure to facilitate digital trade, which can only be developed by having a stable internet connectivity and infrastructure that supports e-commerce transactions. Once this is established, the transition towards essential DPI can be made, which includes introducing a digital identification system; a framework for electronic payments, including cross-border payments; and lastly, data exchanges. DPIs which are interoperable, modular, and built on open standards would all be crucial for driving digitisation and innovation in Africa.

However, having a strong DPI with well-developed connectivity is not enough; there is also a need for digital skills and entrepreneurship. This is particularly relevant given the anticipated transformative impact of Artificial Intelligence (AI). While there are risks that traditional jobs will be displaced by AI and emerging technologies, it also creates opportunities for skills that are indispensable for a digital age. Africa can only tap into its potential with upskilling and responsible governance. Lastly, an enabling regulatory environment is a crucial component of any digital trade ecosystem. This includes a conducive business environment, with transparent policies, easy entry and exit, fostering high competition. It also includes policies and regulations which foster digital trade, for example, regimes supporting e-signatures and e-contracts, data regulations, but also safeguards user privacy and autonomy. Additionally, regulations must have a techno-legal approach where compliance is embedded in the design of DPIs.

10.1 Building Robust Digital Public Infrastructure (DPI)

A. Connectivity as the foundation

The bedrock of the DPI is a high-speed, affordable

infrastructure that builds connectivity. With internet penetration being at just 40 percent, Africa lags behind in this sphere as well. According to Sang et al (2025), internet penetration is not uniform across the 54 African countries that form the African Continent. Before developing a robust DPI system, Africa needs to have investments in broadband connectivity, data centres, and more to develop a framework for public-private partnerships. Additionally, Africa has the first-mover advantage and geographical advantage of using renewable energy while setting up these data centres.

B. Digital identification

The first pillar of the DPI is the digital identification system. Digital identification systems provide a secure, verifiable, and unique identity for individuals. This can become the basis for accessing a wide range of services as it helps in the authentication of identities. It also builds trust between the stakeholders. Digital identification can be extremely useful in places in Africa where traditional forms of identification are insufficient and would help many vulnerable populations to access essential services.

Digital identities are built on key elements that ensure security, inclusivity, and utility. Effective systems integrate advanced technologies such as biometrics—fingerprints, facial recognition, and iris scans—alongside encryption to create unique and secure identifiers. By replacing multiple forms of identification, digital IDs facilitate seamless operations across both public and private services and allow for selective disclosure of personal data, thereby strengthening consumer privacy and control (Bandura et al, 2023). Inclusivity remains central: digital identities must be designed to reach remote populations, often through mobile technologies, to guarantee broad accessibility and equitable participation.

The applications and benefits of digital identities are wide-ranging. In India, the Aadhaar system, combined with the Unified Payments Interface (UPI), has significantly expanded access to

banking services (Sang et al, 2025). Similarly, Kenya's *Huduma Namba* and Nigeria's National Identity Management Commission (NIMC) have enhanced financial inclusion in Africa. Beyond finance, digital identities enable more efficient service delivery and proved crucial during the COVID-19 pandemic, facilitating emergency payments and supporting patient record management (Bandura et al, 2023). Nonetheless, implementation challenges remain. Weak data protection frameworks expose users to risks of breaches and unauthorised cross-border data transfers, while the absence of foundational identity systems and shortages of technical expertise undermine the effectiveness and sustainability of digital ID systems.

C. Financing digital payments

Interoperability between digital payment systems and digital identities is critical, but equally important is building a payments infrastructure on shared rails rather than siloed networks. The Carnegie Endowment highlights that a "common network" or "platform of platforms," illustrated by openness and interoperability, prevents fragmentation and allows diverse providers to compete on the same platform. Low-cost, shared infrastructure is therefore essential for scaling Africa's digital economy, with examples such as Ghana's GHIPSS instant payments platform and the Pan-African Payment and Settlement System (PAPSS) in Tanzania. To advance this, policymakers must promote public-private partnerships, open APIs, and multilateral clearing arrangements, particularly in fintech and telecommunications.

Globally, regulatory sandboxes demonstrate how governments can balance innovation with regulatory safeguards. Initiatives such as the cross-border sandbox between the Abu Dhabi Global Market (ADGM) and the ASEAN Financial Innovation Network, or the ASEAN-ICT ministers' sandbox, allow start-ups and financial institutions to experiment with new technologies in a predictable environment while protecting data privacy. These models illustrate how trade agreements and multilateral cooperation can

leverage regulatory innovation to support digital trade and financial inclusion.

Across Africa, several central banks have implemented regulatory sandboxes to nurture fintech ecosystems. Nigeria's Central Bank launched its sandbox in 2021 to promote financial inclusion while safeguarding consumers, complemented by the Securities and Exchange Commission's "regulatory incubation" for new fintech models. Similar frameworks have emerged in Eswatini, Rwanda, Ghana, Mauritius, Mozambique, and Sierra Leone, each enabling controlled testing of innovative products and services under relaxed regulations. These sandboxes provide regulators with valuable insights, support financial inclusion, and help design adaptive regulatory frameworks that address both risks and opportunities in Africa's evolving digital economy.

D. Data exchange

A well-functioning DPI requires an open and robust data ecosystem, including public data repositories, application programming interfaces (APIs), and interoperability layers. For Africa to fully benefit from data exchange, platforms must be built on open standards with cloud integration and designed for cross-border scalability. The African Union's Digital Transformation Strategy emphasises that digital platforms should serve people, businesses, and governments in all aspects of life, while also calling for harmonised standards and interoperability across systems. To achieve this, African governments should scale up data exchange platforms and adopt international open standards to ensure that national DPIs can seamlessly interoperate across the continent.

11. What Works for Africa?

The African Union Commission, in collaboration with key institutions such as the UN Economic Commission for Africa, Smart Africa, AUDA-NEPAD, Regional Economic Communities, the African Development Bank, the Africa Telecommunications Union, the International Telecommunication Union, and the World Bank,

has developed a strategy to advance digital trade across the continent. This process also included consultations with the private sector and civil society, ensuring broad stakeholder engagement.

Several African countries are leading in shaping digital trade through national strategies aligned with the AU Digital Transformation Strategy 2020–2030. Kenya has pioneered initiatives like the Digital Economy Blueprint (2019), the Konza Tech City, and cross-border mobile payments via M-Pesa, while also introducing digital service taxes and cybercrime legislation. Nigeria, Africa's largest internet market, has strengthened its digital ecosystem with the Startup Act (2022), broadband expansion, customs modernisation, and mobile money frameworks, alongside cybercrime regulation. South Africa, supported by strong telecom and data infrastructure, has adopted the National E-Commerce Strategy (2022), enacted cybercrime laws, and leveraged platforms such as MTN MoMo and the SADC RTGS for digital trade. Rwanda, a continental leader in e-governance and innovation, has advanced initiatives such as the Smart Rwanda Master Plan, the Kigali Innovation City, and IremboGov, while promoting fintech growth, digital literacy, and women in tech. Collectively, these efforts highlight Africa's diverse yet converging pathways toward scaling digital trade.

12. The Way Forward for Africa

Achieving the goals of Agenda 2063 and the Sustainable Development Goals (SDGs) requires stronger solidarity among AU Member States, deeper cooperation between the AU RECs, African institutions, and international partners. Africa must move beyond siloed approaches to digital trade and adopt a holistic ecosystem that integrates the key foundations of digital transformation. Socio-economic development strategies should harness digital technologies to create affordable, inclusive, and accessible solutions across all 54 Member States, ensuring equal opportunities in trade in goods and services. This includes fostering homegrown digital innovations while selectively adopting external solutions that address African countries'

unique challenges. Realising this vision demands not only investment but also a shift in mindset, underpinned by new models of cross-sector collaboration and re-skilling of stakeholders.

Despite its potential, Africa continues to face fundamental barriers such as inadequate digital public infrastructure, legal fragmentation, and technical capacity gaps. The AfCFTA provides critical momentum to overcome these constraints and advance digital and economic integration. By addressing foundational

challenges and scaling innovation, Africa can position itself as a global leader in emerging sectors such as fintech and agri-tech, while leveraging its demographic dividend through the inclusion of women and youth. To achieve this, African states must also build digitally literate societies that are equipped to navigate both the opportunities and risks of digital transformation, ensuring resilience, competitiveness, and meaningful integration into the global economy.

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Non-Tariff Barriers Transparency and Elimination through Online Reporting Mechanisms in the Tripartite and the African Continental Free Trade Agreement

By Thembekile Mlangeni, South African Department of Trade, Industry and Competition

Abstract

The transparency of Non-Tariff Measures (NTMs) and the elimination of Non-Tariff Barriers (NTBs) is a challenge, more especially in regional arrangements that have no mechanism to report draft trade regulations of members. The Tripartite Free Trade Agreement¹ and the Africa Continental Free Trade Agreement (AfCFTA)² are such arrangements that have not established mechanisms to report draft trade regulations before the process of adopting and implementing such trade regulations. The AfCFTA is undertaking a process of collecting NTMs for the purpose of transparency among the AfCFTA State Parties. Members of trade arrangements (importers) often adopt and implement NTMs and impose them on exporters without transparency and proper assessment of the impact of such regulations on the exporter. Hence, even with commitments to reduce tariffs, NTBs remain the hindrance to regional integration efforts such as increased intra-trade.

The Online NTBs reporting Mechanisms in the Tripartite FTA and the AfCFTA are established to identify, report and monitor NTBs. The study considers the framework of the Tripartite FTA and the AfCFTA Annexes that establish the Online Reporting Mechanism and furthermore compares the processes towards resolving and elimination of NTBs in both Annexes. A reflection on the Online Reporting Mechanism as it relates to the time bound commitments to resolve NTBs becomes crucial because of the binding nature of the Annexes including Appendices attached to the main agreement.

Though the Online Mechanism has produced positive results regarding the number of NTBs that have been resolved, it is not clear if the processes are efficient and speedily. The escalation of unresolved NTBs from the Tripartite FTA to the AfCFTA takes time and effort in both trading arrangements. The review of the unresolved NTB under the AfCFTA allows the parties to agree on an acceptable facilitator, agree on the terms of reference for the facilitator. In addition, the parties shall present any information that it deems relevant. However, there is an option to consider third party interests and to provide a temporary solution in the case of unresolved NTBs. The process of reaching a mutually agreed solution takes 45 days. The initial NTBs resolution process under the TFTA (stage 1) takes 60 days and when an unresolved NTB is escalated to the AfCFTA (stage II) the process takes 45 days.

The study provides recommendations that are useful in the event of a review of the Tripartite FTA and AfCFTA Agreements, to bring efficiency and speedy resolution of NTBs for the benefit of trade and economic development in Africa.

Keywords - Non-Tariff Barriers (NTBs), Tripartite Free Trade Agreement (TFTA), AfCFTA, trade facilitation, online reporting mechanism, regional integration.

¹ The Tripartite Free Trade Agreement (TFTA) integrates the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC).

² The Africa Continental Free Trade Agreement (AfCFTA) is established by the African Union to create a single market across the African Continent.

1. Introduction

The Agreement that established the Africa Continental Free Trade Agreement (AfCFTA) was signed on 21 March in Kigali, Rwanda. The AfCFTA entered into force on 30 May 2019 and the Operational Instruments governing trade under the AfCFTA regime were launched in Niamey, Niger in July 2019. Trading under the AfCFTA regime commenced on 1 January 2021. To date, the text of the AfCFTA has been signed by 54 of the 55 AU member states. The process points to the gradual reduction of import tariffs among State Parties who have ratified the AfCFTA and deposited with the AfCFTA Secretariat their instruments of ratification. One of the objectives of the AfCFTA is to eliminate trade barriers and to boost intra-African trade, enabling the free flow of goods and services across the continent as a result boosting Africa's trading position even in the global market. Full implementation of the AfCFTA by State Parties becomes crucial for realising the AfCFTA objectives.

The Tripartite FTA came into force in July 2024; this followed the ratification of 14 among the 29 Members in the three Regional Economic Communities (RECs); COMESA, EAC and SADC. The Tripartite Framework is based on three pillars, which are market integration, infrastructure development, and industrial development.

While regulation that affect trade in the form of Non-Tariff Measures (NTMs) may be legitimate, when it is introduced by importing countries it may tend to limit or restrict the entry of competitive goods into prospective markets. Furthermore, NTMs may affect the quantities and the prices at which goods trade internationally. When NTMs become trade restrictive, they present as Non-Tariff Barriers (NTBs). However, many of the NTMs are, in principle, imposed to address specific and legitimate non-trade objectives, encourage domestic market, boost employment, and maintain balance of trade.

The paper analyses the AfCFTA NTBs Annex that

calls for an establishment of an online NTBs identification, categorisation, reporting and progressive elimination mechanism within the AfCFTA. The NTB online reporting mechanism is based on Annex 5 of the AfCFTA Protocol on Trade in Goods that implements the provisions regarding the elimination of NTBs.

The AfCFTA NTB online mechanism addresses NTBs that have not been resolved at the level of the Regional Economic Communities (RECs), are inter-REC in nature, or are arising from State Parties that are not members of any REC. In that regard, the AfCFTA State Parties are encouraged to resolve NTBs raised at intra-REC level using the resolution mechanism in place in each REC Free Trade Agreements (FTA).

The Protocols, Annexes and Appendices of any FTA form an integral part of the main Agreement and are therefore binding. It becomes crucial that processes of identifying, reporting, monitoring and resolution on NTBs in the RECs and in the AfCFTA are effective, functional and should align with the Annexes regarding the time bound elimination of NTBs especially those that impact heavily on intra-regional trade. The document analyses and compares the NTBs resolution Annexes of the Tripartite FTA and the AfCFTA, including the efficacy of the processes for the elimination of NTBs. It is generally assumed that when NTBs are not resolved at REC level they can be tackled at the AfCFTA level. Though empirical evidence of NTBs reported and resolved both under the Tripartite FTA and the AfCFTA seem to be encouraging, it is not clear that it aligns to the time bound elimination programme. Without proper and speedy elimination of NTBs, the overall objectives of increasing intra-Africa trade and realising one single market under the AfCFTA may not be realised as envisioned.

The Tripartite and the AfCFTA Online Mechanism is open to all African business sectors: small, medium and large companies, informal traders, women and youth business operators. Common NTBs across Africa include, cumbersome customs operations and border documentation, pre-shipment inspections, transport regulations,

sanitary and phytosanitary measures and technical barriers to trade, amongst others. This calls for devoted time, resources and priority towards resolving NTBs for the achievement of the overall objectives of the Free Trade Agreements. The processes of the digital/Online NTB reporting mechanisms at the Tripartite FTA and the AfCFTA level, the outcomes and status of the reported NTBs thus far determines the useful recommendations provided by the study, to ensure continued and enhanced regional integration, especially at the time of the five year review of the AfCFTA.

2. Potential to increase Africa Intra –Industry Trade through Tackling NTBs

Intra-Africa trade remains relatively low compared to other world regions and in global trade, the AfCFTA through the elimination of tariffs and NTBs can boost trade and other objectives such as regional integration.

As indicated by Sithole (2019) NTBs are a major impediment to international trade than imposed customs duties, other duties and charges. For instance, SADC eliminated about 85% of tariffs yet intra-regional trade remains at approximately 10% due to the high prevalence of NTBs.

The Secretary General of the AfCFTA (Mene, 2025) acknowledged that while the AfCFTA offers considerable opportunities in the Continent that could lead to the attainment of Sustainable Development Goals including economic growth and development, there are NTBs that continue to exist. To realise and unlock the benefits offered by the AfCFTA, enhancing logistical and regulatory frameworks while investing in infrastructure connectivity could drastically reduce NTBs.

(Luke and Mabuza, 2018) compares the Agreements and state that both the TFTA and the AfCFTA, establish the NTBs Mechanism for the purpose of addressing the challenge of NTBs. However, the NTB mechanism does not consider the existing NTBs, it is only when an NTB is reported that the process kicks in to resolve the NTB. This calls for a mechanism to notify in a

transparent manner the NTMs that members adopt and implement before they pose as NTBs.

3. The TFTA and AfCFTA NTB Framework

The TFTA NTB Annex combines and improves on the NTB elimination Mechanisms processes of the EAC, COMESA and SADC RECs into one binding Agreement; the Tripartite FTA. Viljoen (2015) cites challenges with the RECs NTB elimination processes that while the commitment is to eliminate existing NTBs, there is no comprehensive method nor measures to resolve identified NTBs. There is no policy guidance to ensure that RECs members abide by the commitments to eliminate NTBs.

This paper discusses the Tripartite Mechanism in contrast with the AfCFTA Mechanism to assess improvements in the process to eliminate NTBs. The AfCFTA Annex is expected to consider the Africa RECs Annexes and improve on legal framework, the process and timing of the resolution of NTBs that could not be resolved and eliminated at RECs level. Therefore, the AfCFTA NTB elimination Mechanism has to advance and improve on the Tripartite and other African RECs frameworks.

Table 1 compares different aspects of the Tripartite and the AfCFTA Annexes to consider whether the AfCFTA can serve as an extended or upper framework that would possibly provide an appellate framework to resolve NTBs that the African RECs could not resolve at their level. In this regard, the AfCFTA legal framework would presume to relate to or recognize appeals of NTBs cases that have not been resolved at REC level but also cater and adjust to resolve NTBs of State Parties that are not members of any REC.

Table 1 Row 1: The Tripartite FTA recognises that there are existing barriers and instructs Partner States to eliminate and not to impose any new ones. In addition, the RECs State Parties recognise their NTB reporting mechanisms and undertake to harmonise them into a single Tripartite Mechanism. The RECs continue to tackle NTBs in their separate mechanisms, with the option of resorting to the Tripartite

Mechanism in case NTBs are not resolved at their level.

The members within the same REC will use their own mechanism for NTBs resolution, when the NTB is inter-REC. Should the NTBs not be resolved, the member proceeds with the option to use the Tripartite Online Reporting Mechanism or even take it up through the AfCFTA Reporting Mechanism.

Table 1 Row 2: Both the Tripartite and the AfCFTA Agreements establishes procedures and provide for a mechanism for the identification, categorization, and elimination of NTBs within the Agreement. Furthermore, the frameworks provide for similar institutional structures. The next section of this document unpack the process towards resolving an NTB.

Table 1 Row 3: Directs the RECs to establish or strengthen national monitoring mechanisms to track and monitor NTBs on intra-Africa trade, including building capacity and sensitisation of stakeholders. The RECs work with the National Focal Points and the Tripartite or AfCFTA Secretariat to track and monitor the NTBs, with a view to resolve them. The National Monitoring Committee ensures the implementation of the NTBs elimination plan. It is often the NTBs reporting or affected country that is able to monitor whether the NTBs is eliminated. The process and the outcome is registered in the NTBs Reporting Mechanism as resolved NTBs, when the affected country has reported as such.

Table 1 Row 4: Both Article 3 of Annex 5 in the AfCFTA Agreement and Article 3 of Annex 3 in the Tripartite Agreement provides for guiding purposes that State Parties adopt the general categorization of potential NTBs, as stated in the respective Articles. The NTBs are categorised in a similar way except that the Tripartite FTA provides a category for other NTBs that might not be classified according to the list provided. Both Agreements provides a classification “other” under each NTB category.

The General Categorisation of NTBs as per the Agreements:

- a) Government participation in trade and restrictive practices tolerated by Governments
- b) Customs and administrative entry procedures
- c) Technical Barriers to Trade
- d) Sanitary and phytosanitary Measures
- e) Specific limitations
- f) Charges on imports and
- g) [Others]

The NTB Annexes state that the categorisation of NTBs may not be binding such that it does not alter or prejudice the rights and obligations of State Parties under the Agreements. The general categorisation does not determine the legitimacy, adequacy, necessity or discrimination of any form of policy intervention used in international trade. The categorisation of NTBs is not static, as potential sources of NTBs develop, the categorisation may change to adapt the changing reality of international trade and data collection. Therefore, the categories can be reviewed and amended.

Article 10 AfCFTA: State parties should exhaust NTB elimination channels at REC level before escalating a complaint or specific trade concern to the AfCFTA level. Where State parties fail to reach an agreement on the resolution of a complaint using the REC based NTB Mechanism, or the complaint arises from inter-REC trade, the State Parties shall use the procedure for elimination and co-operation in the elimination of NTBs (Appendix 2 of Annex 5).

The escalation of NTBs concerns to a different regional arrangement but a similar legal framework will subject the process to additional amount of time. The exception is that different individual experts in different committees will deliberate on the specific trade concern. In the case of an unresolved NTB that is escalated to the AfCFTA, a facilitator is appointed. The focus might not be on the correct interpretation or

application of the law or legal framework in the RECs or Tripartite processes, but the NTBs elimination process will start from the beginning as opposed to a review. The elevated process affords opportunity to interested State parties/countries who trade with the defending party but are not part of the particular REC to participate in the procedures.

4. Status of Protocols, Annexes and Appendices

Article 8 of the AfCFTA Agreement on the status of Protocols, Annexes and Appendices affirms that the protocols and associated annexes including the appendices, upon adoption, form an integral part of the AfCFTA Agreement. Any additional instruments, within the scope of the Agreement, deemed necessary, shall be concluded in furtherance of the objectives of the AfCFTA and shall, upon adoption form an integral part of this Agreement.

Article 36 of the Tripartite Agreement equally recognizes that Member/Partner States shall from time to time conclude such Protocols and Annexes as are necessary for the implementation of this Agreement.

Such Protocols and Annexes shall be adopted by the Tripartite Council of Ministers and shall form an integral part of this Agreement.

Where conflict and inconsistency with Regional Agreements are experienced, Article 19 of the Agreement that establishes the AfCFTA states that in the event of any conflict and inconsistency between this Agreement and any regional agreement, this Agreement shall prevail to the extent of the specific inconsistency, except as otherwise provided in this Agreement. The Tripartite Agreement Article 30 affirms that in the event of inconsistency or a conflict between this Agreement and the treaties and instruments of COMESA, EAC and SADC, this Agreement shall prevail to the extent of the inconsistency or conflict.

Table 1. The Tripartite and AfCFTA NTBs Framework

	AfCFTA	TRIPARTITE FREE TRADE AGREEMENT
1. Definition of NTB	Agreement establishing the AfCFTA Non-Tariff Barriers means barriers that impede trade through mechanisms other than the imposition of tariffs AfCFTA Protocol on Trade in Goods Article 12 – Elimination of NTBs Except as maybe provided for in this Protocol, the identification, categorisation, monitoring and elimination of Non-Tariff Barriers by State Parties shall be in accordance with the provisions of Annex 5 on Non-Tariff Barriers.	Agreement establishing the Tripartite Free Trade Agreement Article 10 Non-Tariff-Barriers 1. Tripartite Member/Partner States shall eliminate all existing Non-Tariff-Barriers to trade with each other and shall not impose any new ones, in line with Annex III on Non-Tariff Barriers. 2. Tripartite Member/Partner States recognise the existing reporting, monitoring and elimination mechanisms on Non-Tariff-Barriers established by the three RECs and undertake to harmonise them into a single mechanism as provided for in Annex III.
2. NTB Annexes /Conceptual Framework. The text of the NTB Protocol or Annex	Article 12 of the AfCFTA Protocol on Trade in Goods refers to Annex 5, which establishes procedures and Institutions for addressing NTBs. The Annex also mandates an online reporting mechanism to identify, categorise and eliminate NTBs (tradebarriers.africa)	Annex III Article 2 provides for a mechanism for the identification, categorization, and elimination of NTBs within the Agreement. The mechanism provides for: a) institutional structures for the elimination of NTBs; b) general categorisation of NTBs in COMESA, EAC and SADC; c) reporting and monitoring tools; and d) Facilitation of solutions to identified NTBs.
3. Requirements of the Protocol or Annex on National and/or Regional Monitoring Committees	The AfCFTA Sub-Committee on NTBs administer the implementation of Annex III, the main function was to develop the working procedure including the NTBs mechanism to enhance the elimination of NTBs. Article 10 of the AfCFTA Protocol on Trade in Goods Directs the RECs to establish or strengthen monitoring mechanisms to track and monitor NTBs on intra-Africa trade, including building capacity and	Article 4 Reporting Procedures 1. The Tripartite Member States shall establish National Monitoring Committees and National Enquiry Points/National Focal Points on NTBs which shall work closely with the Unit located in REC Secretariats. 2. The National Monitoring Committees and

	sensitisation of stakeholders. NTB Sub Committee, RECs NTB Units, National Focal Points shall ensure timely and effective resolution of identified NTBs. RECs to support the NTB Coordination Unit at the AfCFTA Secretariat with a view to facilitate trade	the National Enquiry Points/ National Focal Points together form part of the Institutional Structures at the National level for the Elimination of NTBs.
4. General Categorisation of potential sources of NTBs	Categorisation of NTBs into six categories	WTO categorization into seven categories.

5. The Tripartite and the AfCFTA Time bound programme on the elimination of NTBs

The TFTA and the AfCFTA NTB mechanisms establish time bound processes for elimination of NTBs. Diagram 1 presents that the processes are similar, however, the reporting country has to exhaust the RECs process before escalating an NTB to the AfCFTA stage II process.

After an identification of an NTB by the reporting country, the concerned government authorities will follow-up to resolve the concern. The NTBs Coordination Unit in the AfCFTA Secretariat, NTB units in RECs, national focal points/Enquiry points will support the process. The team envisage a mutually agreed solution with an NTB elimination plan that the responding country should implement. The framework indicate that stage 1 of the mechanism should not exceed sixty days. However, there is no recourse to non-compliance to the timelines for both the Tripartite and the AfCFTA.

If there is no mutually agreed solution, by mutual written consent from the parties, the process moves to stage II. In case of disagreement to proceed to the next stage, the mechanism provides for a facilitator and new terms of reference, the process will include third parties who are interested in the NTB case and an interim solution especially for perishable goods is found.

For both the Tripartite FTA and the AfCFTA the appointment of an independent expert as a facilitator to seek mutually agreed solutions, within forty-five 45 days from the commencement of Stage II proceedings is agreed. Parties discuss and agree on the Terms of reference. The facilitator within ten 10 days drafts factual report on mutually agreed solution, and provide the Parties ten 10 days to comment, after incorporating comments submit within ten 10 days to the Tripartite task Force (TTF) / AfCFTA Secretariat a final report. A mutually agreed solution is circulated to Member partner States / State Parties to implement according to the implementation

plan.

If a Members Partner State / State Party fails to resolve an NTB after the issue of a factual report and a mutually agreed solution, the requesting Member may resort to the Dispute Settlement Mechanism OR Parties may submit the matter to arbitration in accordance with the rules and procedures of the settlement of disputes under the main agreement.

The NTB Mechanism incorporates almost all the requirements of the NTB Annex for both the Tripartite and the AfCFTA.

Diagram 1. Procedure for the Elimination and Co-operation in the Elimination of Non-Tariff Barriers

Time bound programme

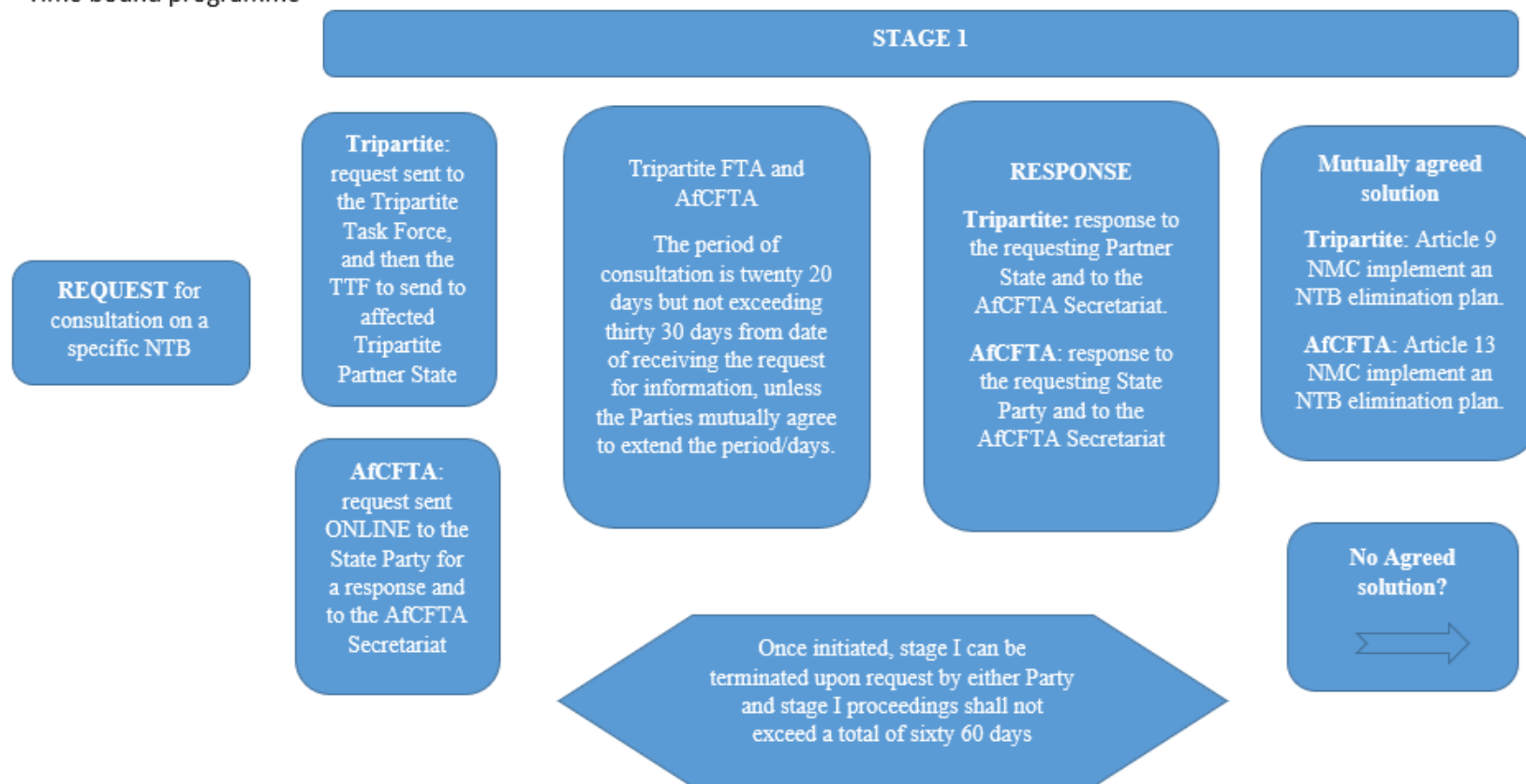
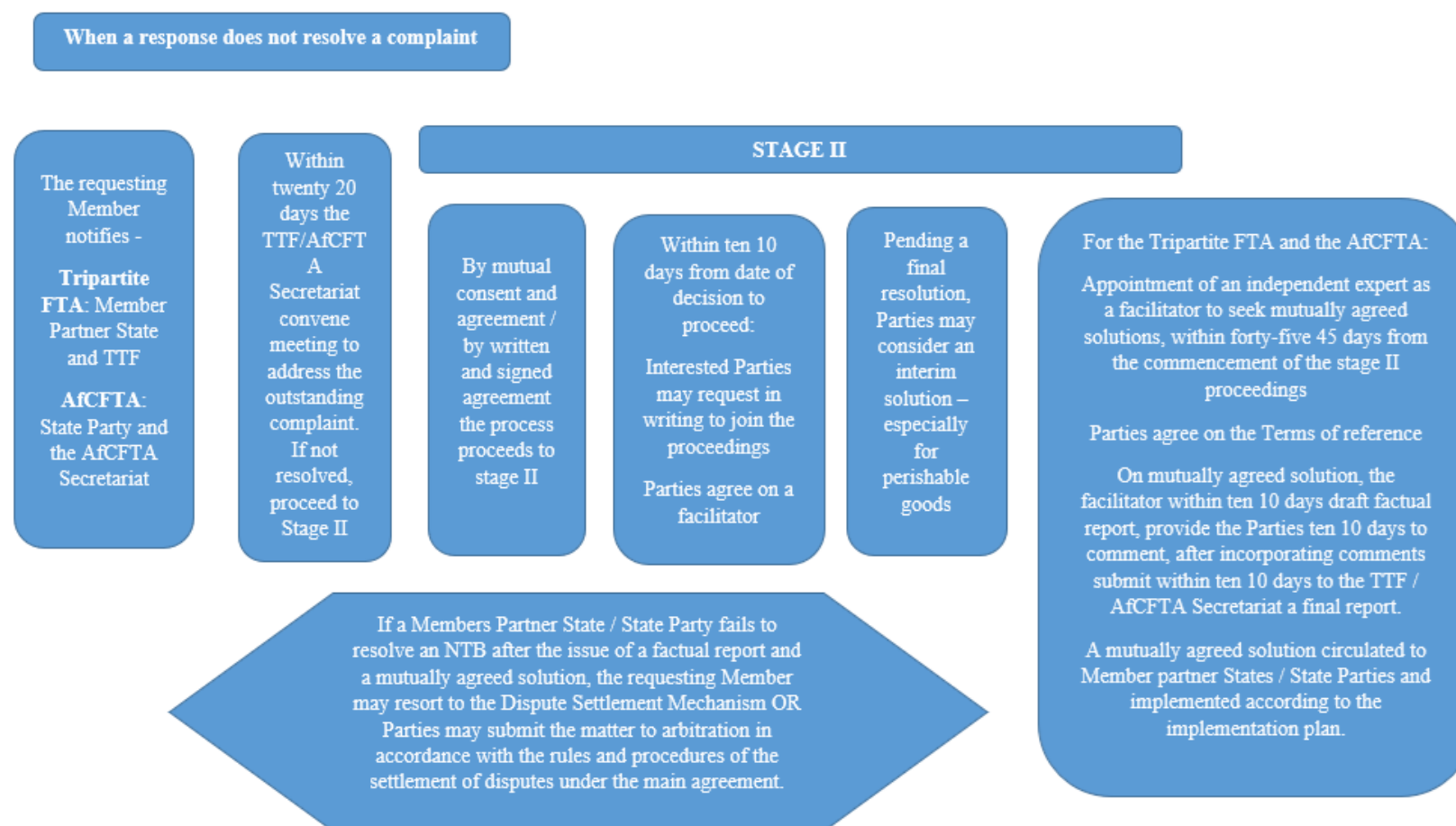


Figure 3 - Diagram 1. Procedure for Elimination and Co-operation in the Elimination of Non-Tariff Barriers



6. The Online NTB reporting, monitoring and elimination mechanisms in the TFTA and the AfCFTA

The NTB online reporting Mechanisms are designed to enhance transparency and easy access of information regarding the resolution of identified and reported NTBs. The Annexes prescribe that the online mechanisms will be available online through communication technology tools and should be subject to review.

The online mechanisms are available as identified in Table 2 through the websites indicated. The information contained in the website indicate that the mechanisms incorporate timelines within

which NTBs are resolved. However, it is not clear how the timelines indicated in the Procedure for the Elimination and Co-operation in the Elimination of Non-Tariff Barriers aligns with the online mechanism. A number of cases have been resolved under the Tripartite Agreement 824 compared to active cases at 112. The AfCFTA has recorded a limited number of cases since trading started 14 resolved and 13 active cases as at March 2025. The adherence to the timelines indicated in the time bound elimination mechanism is not evident from the online reporting mechanism. Table 2 further indicates how the online process works in reporting, monitoring and eliminating NTBs through a mobile app.

Table 2. The Online NTB reporting, monitoring and elimination mechanisms in the TFTA and the AfCFTA

	AfCFTA	Tripartite FTA
Online Reporting Mechanism Address	https://tradebarriers.africa	https://tradebarriers.org
NTBs Reporting Mechanisms	An online reporting, monitoring and eliminating Mechanism in a platform where business report and track NTBs that hinder intra-Africa trade, with the goal of facilitating resolution and promoting trade. Online Reporting Mechanism The AfCFTA reporting, monitoring and elimination Mechanism where private sector can file complaint on a specific trade obstacles. The AfCFTA transmit the complaint to the government of the responsible trading partner to react to the complaint and <u>resolve it within concrete timelines</u>. The reported NTBs also feeds into national and regional trade policy improvements by means of a NTB elimination plan. NTBs can be reported online, or via a mobile App Tradebarriers.africa Reporting, Monitoring and Eliminating Mechanism. The Mechanism/facility is designed to enhance trade through the removal of NTBs. Log in as a registered user in four languages	All three RECs have established their NTB monitoring Mechanism, however, the Tripartite reporting, monitoring and eliminating Mechanism enhances transparency and enables the Tripartite Member Partner States to follow-up and monitor reported and identified NTBs including NTMs. Online Reporting Mechanism The SADC, EAC and COMESA implement the NTBs reporting, monitoring and eliminating Mechanism <u>incorporating concrete timelines for the removal of NTBs</u>. The process follows after a complaint is registered in the website. https://www.tradebarriers.org/register_complaint Reporting by mobile phone tradebarriers.org/sms_details How does the process work? 1. Complainant sends text message to have their problem registered 2. Complaint stored in the NTB system and Administrator notified 3. Administrator assigns RECs and Focal Points to resolve the complaint 4. Complainant notified that the complaint has

	(English, French, Arabic and Portuguese). Downloadable user manual.	been referred to a Focal Point and is being attended to 5. RECs and Focal Points start resolution process and post comments 6. Administrator changes status of complaint to Resolved in system 7. Complainant notified that the complaint has been resolved
System Requirements	Similar System Requirements Reporting country Details of occurrence Location of the NTB (Where the barrier was experienced) Description of the NTB Details of affected products. Product value. Supporting documentation if any	
As at 26 March 2025 Number of cases reported Active complaints	Active 13	Active 112
As at 26 March 2025 Number of cases resolved	Resolved 14	Resolved 824

7. Conclusion

It is often easier to implement commitments through tariff phase down, however; in highly regulated sectors there is no experience of the impact and benefits of integration through trade arrangements. Trade barriers brought about by NTBs tend to be challenging and may take time to resolve. During the process of resolving the NTB challenge, the delay of goods tends to increase the cost of doing business, perishable goods already in the process of export expire. Private firms suffer the most consequences of NTBs, in some instances, the increase in demand transfers the cost to consumers through price increase. NTBs hinder the objective of increasing intra-Africa trade. The mechanisms for identifying, reporting, resolving, monitoring and elimination of NTBs are established to tackle inefficiencies in the process of resolving NTBs and to provide transparency including a follow up on the outcomes to eliminate NTBs.

The NTBs Framework under the Tripartite and the AfCFTA includes Annexes, Appendices and the Online Reporting Mechanisms, which are binding to all members since they are established through the Agreements on Trade in Goods. It is therefore crucial that NTBs are resolved efficiently and speedily according to the processes and timelines stated therein, and as committed in the legal texts. Though a number of NTBs have been resolved through the Online Reporting Mechanisms, the alignment to the procedure for elimination and co-operation in the elimination of NTBs is not clearly defined in the Mechanism.

Effectiveness of the Online Reporting Mechanisms to eliminate barriers, will be demonstrated by monitoring the implementation of outcomes; using the NTBs elimination implementation plan. The elimination plans will ensure compliance by State Parties and restrain from introducing similar or new NTBs.

The NTB Reporting Mechanisms do not provide any remedies on violation of the outcomes, which are mutually, agreed solutions. NTBs cases

that escalated to the AfCFTA may be subjected to the same process that was undertaken at the Tripartite level. It should be made clear whether an escalation of an NTB from the TFTA to the AfCFTA starts at stage I or at stage II of the AfCFTA. **The AfCFTA does not provide for a clear review of the outcome from the TFTA process (stage I).** When an unresolved NTB is escalated from the TFTA to the AfCFTA the mechanisms provide for a similar process, hence a recommendation for an appellate review of cases that are escalated from the RECs to the AfCFTA. If cases are not resolved under the NTBs Stage II Mechanism or in case of violation and non-compliance, an affected member may take up the process on the reported NTBs, in the Dispute Settlement Mechanism under the main Agreement.

Recommendations for the Review of the NTB Reporting Mechanism

- The AfCFTA NTB Reporting Mechanism can provide for a clear option for a review of the outcomes of unresolved NTB cases that are already discussed in the Tripartite or any REC level, so that the process should not start at stage 1 when escalated to the AfCFTA. The process of the review of escalated NTBs should be accommodated and backed by legal text.
- The Online Reporting Mechanism can provide timelines and updates in a transparent manner that is aligned as committed in the text of the procedure for the elimination and Co-operation in the elimination of NTBs. Adherence to processes and timelines will ensure that NTBs cases are resolved speedily and efficiently.

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