African Open Science Platform (AOSP)
Towards a continental Open Science Vision
[Open Science Diplomacy and Cyberinfrastructure]

Policy | Infrastructure | Data |Access| Skills | incentives| Collaborations| Partnerships|

Tshiamo Motshegwa
Incoming Director , AOSP

3rd Open Science Conference
8th - 10th February 2023
New York, USA

https://council.science/current/news/the-national-research-foundation-of-south-africa-to-host-the-african-open-science-platform/
https://council.science/current/blog/african-open-science-platform-takes-shape/
Website: https://aosp.org.za/

The World In Africa

The **True Size** of Africa

A small contribution in the fight against rampant *immappancy*, by Kai Krause

Graphic layout for visualization only (some countries are cut and rotated)
But the conclusions are very accurate: refer to table below for exact data

COUNTRY	AREA x 1000 km²
China	9.597
USA	9.629
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	**30.102**
AFRICA	**30.221**

In addition to the well known social issues of *illiteracy* and *innumeracy*, there also should be such a concept as *"immappancy"*, meaning *insufficient geographical knowledge*.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose *"1-2 billion"* and *"largest in the world"*, respectively.

Even with Asian and European college students, geographical estimates were often off by factors of 2-3. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as *Mercator*).

A particularly extreme example is the worldwide misjudgement of the true size of *Africa*. This single image tries to embody the massive scale, which is larger than the *USA*, *China*, *India*, *Japan* and all of *Europe*....... combined!
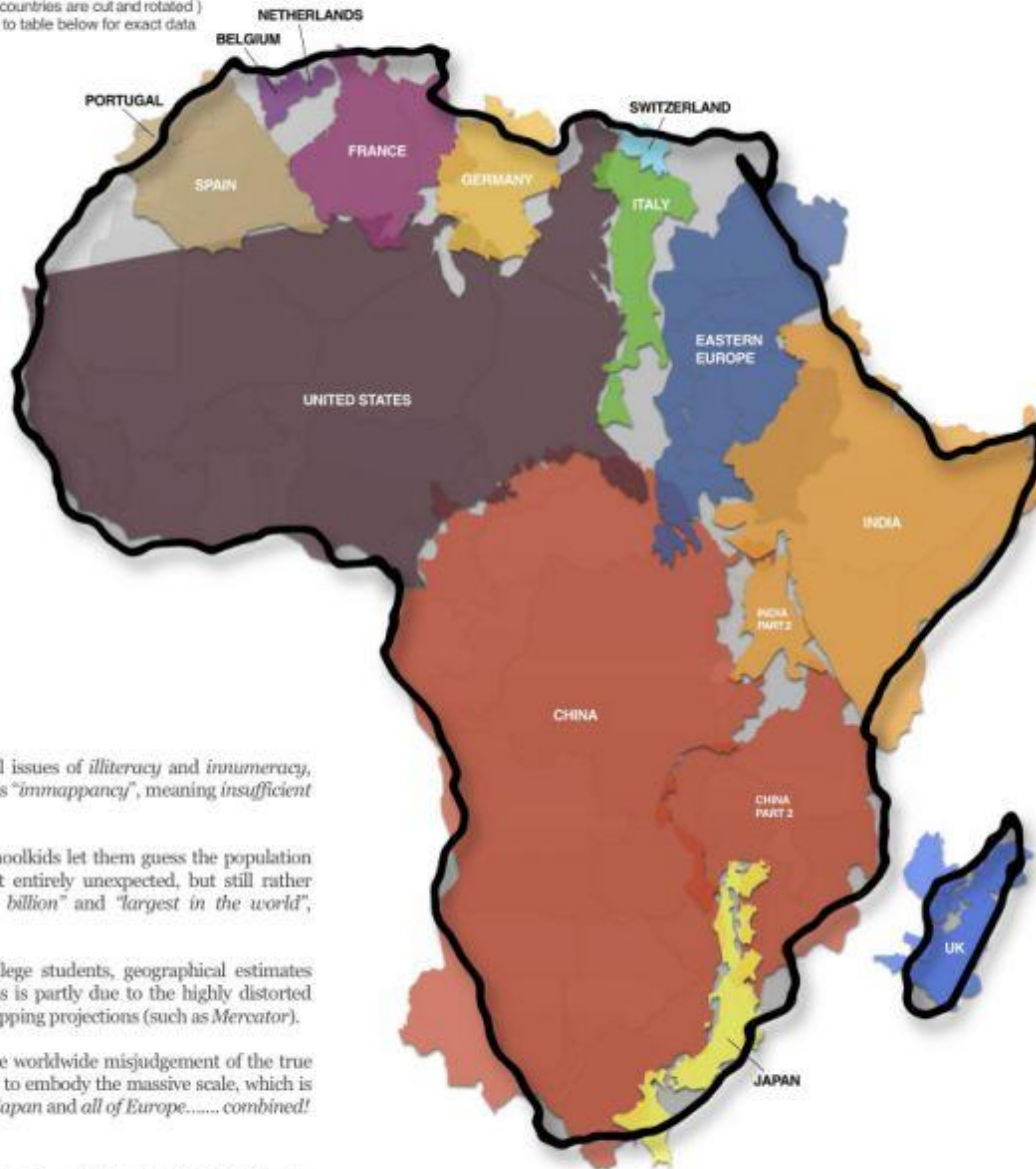
Top 100 Countries
Area in square kilometers, Percentage of World Total
Sources: Britannica, Wikipedia, Almanac 2010

THE AFRICAN DEVELOPMENT CHALLENGES

AGENDA 2063: THE AFRICA WE WANT

INTEGRATED – PROSPEROUS and PEACEFUL AFRICA

Africa Economic Pillars
- ▶ Agriculture, Natural Resources and Water
- ▶ Energy
- ▶ Blue Economy
- ▶ Digital Infrastructure

Global challenges
- ▶ Climate change and variability
- ▶ Disaster Risk Reduction
- ▶ Post-2015 on **Sustainable Development**

Rapid Change of the African Global Landscape
- ▶ **Impressive Economic growth**: the aggregate GDP of the continent has doubled in the last 10 years, to over USD 2.2 trillion.
- ▶ **Increase of democracy level** (number of countries and quality)
- ▶ **Societal**: Mass movements (migration), Population growth, and growing youth population (60% under 30 year-age)

Slide Courtesy of AU Commission

CHARACTERISTICS OF THE CHALLENGES

Multifaceted

Interlinked

Transcend national boundaries

Cannot be addressed by government single handedly

AfCFTA — Creating One African Market

AFRICAN UNION DIGITAL TRANSFORMATION STRATEGY

CROSS CUTTING THEMES	Digital Content and Applications	Emerging Technologies	Cyber Security, Privacy and Personal Data Protection
	Digital ID	Research and Development	
CRITICAL SECTORS TO DRIVE DIGITAL TRANSFORMATION	Digital Industry	Digital Governance	Digital Health
	Digital Trade and Financial Services	Digital Education	Digital Agriculture
FOUNDATION PILLARS	Enabling Environment/ Policy and Regulation	Digital Infrastructure	Digital Skills and Human Capacity	Digital Innovation and Entrepreneurship

STISA-2024

SCIENCE, TECHNOLOGY AND INNOVATION STRATEGY FOR AFRICA 2024
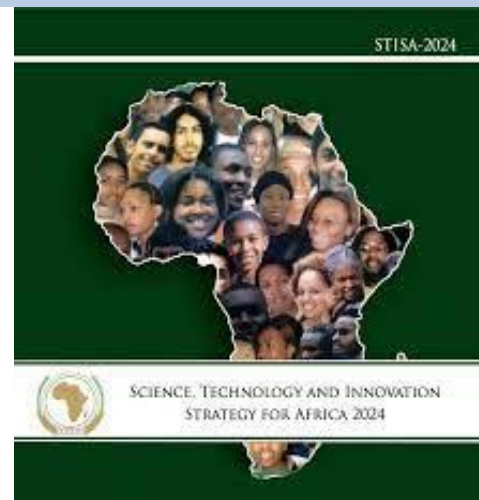
S4D4C — USING SCIENCE DIPLOMACY FOR ADDRESSING GLOBAL CHALLENGES

Open Science:
- Open Educational Resources
- Open Access
- Open Peer Review
- Open Methodology
- Open Source
- Open Data

WHY OPEN SCIENCE?

Efficiency
Greater access to scientific inputs and outputs can increase scientific productivity through reducing duplication, allowing **more research from the same data** and multiplying opportunities for domestic and global participation in the research process.

Quality & integrity
Open access to scientific outputs allow for **greater evaluation and scrutiny** by the scientific community which means more accurate replication and validation of research results. Openness to data contributes to maintain science's self-correction principle.

Innovation
Open science can **reduce delays in the re-use of scientific research** including articles and data, and promote a swifter path from research to innovation to produce new products and services.

Economic benefits
Science plays a key role in today's knowledge economies and increased access to research results, including data, can positive impact not only scientific systems but also innovation.

Public disclosure & engagement
Science, often publicly funded, should be publicly accessible **to promote a greater awareness** among citizens and to build public trust and support for public policies and investments in research. Open science also promotes citizen science in experiments and data collection.

Global benefits
Open science promotes **collaborative efforts** and faster knowledge transfer for a better understanding of global challenges and wicked problems.

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA · UNIVERSITEIT VAN KAAPSTAD
GRAPHICS BY GAELEN PINNOCK

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Trend - Global and Continental Open Science Platforms RSTI and Collaborations in Digital Era

Open Science Platforms

❑ Global Open Science Cloud (GOSC)
- ✓ Supporting research collaborations across continents
- ✓ Assist in addressing global science challenges – e.g. UN Sustainable Development Goals (SDGs), climate change, infectious diseases and coordination of global disaster risk reduction etc

❑ Regional, Continental and National Open Science Clouds
- o e.g. European Open Science Cloud (EOSC)
  - ✓ "Digital Single Market" strategy - building a competitive data and knowledge economy in the European Union powered by cyberinfrastructures
  - ✓ EOSC - an environment for hosting and processing research data to support EU wide science collaborations

https://eosc-portal.eu/
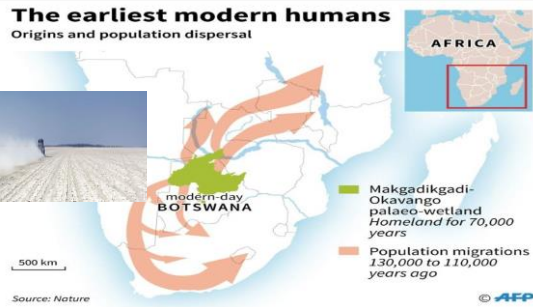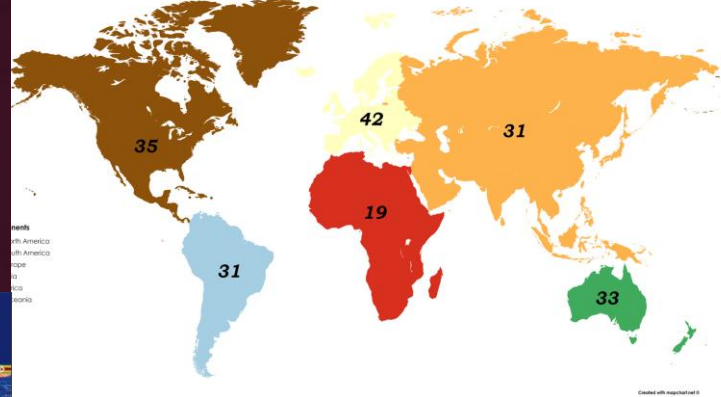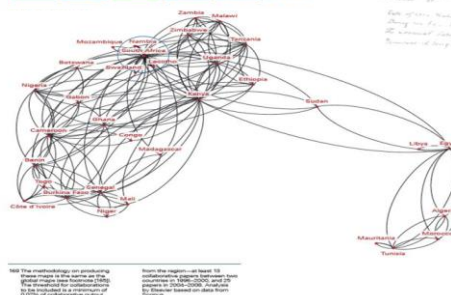
African potential and priorities through Open Science
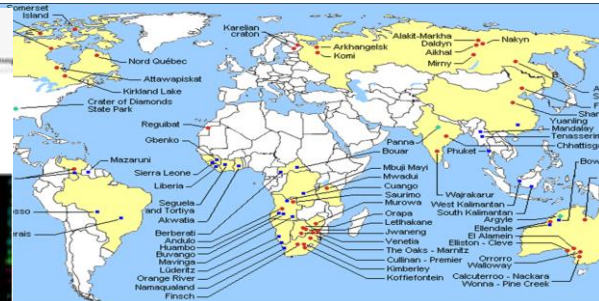
Open Science Imperatives for Africa (1)

1. **Sustainable Development Goals , Agenda 2063 – The Africa We Want**
   - ✓ We do need these guiding instruments – Actioned and progress measured, assesed

2. **Science Technology , Innovation as a conduit**
   - ✓ Science for inclusive sustainable Development/Science for transformational change
   - ✓ Cocreation/Codesign with [whole of] Society
   - ✓ Science Systems/Enterprise fit for purpose with requisite interfaces
   - ✓ Vibrant enabled, efficient, transparent and ethical scientific community
   - ✓ Impact Framework for Open Science, Impact Dimensions?
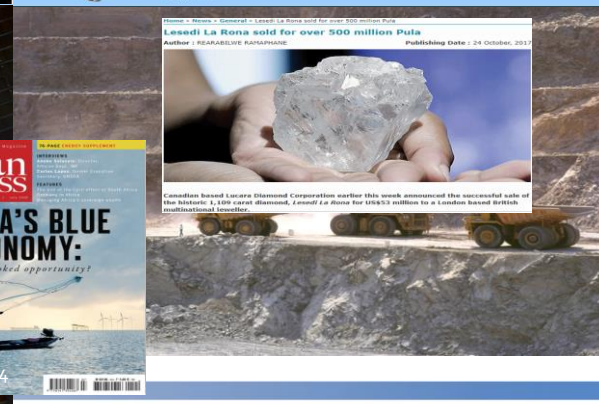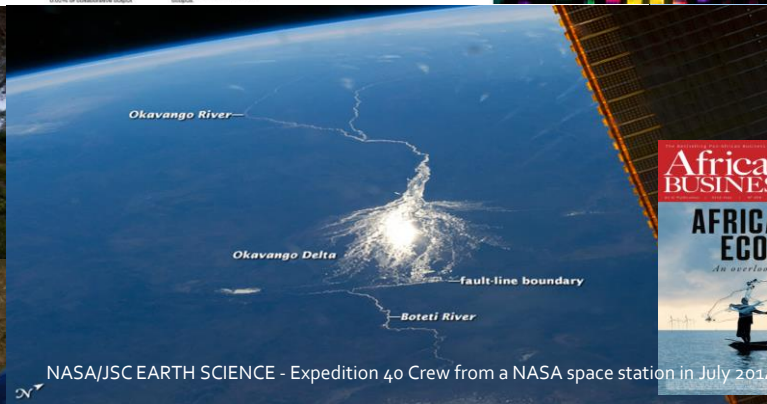   - ✓ Foster continental science and research agenda and collaboration

3. **Access to Knowledge**
   - ✓ Reflective of our values?
   - ✓ Dialogue between knowledge systems
   - ✓ Science as a commodity vs Science a public good
   - ✓ Democratie science – equity, efficiency, transparent and inclusive
   - ✓ What is the true cost of publishing? And who should pay for it?
   - ✓ Refocus Open Access debate to include public voices
   - ✓ Science Communication for public and policy engagement
   - ✓ Need for International Policy and Action Framework
   - ✓ For Africa what are key benefits?
   - ✓ How is Africa shaping the debate?
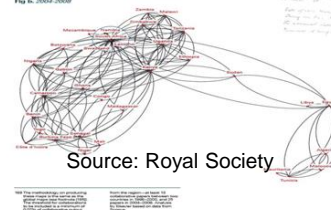
HEALTH

'The Lancet' journal rejects papers that don't acknowledge African researchers

Maina Waruru 13 Jun 2022

Source: Royal Society

Trials and tribulations: a technician tests Covid-19 antibody neutralisation at the African Health Research Institute in Durban. Photo: Waldo
Source: https://mg.co.za/health

A 22-Million-Year Journey From the Asteroid Belt to Botswana

Source: https://www.nytimes.com/2021/04/29/science/meteorite-botswana-asteroid.html

Mohutsiwa Gabadirwe (center of photo) and second find of a piece of asteroid 2018 LA recovered in the Central Kalahari Game Reserve in central Botswana.
Image Source: seti.org

4. Data

❑ **Data Values** (See - https://www.data4sdgs.org/datavaluesproject)
  ✓ Data as a route to inclusion and equity
  ✓ Data that is well-governed
  ✓ Data that powers sustainable and equitable developmen

❑ **Data Citizenship and Data literacy**
  ✓ Data Doing
  ✓ Data Thinking
  ✓ Data Participation

❑ **Data Stewardship**
  ✓ Professionalise data stewardship
  ✓ Incentivise FAIR data publishing

Source: Me and My Big Data Project
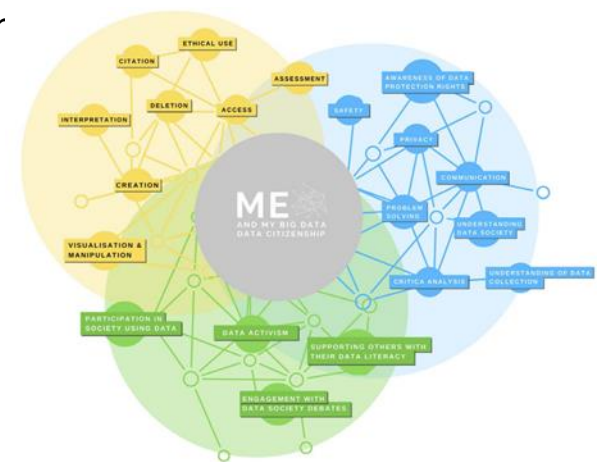
5. The Actors and clarity of role in OS

❑ **Governments?**
  ✓ Champions and drivers of implementation of the UNESCO OS Recommendations
  ✓ Cyberinfrastructure (Connectivity (last mile inclusive connectivity) , Data Centers, Energy 4IR/AI Readiness
  ✓ Investment in Science , Value Proposition for Open Science, What are the costs? What is the Impact of OS?
  ✓ Promoting Collaborations – including public-private partnerships, Science Diplomacy and Research Infrastructures

❑ **Universities ?**
  ✓ Configuration? Define excellence, How to perpetuate right behaviors, Change Management
  ✓ Define quality and be prepared to pay the right price to develop institutions fit for purpose
  ✓ Quantity – outputs, researchers, critical mass of institutions?

❑ …..

African Open Science Platform – Landscape Study

- **Status of Open Science <mark>capacities and activities</mark> in the continent**
- **Dimensions of**
  - **Policy**
  - **Cyberinfrastructure [e-Infrastructure]**
    - **Connectivity, Computational platforms,**
    - **Data (Repositories + Data Stewardship)**
  - **Education & Skills**
  - **Research Culture (barriers + incentives)**
- **Gaps and Key findings**
  - **Role Players**
  - **Data Activity**
  - **Projects**
  - **Funding**
  - **Advancing Open Science**
  - **Barriers To Open Science**
- **Developed frameworks**
  - **Policy**
  - **Infrastructure**
  - **Training**
  - **Incentives**
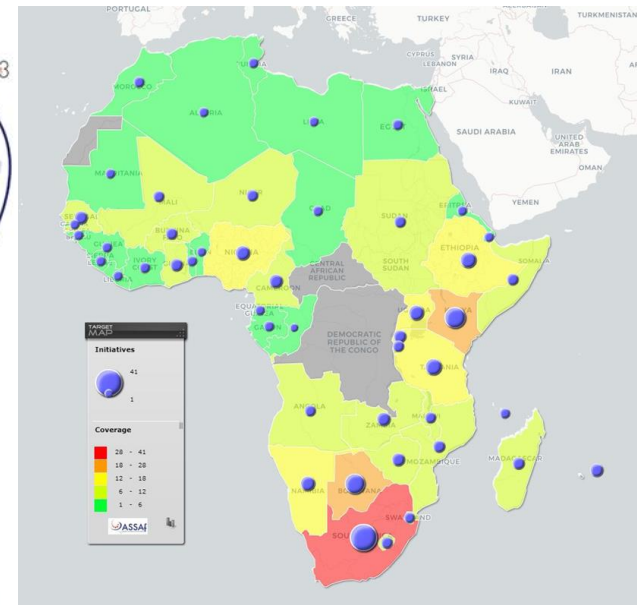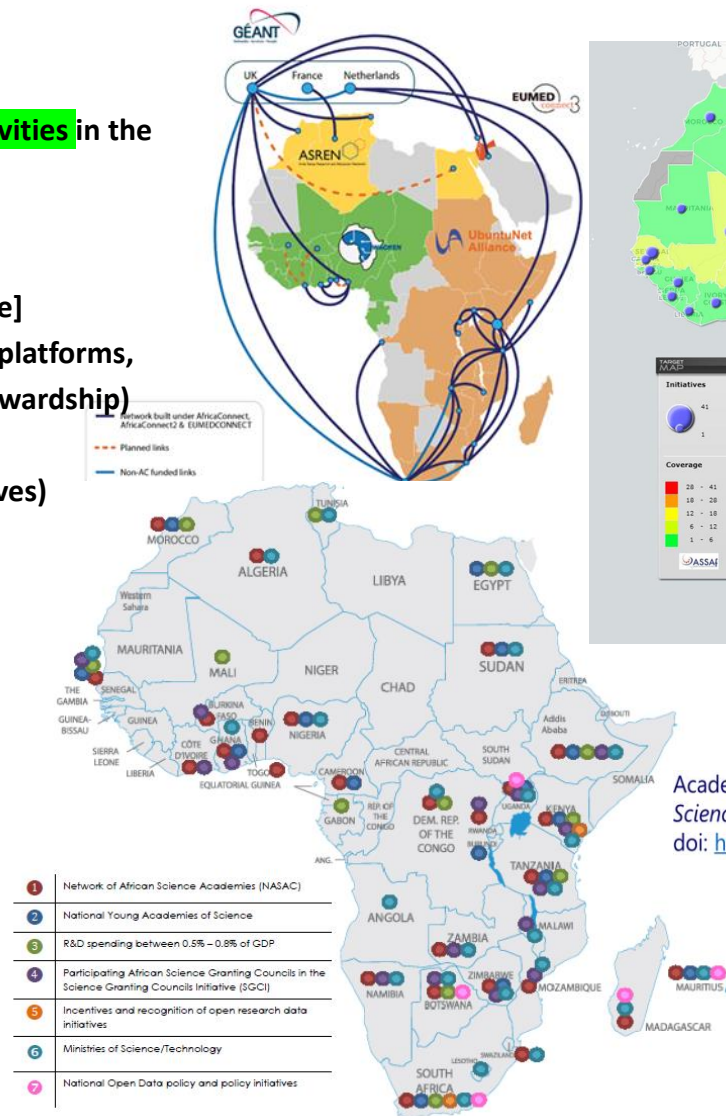
Academy of Science of South Africa (2019), *African Open Science Platform - Landscape Study.*
doi: http://dx.doi.org/10.17159/assaf.2019/0047

1. Network of African Science Academies (NASAC)
2. National Young Academies of Science
3. R&D spending between 0.5% – 0.8% of GDP
4. Participating African Science Granting Councils in the Science Granting Councils Initiative (SGCI)
5. Incentives and recognition of open research data initiatives
6. Ministries of Science/Technology
7. National Open Data policy and policy initiatives

African Open Science Platform (AOSP) - Vision and Strands

"*African scientists are at the cutting edge of contemporary, data-intensive science as a fundamental resource for a modern society. They are innovative global exponents and advocates of Open Science and leaders in addressing African and Global Challenges.*"

- ✓ Develop a federated network of computational facilities and services, software tools and advice on policies and practices of research data management,
- ✓ Develop Data Science and AI Institute spanning and embedded at African institutions,
- ✓ Promote collaboration on African priority application programmes – ranging from health, biodiversity, disaster risk reduction, agriculture and open innovation ,resilient cities, indigenous knowledge etc.,
- ✓ Create a Network for Education and Skills in data and information,
- ✓ Create a Network for Open Science Access and Dialogue.
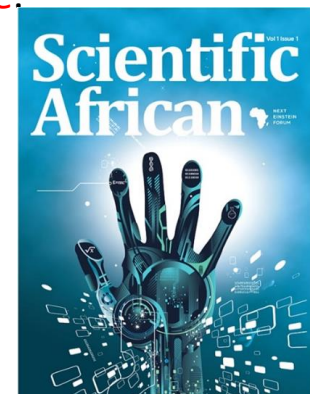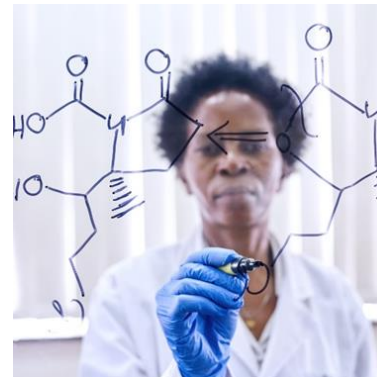
AOSP and Regional Policy Alignment

African Open Science Platform

Revised Regional Indicative Strategic
Development Plan, RISDP

SADC CI Framework

Industrialization Strategy and
Roadmap
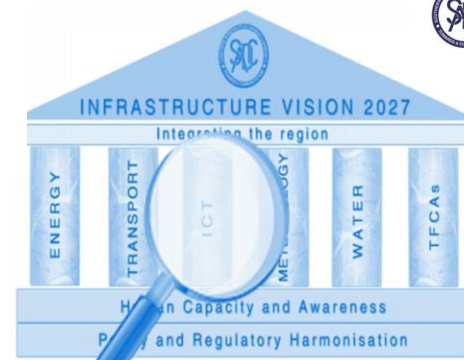
Regional infrastructure
Development
Master Plan, RIMDP

SADC Strategic Plan on STI 2015 - 2020

Protocol on
STI
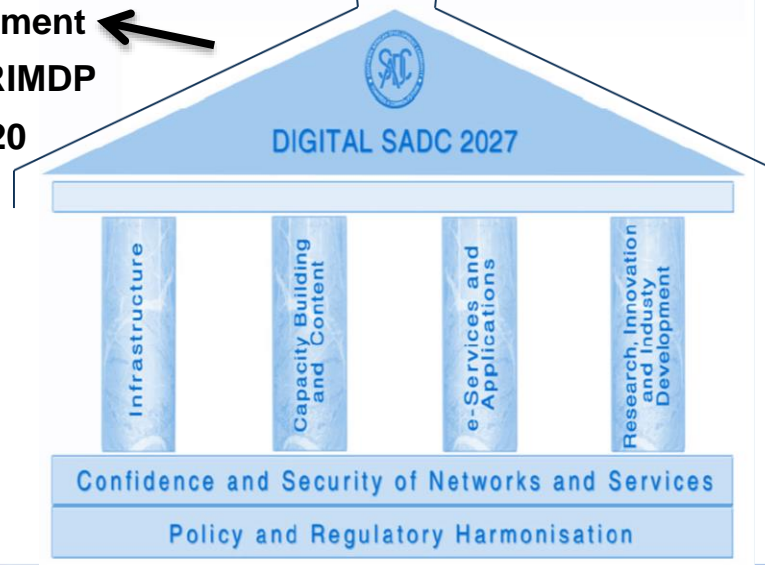
INFRASTRUCTURE VISION 2027
Integrating the region

ENERGY | TRANSPORT | ICT | METEOROLOGY | WATER | TFCAs

Human Capacity and Awareness

Policy and Regulatory Harmonisation

DIGITAL SADC 2027

Infrastructure | Capacity Building and Content | e-Services and Applications | Research, Innovation and Industy Development

Confidence and Security of Networks and Services

Policy and Regulatory Harmonisation

Cross-cutting issues including Gender, Youth, Environment and **Climate Change, and Disaster Risk Management**; and Strategic Management of RISDP 2020–2030.

RSIDP Infrastructure Development (Meteorology Sector)

o **Institutional Support to African Climate Institutions Project (ISACIP)**
  ✓ Strengthening the capacity of African climate institutions in the **generation of relevant climate information**.

o **Monitoring for Environment and Security in Africa (MESA)**
  ✓ Promoted the use of satellite **Earth Observation (EO) data** for environmental monitoring and sustainable development .

o **Climate Services Centre (CSC)**
  ✓ implementing Southern African Regional Climate Services for Disaster Resilience (SARCIS-DR) project, **Satellite and Weather Information** for Disaster Resilience in Africa (SAWIDRA) project
  ✓ Strengthen capacity to **generate and disseminate climate information** in response to climate-induced disasters
  ✓ Capacity in **numerical weather prediction** and **regional climate models** for seasonal climate forecasting

o **Early Warning System (EWS)**
  ✓ Providing operational **regional climate information services** for monitoring and forecasts of al facets of seasonal climate conditions;
  ✓ developing and distributing meteorological, environmental, and hydro meteorological products

o Outlines the preparedness and response **strategy** and **fund** for the SADC region. Three priorities:
  ✓ understanding risk and **disaster management information systems**;
  ✓ strengthening disaster preparedness and response planning;
  ✓ establishing the regional disaster preparedness and response fund.

o Part of global and regional efforts of enhance resilience to disasters.

SADC Regional Indicative Strategic Development Plan (RISDP) 2020–2030

October 2020

SADC DISASTER PREPAREDNESS AND RESPONSE STRATEGY AND FUND

2016 - 2030

Enhancing coordination for effective disaster preparedness, response and resilience

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Biodiversity and platforms

KAVANGO ZAMBEZI TRANSFRONTIER CONSERVATION AREA

© 2012 Encyclopædia Britannica, Inc.

NASA/JSC EARTH SCIENCE - Expedition 40 Crew from a NASA space station in July 2014

OKAVANGO RESEARCH INSTITUTE, UNIVERSITY OF BOTSWANA (2020)
ORBIS: Okavango Repository for BIodiverSity Data Planning

✓ **Data relating to biodiversity are often lost and misplaced**

✓ **Should be used to inform conservation management decisions**

✓ **ORBIS can offer a platform where stakeholders can access data**

✓ **Provide training on data management, access and analysis**

✓ **Work with stakeholders to develop useful, tailored system**

✓ **Currently able to handle species occurrence point data**

✓ **Expand to incorporate wide variety of data types (images, GPS data, maps, pdfs)**

ORBIS: Okavango Repository for BIodiverSity Data Planning https://jrsbiodiversity.org/grants/okavango-research-institute-2020/

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Genomics

o **eLwazi Open Data Science Platform and Coordinating Center**
- ✓ Genomics Research in Africa, Genomic Data, Data Science
- ✓ Aims to provide a flexible, scalable open data science platform for the DSI-Africa consortium (NIH Project) to find and access data, select tools and workflows and run analyses on a choice of computing environments, all through easy-to-use workspaces.
- ✓ UCT eResearch collaboration with H3ABioNet to build an Open Data science Platform
- ✓ H3ABionet = large Pan-African bioinf   network of 27 institutions in 17 countries
- ✓ Scalable for Pan African Footprint
- ✓ Can promote Open Science practices

http://www.eresearch.uct.ac.za/eresearch/news/elwazi

https://reporter.nih.gov/project-details/10311568
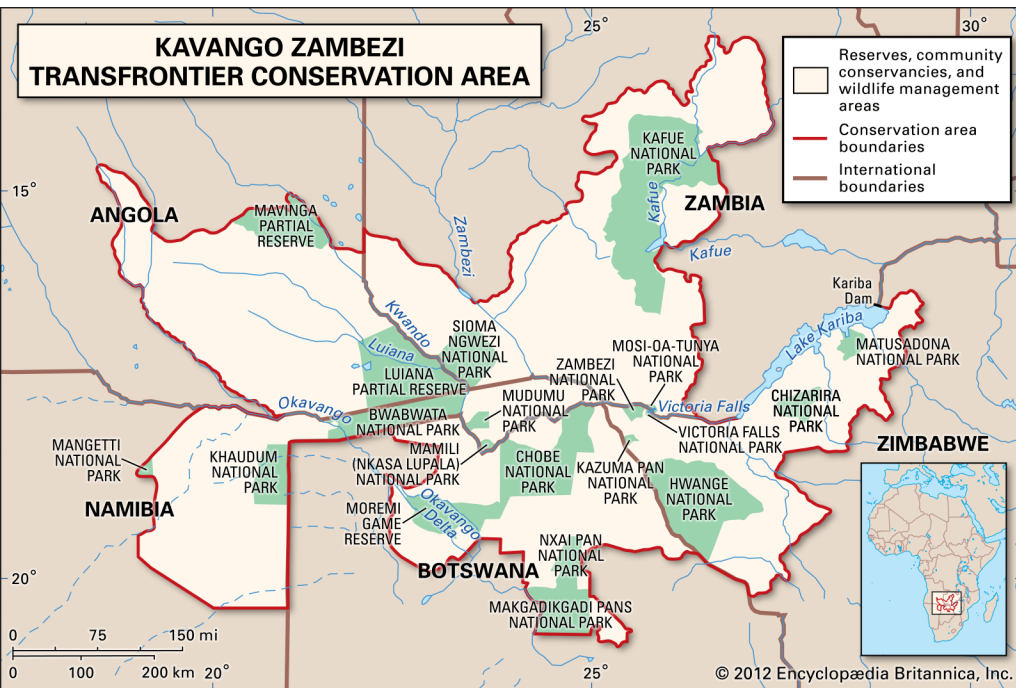
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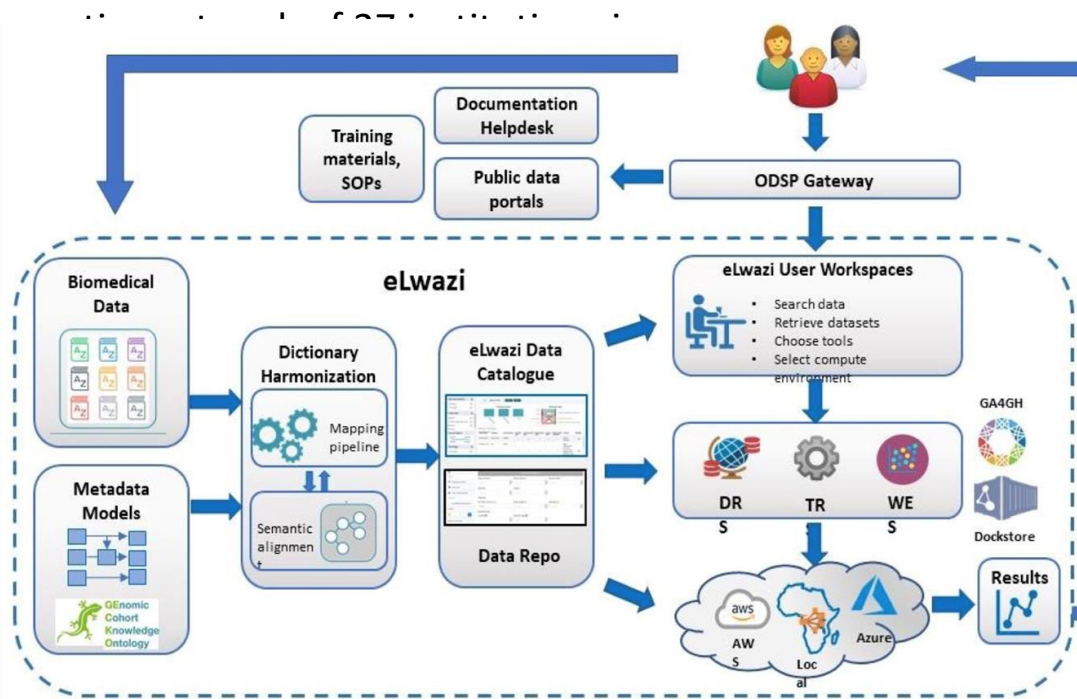
AOSP Strategy & Implementation Elements

- Governance
- Platform Management
- Stakeholder Engagement
- Resource Mobilisation
- Operations
- Enabling Activities
- Application Activities
- Monitoring & Evaluation Framework

AOSP - EVOLUTION

2015 SFSA:
Hosted the first meeting of Science International (ICSU, ISSC, TWAS, IAP) which led to the publication of an **international accord on open data in a big data world**

2016 SFSA:
Launched the **Pilot Phase of the AOSP** as an outcome of the 2015 Science International meeting (ASSAF and CODATA)

2017 SFSA:
Reported on progress in **building an AOSP community of practice** and challenges

2018 SFSA:
Launch of the vision and strategy of the **Operationalization of the AOSP**

2019 Library of Alexandria:
Delivery phase planning; key regional stakeholders and international partners consultation

2020 - 2021:
Resourcing (competitive process); appointment of staff; AOSP business plan development; strategic partner engagement

2022- ->
Delivery phase implementation; NRF as AOSP Office host

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Status of AOSP

- **Operationalisation** of the AOSP Strategy and AOSP Coordinating Hub Office
- **Gap Analysis** - update knowledge of the OS landscape in Africa
- **Positioning**, Awareness, Outreach and Stakeholder Engagement
- **AOSP M&E Framework** – *links to African STI Observatory and Indicators*
- **Process to establish Regional Nodes** – *Call for five (5) Regional Nodes*
- The **AOSP Governing Council** – *Call/EOI and TORs for GC*
- **Resource Mobilisation** and Programme Prioritisation – Value Proposition
- **Leverage Regional/National/international Open Science Initiatives and Networks**
- ✓ Supporting Open Science Policy Development in the Continent
- ✓ Open Access – *Dialogue with publishers, alignment with ISC`s "Opening the Record"*
- ✓ Open Data – *Conceptual Framework for an AOSP Data Institute*
- ✓ Capacity Building and Training – *Partnerships for training*
- Application Programmes

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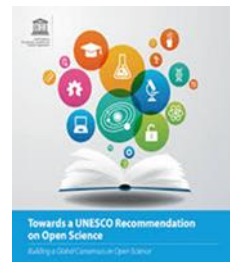
Back To The Topic
Reforming Scientific Publishing: Some thoughts

1. It is critical to have **strong advocacy across board** – in academia and outside.
2. **Broaden** the Open Access debate beyond peer-to-peer sharing between academics.
3. Include wide swathe of **public voices** with emphasis on **public benefit**. The Public does **influence policy** and public purse **funds Government funded research**
4. Universities should consider proportions of library budgets and what journal access subscriptions.
5. I**ntrospection** (including by Researchers) on where they publish and if choice hides (inadvertently?) results from the public – e.g. public health research involving human subjects?
6. The **public too** – especially those involved in studies can **influence decisions** regarding publishing by making enquires about intent.

Summary and Future outlook

- AOSP is an Open Science Diplomacy platform **stimulating interactivity** and creating opportunity through the development of **efficiencies of scale**, **building critical mass** through **shared capacities**, **amplifying impac**t through a **commonality of purpose and voice**, and to engage in Global Commons to address continental and global challenges through **joint action**
- **Enhancing and entrenching dialogue** on open science, skills development, infrastructure , sustainability and resourcing in Africa,
- **Promotion of development of interoperable** and aligned open science policy frameworks,
- **Operationalization of the UNESCO Open Science Recommendations**, sharing best practices, development of continental research commons,
- **Showcasing African Research** addressing developmental agenda and societal impacts,
- **Creating linkages** between open data and open science programs across disciplines across continents and promoting **Open Science Diplomacy**
- **Contribution to the development** of global standards, community of practice.
- Plugging in to **global architecture for GOSC** amidst **multiple dimensions of diversity**
- **Pragmatic incremental approach in implementation**

Thank you

Enquiries Contacts

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AOSP Value Proposition(1)

1. AOSP Goal
- ✓ Posititioning African scientists at the cutting edge of data intensive science
- ✓ Stimulating interactivity
- ✓ Creating opportunity through the development of efficiencies of scale
- ✓ Building critical mass through shared capacities
- ✓ Amplifying impact through a commonality of purpose and voice.

2. AOSP Stakeholders
- ✓ Governments and their Departments and entities
- ✓ Higher Education and Research Performing Institutions
- ✓ Domain Research Communities and networks
- ✓ Regional Economic Bodies
- ✓ Donors and Funders
- ✓ Private Sector
- ✓ Researchers
- ✓ Society

3. What AOSP Offers
- ✓ Provide direction and promote adoption of open science best practices
- ✓ Increased national, regional, continental, and global collaboration for joint action on challenges through open science
- ✓ Increased quantity, quality and integrity and accessibility of research outputs
- ✓ Increased access to scientific data, tools, infrastructure, literature,
- ✓ Access to wide networks for collaboration, funding and capacity building opportunities
- ✓ Enhanced engagement of society and economy in research activities,
- ✓ Governance and setting direction for AOSP

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AOSP Value Proposition(2)

4. Benefits of Partnering with AOSP

- *Governments*
  - ✓ Guided development of interoperable and aligned open science policy frameworks,
  - ✓ Increased impact from investment in activities relating to data; economic, innovation and research benefits,
  - ✓ Partnerships for research, development, and innovation around co-design, Open Science and FAIR data.
- *Institutions*
  - ✓ Data Sovereignty and preservation of valuable data,
  - ✓ Attract international collaborators,
  - ✓ Increased level and quality research activity, outputs, and impacts.
- *Researchers*
  - ✓ Enhanced skills in open science and tools for doing science in the digital era,
  - ✓ Enhanced professional recognition, visibility, and citation of research outputs through incentives for open culture and methodology,
  - ✓ Transformation of domains and disciplines through open science.
- *Development partners, funders and donors*
  - ✓ Enhanced continent-wide impact and return on investment
- *Regional and continental Bodies*
  - ✓ Enhanced regional and continental integration through open science
  - ✓ Monitoring and evaluation of science systems

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AOSP CALLS

Current

NEWS

Call for nominations for Members of the Governing Council of the African Open Science Platform

The African Open Science Platform (AOSP) is now receiving nominations for its first Governing Council.

[Call for nominations for Members of the Governing Council of the African Open Science Platform - International Science Council](#)

AOSP CALLS

https://www.nrf.ac.za/call-for-expression-of-interest-establishment-of-the-african-open-science-platform-aosp-regional-nodes/

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