The African Open Science Platform (AOSP): Fostering a Culture of Open Data within African National Systems of Innovation

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Academy of Science of South Africa (ASSAf)
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Open for all
Live view of airspace on 12 August 2019 – People on the move ...

Source: https://flightaware.com/live/
Ebola outbreak 2014-2015 in West Africa

Only a selection of international responders is shown. There were many more.
The Battle Against One of the Worst Ebola Epidemics Ever Is in Trouble

Distrust, fear and lack of communication from aid groups have alienated communities in the Democratic Republic of Congo, leading some people to spurn treatment and even attack treatment centers.

Source:
“If you want to go fast, go alone. If you want to go far, go together.”

African Proverb
“Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.” - FOSTER Project, funded by the European Commission
Data sharing: Make outbreak research open access

Nathan L. Yozwiak, Stephen F. Schaffner & Pardis C. Sabeti

25 February 2015

“We urge researchers working on outbreaks to embrace a culture of openness.”

Source:
http://www.nature.com/news/data-sharing-make-outbreak-research-open-access-1.16966
Challenges regarding Health Data

• Delay in sharing data collected
• Gaps in data
• Lack of adherence to international standards
• Uncertainty about IP rights
• Can data be trusted?
• Absence of patient consent
• And more
Data Democratising Agriculture

KALRO launches app to help farmers run avocado agribusiness

“... while the big players are operating using data, the small holder farmers are operating blindly because they have no access to key information on how to farm.”

How a lack of access to reliable weather data is hurting African farmers

Source: https://theconversation.com/how-a-lack-of-access-to-reliable-weather-data-is-hurting-african-farmers-80011
South Africa’s land debate is clouded by misrepresentation and lack of data

March 8, 2018 4.17pm SAST

"Kevin Wheeler (Environmental Change Institute, University of Oxford, UK) says that transparency over information, and the development of effective data-sharing and communication platforms, are also crucial."

Source: https://edition.cnn.com/
“Replications of 21 high-profile social science findings demonstrate challenges for reproducibility and suggest solutions to improve research credibility. Eight of the 21 studies failed to find significant evidence for the original finding, and the replication effect sizes were about 50% smaller than the original studies.”
Data bring Power, but also Responsibility

Endangered species
Classifying data to keep poachers, enthusiasts who might use information to track & disturb creatures.

BUT

Declassifying data led to discovery of at least three new populations.

Pezoporus occidentalis

Source: https://www.nature.com/articles/d41586-018-05800-y
200 OA DOAJ-listed journals
174 IRs registered on OpenDOAR
34 OA policies on ROARMAP
24 data repositories registered on re3data, while study identified 66+
1 data repository assigned CoreTrustSeal

Source: Academy of Science of South Africa (2019)
## Research Data Initiatives (66+)

<table>
<thead>
<tr>
<th>Goal</th>
<th>Initiatives</th>
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<tbody>
<tr>
<td>Zero Hunger</td>
<td>E.g. CIRAD, FAOSTAT, KAiNeT, RCMRD, CSIRSpace</td>
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<td>E.g. AfReMaS, IODE, ODINAFRICA, SAIAB</td>
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<td>Good Health</td>
<td>E.g. H3Africa, AHRI, APHRC, GHDx, MalariaGEN</td>
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<td>E.g. GBIF, ReBioMa, ICRAF, CERSGIS, CGIAR, GLOSS, MASDAP, SERVIR, AMMA-CATCH, SASSCAL</td>
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<tr>
<td>Climate</td>
<td>E.g. CGKP, SAEON, RESILIENCE ATLAS, WASCAL</td>
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<td>E.g. OHADA, DICAMES</td>
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Source: Academy of Science of South Africa (2019)
Square Kilometre Array

African SKA Consortium
Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia, South Africa and Zambia

The MeerKAT image shows the central regions of our galaxy with a wealth of never before seen features, as well as a clearer view of previously known supernova remnants, star-forming regions, and radio filaments. (Credit: SARAO)
“R3 million has been spent on **catering** and a further R4 million on **transport** in the area since construction began in 2012. One hundred and seven locals have been **employed** by the South African Astronomical Observatory between 2015 and 2017.”

CAREERS AT SARAO

Key career opportunities exist in the following areas to become part of an international effort to build the world's largest radio telescope:

- Digital Signal Processing
- FPGA Development
- High Performance Computing
- Massive Data Networks and Storage
- Radio Frequency Engineering
- Real-time Computing and Process Control
- Radio Astronomy Science Data Processing
- Telescope Commissioning Scientist
- Data Scientists
- Senior Software Engineers (Python)
- Radio Frequency Interference Engineers and Specialists

Source: https://www.ska.ac.za/about/sarao/
SKA SA Managing Director Rob Adam said, “We have electricians being trained, boilermakers, fitters and turners and people splashing the fibre that carries the signal from the satellites through the computers, that fibre is being splashed by people from the local community.”
African Investment in Science, ICT

- Low levels of organisation and funding of many science systems in Africa - UNECA 2018 Sustainable Development Report
- Kenya & SA closest to AUs target of investing 1% of annual GDP in R&D (Kenya & SA invest 0.8%)
- R&D expenditure of 24 African countries unknown

Source: Academy of Science of South Africa (2019)
Political Willingness

- National Academies of Science [26]
- National Young Academies of Science [18]
- R&D spending between 0.5%-0.8% of GDP [12]
- African Science Granting Councils [15]
- Incentives & recognition for sharing research data [2]
- Ministries of Science/Technology/Innovation [25]
- National Open Data policy & policy initiatives [5]

Source: Academy of Science of South Africa (2019)
Challenges on Continent

**HUMANITARIAN OVERVIEW**
10 countries are currently experiencing conflict related to political, military & Islamic forces.

**POLITICAL FREEDOM**
Political freedom based on political rights and civil liberties indicators rated 22 countries as not free countries, only 10 as free countries, and 22 as partly free countries.

**PERCEPTIONS OF CORRUPTION**
48 countries scored below 50 (on a scale of 100) on the Corruption Perceptions Index (CPI) scale and only 6 countries scored above 50.

**INFRASTRUCTURE DEVELOPMENT**
The Africa Infrastructure Development Index (AIDI) rated 46 countries below 50 on a scale of 100, and only 8 countries higher than 50.

**INTERNET CENSORSHIP**
20 governments applied some form of Internet censorship 45 times since 2001 of which 36 times the shutdowns related to anti-government related protests.

**HUMAN DEVELOPMENT**
24 countries are ranked by the UN Human Development Index (HDI) in the low human development category and 20 countries in the medium human development category.

Source: Academy of Science of South Africa (2019)
"The A4AI defines affordability as 1GB of mobile broadband data costing no more than 2% of average monthly income. But the average across the African continent is 7.12%, and in some cases 1GB costs more than a fifth of average earnings.

Such prices are "too expensive for all but the wealthiest few," the report states, citing cost as the primary reason why an estimated 49% of the global population remains offline.

The report authors argue that sluggish markets and monopolies are a primary cause of high prices and offer several policy prescriptions to address the issue."

Connected Countries

- **ASREN** - Algeria, Egypt, Lybia, Mauritania, Morocco, Tunisia (4 connected; 2 not yet connected)

- **WACREN** - Benin, Burkina Faso, Cameroon, Chad, Côte d’Ivoire, Gabon, Ghana, Guinea, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo (3 connected; 11 not yet connected)

- **UbuntuNet Alliance** - Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, Rwanda, Somalia, South Africa, Sudan, Tanzania, Uganda, Zambia, Zimbabwe (10 connected; 6 not yet connected)

17 connected; 19 not connected

Source: Academy of Science of South Africa (2019)
Sub-marine Cables reaching Africa up to 2018

https://manypossibilities.net/african-undersea-cables/
Unlock the potential of education and research in enhancing human capital development in Africa by improving access to digital infrastructures and applications, in line with the priorities of the “Digital4Development” (D4D) strategy.

AfricaConnect3

By providing access of research and education institutions to affordable and secure broadband connectivity and dedicated digital tools and applications, the action will facilitate research and education collaboration, thereby supporting the digital transformation of the research and education sectors as well as digital skills development.

Objectives

The overall objective of the action is to enhance human capital development in Africa. The specific objective is to increase the use of digital technologies by African education and research institutions, through improved access of tertiary education and research institutions to adequate and affordable e-infrastructures

- Development of dedicated services and applications for the benefit of education and research communities
- Strengthening of human resource capacity and expertise within education and research communities
- Increased awareness of the role of digital transformation for education and research.

Facts and figures

- Total budget: EUR 37,5 million
- European Commission contribution: EUR 30 million

"We are not building the future EOSC [AOSP] from scratch, but will be starting from what members of the community worked in the last years: inclusiveness is going to be critical, especially in regions whose voice has not been heard enough so far."

- Cathrin Stöver, Chief Collaboration Officer, GÉANT
Key to Future AOSP

• **Collaboration** among countries, institutions, projects, researchers – sharing resources; free flow of data, research, knowledge

• **Trust** relationships, openness, transparency – trusting others for having your best interest at heart, and not because of the profits they can make from your research

• **Researcher driven** – needs addressed & bring infrastructure to data

• Keep momentum, strong leadership, build on knowledge (also tacit) collected through project

Bibliography

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*Under embargo*
Thank you!

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