WELCOME SPEECH AT THE LIBSENSE REGIONAL OPEN SCIENCE POLICY DEVELOPMENT WORKSHOP

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Open Science as Defined by UNESCO

- Open Science is "an umbrella concept that combines various movements and practices aiming to make scientific knowledge, methods, data and evidence freely available and accessible for everyone, increase scientific collaborations and sharing of information for the benefits of science and society, and open the process of scientific knowledge creation and circulation to societal actors beyond the institutionalized scientific community".
- Open Science encompasses other aspects such as "Open Access" (freely available scientific publications), "Open Data" (data that are freely shared for the use and benefit of all), "Open Source" (software that is configurable and freely available to diverse software engineering communities) and "Open Educational Resources" (learning and teaching materials in various media that are freely available online for reuse and sharing).

How Do Scientists Define Openness?

- There is no common agreed definition of openness
- An Example of how biomedical researchers in the United Kingdom understand and enact the idea of "openness": In everyday research, Open Science takes many forms and it can involve researchers (Levin et al., 2016):
 - 1) Putting their data into online databases such as GenBank and Figshare, or into journal repositories;
 - 2) Developing international standards for data formatting, curation, and quality, as promoted by institutions like the European Bioinformatics Institute (EBI) and the National Center for Biotechnology Information (NCBI);
 - 3) Publishing in open access journals like the Public Library of Science (PLoS), or publishing open access articles in journals like Nature, Science, and Proceedings of the Academy of Sciences; or
 - 4) Creating software, models, or materials that can be of use across a variety of projects, labs, and disciplines, such as the BioBricks initiative in synthetic biology.

Open Science Visibility and Need for Clarity on how to Enforce it

- Open Science has gained increased visibility and influence for a number of reasons. These range from scientific advances, such as recent developments in computing and communication technologies and the rise of "Big Data," to political and economic factors, including the interest of European and North American governments in reinforcing the transparency and accountability of research processes, so as to renew public trust in science-based policies (Leonelli, 2013).
- There little clarity around how the implementation and enforcement of Open Science should occur. This is because Policies have different terms and requirements for researchers (Corrall & Pinfield, 2014), institutions have different infrastructures for repositories and databases, and scholarly communities have different commitments and goals. This often means that researchers do not know how, and in what way, to practice Open Science (Ferguson, 2014).
- Hence the effort in regard to Regional Open Science Policy Development aimed at coming up with agreed **minimum policy standards** that shall guide open science policy development at national and institutional level is very timely.

The Need for Communities of Practice in Open Science

- A community of practice (CoP) is a group of people who share a common concern, a set of problems, or an interest in a topic and who come together to fulfill both individual and group goals.
- Communities of practice often focus on sharing best practices and creating new knowledge to advance a domain of professional practice. Interaction on an ongoing basis is an important part of this.
- Many communities of practice rely on face-to-face meetings as well as web-based collaborative environments to communicate, connect and conduct community activities.
- We need to build communities of practice and strengthen local and national services to support open science and research in Africa

We Need To Open Up Universities And Research Institutions

- We need to lead in promotion & devpt of open educational resources
- We need to promote and support open access of academic and research staff:
 - a) We need to put on the website for each academic/research staff: Staff Profile, qualifications, academic rank, research interests, publications, research projects, innovations, patents, students supervised with corresponding dissertations, CV, department, school/faculty.

b) This calls for an open website/online policy

- We need to promote and support open institutional repositories, open data, open source etc.
- We need open science/open access policies at institutional, national and regional level.
- Opening up institutions calls for full digitalisation of our institutions.

Impact Of Digitalization On Research And Innovation

- The advancements in digital transformation in higher education present African universities with several possibilities to transform their research and to develop the next generation of talented researchers.
- Digital technologies can transform how research is conducted in higher education and open new frontiers for the development of early career researchers. For this reason, African universities have to integrate digitalisation into their policies, strategic plans and activities which in most cases would require institution-wide planning to integrate digital technologies in teaching, learning and research activities (Orr et al., 2020: 19).
- Most African universities are yet to fully get to grips with comprehensive digital transformation (Castañeda and Selwyn, 2018: 2; Tømte et al, 2019: 100), especially when it comes to the use of digital technologies and platforms for research and innovation.
- Digitalisation can also be instrumental in fostering international research collaborations (OECD/European Union, 2019: 126), which can offer new opportunities for researchers' growth and global profiling and networking.

What is Science Policy?

- Science policy is defined as being an area of public policy which is concerned with the policies that affect the conduct of the science and research enterprise...often in pursuance of other national policy goals such as technological innovation, weapons development, health care and environmental monitoring.
- Science policy also refers to the act of applying scientific knowledge and consensus to the development of public policies.
- Science policy workers consider the ethical and political dimensions and how science and technology can best serve the public.

What is Science Policy Concerned with?

- Science policy is concerned with the allocation of resources for the conduct of science towards the goal of best serving the public interest.
- Science Policy issues include the funding of science, the careers of scientists, and the translation of scientific discoveries into technological innovation to promote commercial product development, competitiveness, economic growth and economic development.
- Science policy focuses on knowledge production and role of knowledge networks, collaborations and the complex distributions of expertise, equipment and know-how.
- Understanding the processes and organizational context of generating novel and innovative science and engineering ideas is a core concern of science policy.
- Science policy topics also include weapons development, health care and environmental monitoring.

Research and innovation systems

- The Gross Expenditure on Research and Development (GERD) is one of the key indicators of how much money a country dedicates to research and development activity as a percentage of its GDP constraints, and African Countries have committed themselves to spend at least 1% of their GDPs on research and development as per African Union declaration, 2006.
- No country in Africa is spending 1% of its gross domestic product (GDP) on research and development (Kigotho, 2021; UNECA, 2018), as all countries on the continent are among the 80% of countries worldwide that invested less than 1% of GDP in scientific research (Azoulay, 2021).
- According to UNESCO's latest science report, The Race Against Time for Smarter Development, Africa's share of global expenditure on research and development remained constant at 1.01% between 2014 and 2018, but, in Sub-Saharan Africa, it dropped from 0.44% to 0.42% (Azoulay, 2021). Even then, on average, investment in research and development as a share of GDP in Sub-Saharan Africa rose from 0.49% in 2014 to 0.51%, an insignificant increase of 0.02 percentage points. South Africa recorded the highest scientific research expenditure in Africa, after increasing its share from 0.77% in 2014 to 0.83% in 2018, while Egypt took the second position by raising its share from 0.64% to 0.72% during the same period.
- Research output from African Universities and Research institutions is still very low and so is the level of funding.
- Most research done in Africa contributes to the **body of knowledge** and **little leads to commercial innovative products/services.**

The value chain continuum from research through technology transfer to innovation; Source: Adapted from Drennan (2018)



Quality Research

- High-quality research is research that stands the test of being scrutinized by highly recognized peers within the field, and that has a substantial impact on the development of the research field, and provides a useful contribution to society in the short or long term, either directly or indirectly (Carlsson, Kettis & Söderholm, 2014).
- High quality research is creative, ground-breaking research, often as a result of small, step-wise advances that result in a new way of thinking about a problem (Hollingsworth, 2008).
- The major challenge is how to measure research quality in a reliable way, since some research may be regarded as having low quality at the time, but eventually lead to something valuable and of considerable interest, and vice versa.
- There is need for Regional and National Bodies responsible for regulating Research and Higher Education to regulate & accredit **open journals** at national and regional level to assure quality.
- There is also need for development and use of ''Research assessment and evaluation instruments (Quality Assurance tools) at institutional, national and regional level to assure research quality.

Each University/Research Institution needs a Functional Research Office: The many functions of a Research Office are provide in the table below:

•	Development of research strategy and themes	•	Networking with funders
•	Horizon scanning	•	Portfolio management & reporting, trend analysis
•	Monitoring and evaluation, and metrics	•	Project management of large contracts and bids
•	Benchmarking	•	Research governance
•	Pre-award skills, research development and costing methodologies	•	Relationship building with international funders, stewardship
•	Internal peer review	•	Knowledge Transfer and Intellectual Property
•	Contract negotiation	•	Spin outs and commercialisation
•	Post award management and adherence to funder and statutory terms and conditions		Audit (of technology, project progress and finances)
•	Consultancy	•	Business systems
•	Using knowledge about individual and collaborative disciplines	•	Management information and reporting

Source: Adapted from Drennan (2018).

Professional Competency Framework consisting of 9 key competency areas for Research Office Staff or staff involved in Research Management; Source: Adapted from Drennan (2018).

Key competency area	High-level description of the area
1. Organisation and delivery of a research management service	Organise, structure, manage, monitor and review a research support function
2. Research planning, strategy and policy development	Facilitate and support the development, implementation, monitoring and evaluation of research policy and strategy across the competency areas
3. Researcher Development	Support postgraduate student and researcher development across the research pipeline within different organisational settings
4. Partnerships and collaboration	Facilitate and manage national, regional, international partnerships and collaborations to advance research, including with research organisations, funders, industry, government and society
5. Research Funding	Identify and disseminate funding opportunities; develop and implement funding optimisation strategies; support the writing of approvals and submissions
6. Research Ethics & Integrity	Promote, foster and support research ethics and integrity, compliance and responsible research conduct
7. Managing funded research	Research contracts negotiation and management; research financial management; funder/sponsor engagement and liaison; research project management
8. Research data and research information management	Develop research data management plans and support systems; databases and information systems; research data management; reporting
9. Research uptake, utilisation	Dissemination and communication of research; knowledge transfer; and impact business development; measuring and demonstrating research

Policy and Strategy Frameworks

- There is need to develop Policy and Strategy Frameworks that constitute minimum standards for institutional policies and strategies to guide member institutions to come up with key institutional policies and strategies required to enable research development and management.
- As regards Research development and management all Universities/Research Institutions should have in place a research policy and strategy; a research guide; data sharing policy; an innovation policy and strategy; technology transfer policy and strategy; partnerships and collaborations policy and strategy; an Intellectual property policy and strategy; and institutional overhead and incentives policy among others.
- The policies and strategies should comply with the open science principles to the extent possible.

Professional staff Development & Human Capital Development

- There is need to have accredited regional/national professional staff development centres to help build capacity.
- There is need to develop and implement a certificate/diploma in higher education of a minimum duration of six (6) months to be taken by all academic staff.
- There is need to develop and implement a postgraduate certificate/diploma in research management of a minimum duration of six (6) months to be taken by all academic and research staff.
- Young PhD holders should be enabled to undertake postdoc fellowships so that they can engage in mentored research or scholarly training to acquire the professional skills needed to pursue a career path of their choosing under the supervision of a mentor as part of a larger research group.

• Senior academics should take sabbatical leave to write academic books and engage in research.

- There is need to establish more joint/double PhD programmes for joint/double awards by universities within Africa or between Universities within Africa and collaborative Universities outside Africa.
- There is need to prioritise, support and secure funded scholarships from foreign Universities for PhD students in STEM disciplines.
- National governments and development partners should pull resources to train PhD students in STEM disciplines from centres of excellence within Africa.

Growing the Research Mission within the University

- Regional and National Bodies responsible for regulating/overseeing Higher Education should rank schools/faculties using a ranking system developed by the regional body.
- Using the regional ranking system, national centres of excellence and regional centres of excellence in the various disciplines should be declared.
- Universities need to specialise in a few disciplines and recruit sufficient academic and research staff to undertake teaching and research in those selected disciplines
- Most Universities that want to be research-led should consider decreasing enrollment of undergraduate students to a ratio of at most 2:1 for undergraduate to postgraduate students to free academic staff from teaching and assessing huge classes that consume much time at the expense of doing research. Focusing on research would require the universities to establish research institutes and centres in priority research areas. These Research Institutes and Centres should have fulltime researchers in established research positions of Research Professor, Associate Research Professor, Senior Research Fellow and Research Fellow.
- The need to promote and support the twinning of Universities within Africa to research in areas of common interest.

Minimum Requirements of Appointment by Promotion for position of Lecturer, Senior Lecturer, Associate Professor and Professor; Source- adapted from IUCEA Report (2021)

In order to strengthen research in the Universities, we recommend that for the position of Lecturer, Senior Lecturer, Associate Professor and Professor to include the following minimum requirements for appointment/promotion of academic staff from one rank to the next:

- Lecturer: PhD and the Certificate/Diploma in Higher Education.
- Senior Lecturer (SL): The Certificate/Diploma in Research Management, 6 peer reviewed publications, at least 3 research grants, each of at least USD 100,000, supervised at least three (3) master's students to completion.
- Associate Professor (AP): After appointment as SL, should have successfully served as a Principal Investigator (PI) on two research projects with a research team of not less than three (3) researchers and each project should be worth at least USD 200,000, eight (8) peer-reviewed publications, supervised at least five (5) master's students and two (2) PhD students, published at least one academic book.
- Professor: After appointment as AP, should have successfully served as Principal Investigator (PI) on at least three

 (3) research projects where each project had a research team of not less than three
 (3) researchers and at least two (2) of the projects should each be worth at least USD 500,000 each, supervised at least Twenty (20) master's students and PhD (5) PhD students, published at least two academic books.
- National councils/commissions/agencies responsible for higher education should verify qualifications and publications and audit appointments in Higher Education Institutions for compliance with the legal framework just like procurements are audited by the national procurement and disposal of public assets authorities.

Internationalization of Research; Source – adapted from IUCEA Report (2021)

- Internationalisation of research is being addressed through international research collaborations, partnerships and networks, co-authorship with international faculty, working with international Principal Investigators (PIs) on research grants, hosting and exchanging visiting faculty, hosting international students, engaging in joint research and joint postgraduate student supervision with international faculty, attachment of academic/research staff through short visits and sabbaticals to world class universities and research institutions.
- The Universities have put in place International Relations Offices or equivalent that take care of international issues that may arise from time to time.
- Most Universities host international events such as conferences, workshops and journals.
- Faculty present at international conferences and publish in high impact international journals
- Universities have international faculty appointed as either full-time or part-time staff.
- Thus in view of the above initiatives/findings by universities, we recommended that:
 - International Collaborations and Partnerships should be pursued and prioritised by all universities as strategies to advance higher education training and research.
 - There is need for key stakeholders in research to organise annual national and regional conferences that attract international participants to create avenues for networking and partnerships.
 - There is need encourage joint teaching and supervision of postgraduate students with international faculty.
 - There is need to promote and support joint/double degrees accreditation between African Universities and international universities.
 - In order to ensure research is disseminated internationally, faculty should be encouraged and supported to present at international conferences and workshops and publish in high impact international journals.

Recommendations and/or Conclusion

- We need to enable equal opportunities for all researchers to publish their research in open access journals and books and other publication avenues, regardless of field of research, funding basis, or career stage. African repositories are already playing a role in knowledge sharing and should be strengthened and enhanced.
- There is need to strengthen equitable partnerships of editors and publishers, libraries, RENs, funders and other actors to provide immediate open access to African research via journals, repositories and other means supported by an evolving scholarly communication landscape. There is need to train African editors to create and manage African journals.
- We need regional and national shared-platforms for Research Data Repository, Journals, Micropublications and Preprints across Africa.
- We need to ensure that universities and research organisations have the evaluation practices, incentives and services needed to support open science and research, e.g. the academic career system supports and rewards researchers who participate in a culture of sharing the results of their research; adopt open responsible research metrics, along with ways of rewarding the full diversity of outputs and contributions, capturing the broader social impact of research.
- We need to enhance open science skills: those involved in each stage of the research process should have the capacity and skills necessary to publish in open access publications, manage research data and practice open science.

Recommendations and/or Conclusion Cont'd

- There is need for digital learning environment focused on early career researchers (ECRs) in areas such as research development and management.
- There is urgent need to build a cohort of PhD holders in various STEM disciplines that would eventually undertake research and development critical to national and regional development of Africa.
- We need to increase scientific collaborations and sharing of information across Africa and beyond.
- We need to increase ''Open Educational Resources'' and collaborative educational programmes across Africa & beyond.
- We need to fully digitalize the African universities and research institutions and fully open them up to the extent possible guided by open science principles.
- There is need for development and use of "Research assessment and evaluation instruments (Quality Assurance tools) at institutional, national and regional level to assure quality in research.
- There is need to develop Policy and Strategy Frameworks based on open science principles that constitute minimum standards for institutional policies and strategies to guide member institutions in coming up with key institutional policies and strategies and strategies required to enable research development and management.
- National and Regional Regulatory bodies should ensure that senior academics especially professors at African Universities meet minimum global standards. Senior Academics should take sabbatical leave and write books and engage in research.
- International Collaborations and Partnerships should be pursued and prioritised by all universities as strategies to advance higher education training and research. Research institutions should also pursue internationalisation of research.
- In order to ensure research is disseminated internationally, faculty should be encouraged and supported to present at international conferences and workshops and publish in high impact international journals.
- African Universities and Research Institutions should work towards fully embracing open science.

I THANK YOU. END.