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Infrastructuring in a Socially Just Way: Lessons Learnt from a Grassroots Open Science Initiative in Africa

Pamela Abbott

Information School, University of Sheffield, UK

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Outline



Background & Problematisation



Methodology and Case Study



Analysis and Implications

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Background & Problematisation

Introducing the Research Problem

Science Papers Published 2016

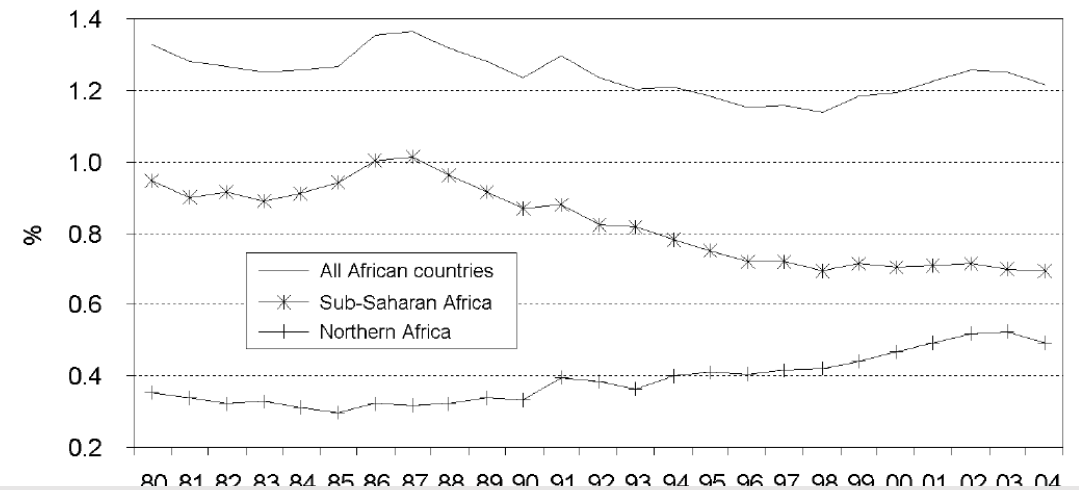
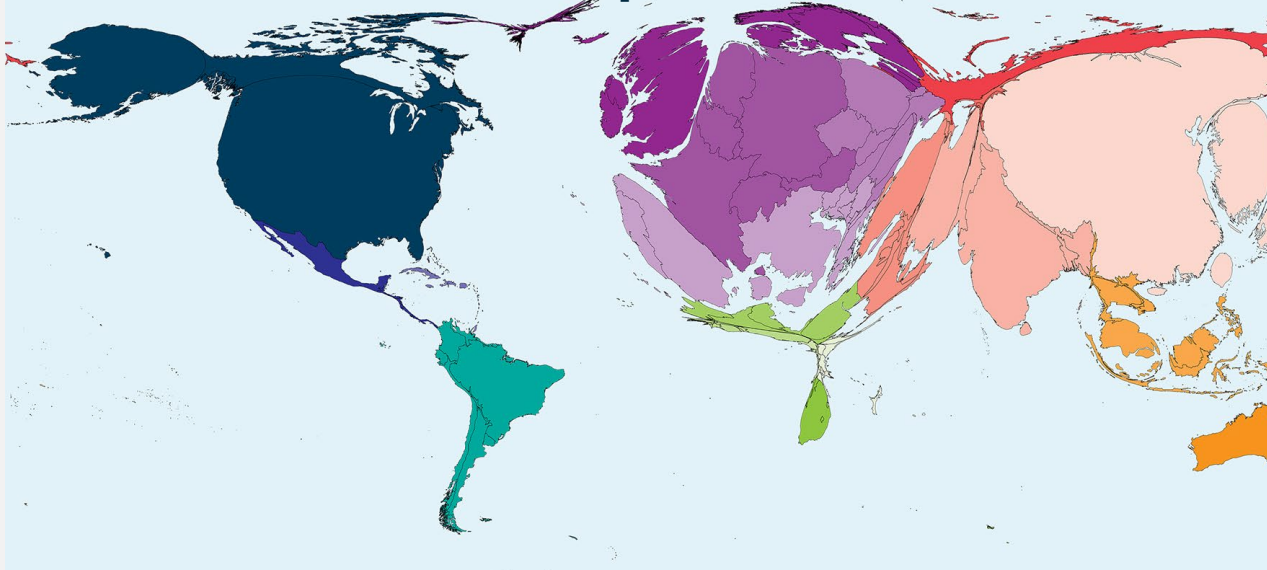


TABLE 3
Scientific Production (World Share of
Scientific Publications) in Developing Countries

Areas/Countries	World share (%) of scientific publications		
	2001	2006	Evolution 2006/2001
Asia (excluding Japan)	9.4	14.8	+87
China	3.6	7.0	+96
ASEAN	0.7	1.0	+42
Latin America (including Mexico)	2.6	3.2	+46.4
Brazil	1.2	1.6	+35
Africa	1.2	1.2	0
North Africa	0.5	0.5	+11
South Africa	0.4	0.4	-9
Near and Middle East (excluding Israel)	0.5	0.8	+90
Total Developing Countries	13.7	20.0	+46

Source: Thomson Scientific data (OST 2008).

Reproduced from (Gaillard, 2010)

“Africa’s long-term publication output trends indicate that its contribution to global knowledge production has slipped slightly during the 1990s. Sub-Saharan Africa has fallen behind quite dramatically; from a 1% share in 1987 to 0.7% in 1996, with no sign of recovery (Figure 1). Africa has lost 11% of its share in global science since its peak in 1987; Sub-Saharan science has lost almost a third (31%)”. (Tijssen, 2007, p. 307)

“Following a long period of relative stagnation, Africa’s share of world publication output more than doubled since 2003 to reach 3% today. This is a notable but contrasted progress” (Gaillard & Mouton, 2022, p. 319)

15/12/2024

BKIS Conference on Advancing Social Justice Through Curriculum Alignment

Explaining the Research Problem

Is the problem one of **accessibility**, **visibility** or **productivity**?

- If **accessibility**, then the research is being published in venues which require subscriptions or on which barriers have been placed to access the research, i.e., the research sits behind paywalls of international journals and are not accessible to the communities it is meant to serve or educate
- If **visibility**, then the problem may be due to a lack of discoverability in mainstream research output databases such as Web of Science and Scopus, i.e., African research outputs are less likely to appear in these databases, but they are the ones on which scientometric research is being undertaken
- If **productivity**, then it may be due to a dysfunctional or low-resourced research ecosystem, i.e. lack of resources, infrastructure and institutional capacity to support research, thus leading to poor quality or no output

Open science is perceived to be able to address all three issues:

- To improve **accessibility** and **visibility** through open publishing platforms and open research infrastructures that create alternative discoverable channels for the dissemination of research outputs, e.g. green open access, open journals etc.
- To improve **productivity** by enabling collaborative research practices, data sharing, co-production of research outputs, and ways of incentivising researchers that do not depend on high impact factors and journal rankings

Open Science and Research Infrastructures

Open science can be loosely defined as a set of practices aiming to ***make scientific knowledge openly available, accessible and reusable*** for everyone to ***promote research collaborations*** and the ***sharing of knowledge*** for the ***benefit of science and society*** and to make the processes of ***doing science transparent and inclusive*** of various societal actors (very loosely based on a number of official definitions)

According to (Fecher & Friesike, 2014), a key part of the delivery of open science principles is ***infrastructure***

According to (European Commission, 2024) research infrastructures are “***facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields***”. These include:

- major equipment or sets of instruments
- knowledge-related facilities such as collections, archives or scientific data infrastructures
- computing systems
- communication networks”

But infrastructural resources can introduce their own inequalities because of (a) global digital divides and (b) incorporation of systemic injustices in their construction/deployment

Some key Infrastructure Definitions

Infrastructuring is “the ongoing and continual processes of creating and enacting information infrastructures” (Karasti & Blomberg, 2018).

- **Infrastructuring work** is the processual view of all the activities involved “[in] captur[ing] interventions, actions, and transformations in designing and developing infrastructures”
- The **work of infrastructuring** is how the developed infrastructures themselves then impact the organisation of work (Aanestad et al., 2014)
- Infrastructures and the practices they enable **mutually shape each other**

Networks of action (Braa et al., 2004), position infrastructuring work in ICT4D as proceeding from pockets of action-related research which foster both innovation and standardisation through networked capability-building.

Infrastructuring and Social Justice

Two key streams of research:

1. Investigating how infrastructures may lead to the ***maldistribution of access*** that often results in some communities/groups/nations being deprived of resources that are otherwise available in other contexts/situations. In terms of digital infrastructure this type of phenomenon is ***often referred to as digital divides***
2. Focusing on ***cognitive justice issues***, i.e., the systemic and hegemonic oppression of indigenous knowledge systems by dominant and generally former colonial powers, also referred to as “epistemic violence” and “epistemicide”. Infrastructuring work ***cannot assume technological neutrality*** is embedded in existing power relations and asymmetries which can become inscribed in the developed networks and systems

Key research question: “how to do infrastructuring work in the context of inequitable research visibility in such a way that it promotes more sustainable, socially just and equitable outcomes”?

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Methodology and Case Study

Methodology – archival analysis

- A digital archive of documents collated of interventions taking place in the case study project, LIBSENSE, from October 2016 to December 2023.
- The following protocol used to collate the documents:
 1. Develop Python code to search the provided Google folders containing relevant documents
 2. Extract information around a typology of interventions
 3. Using a coding frame, code the documents in Nvivo
 4. Prepare a high-level chronology of the interventions

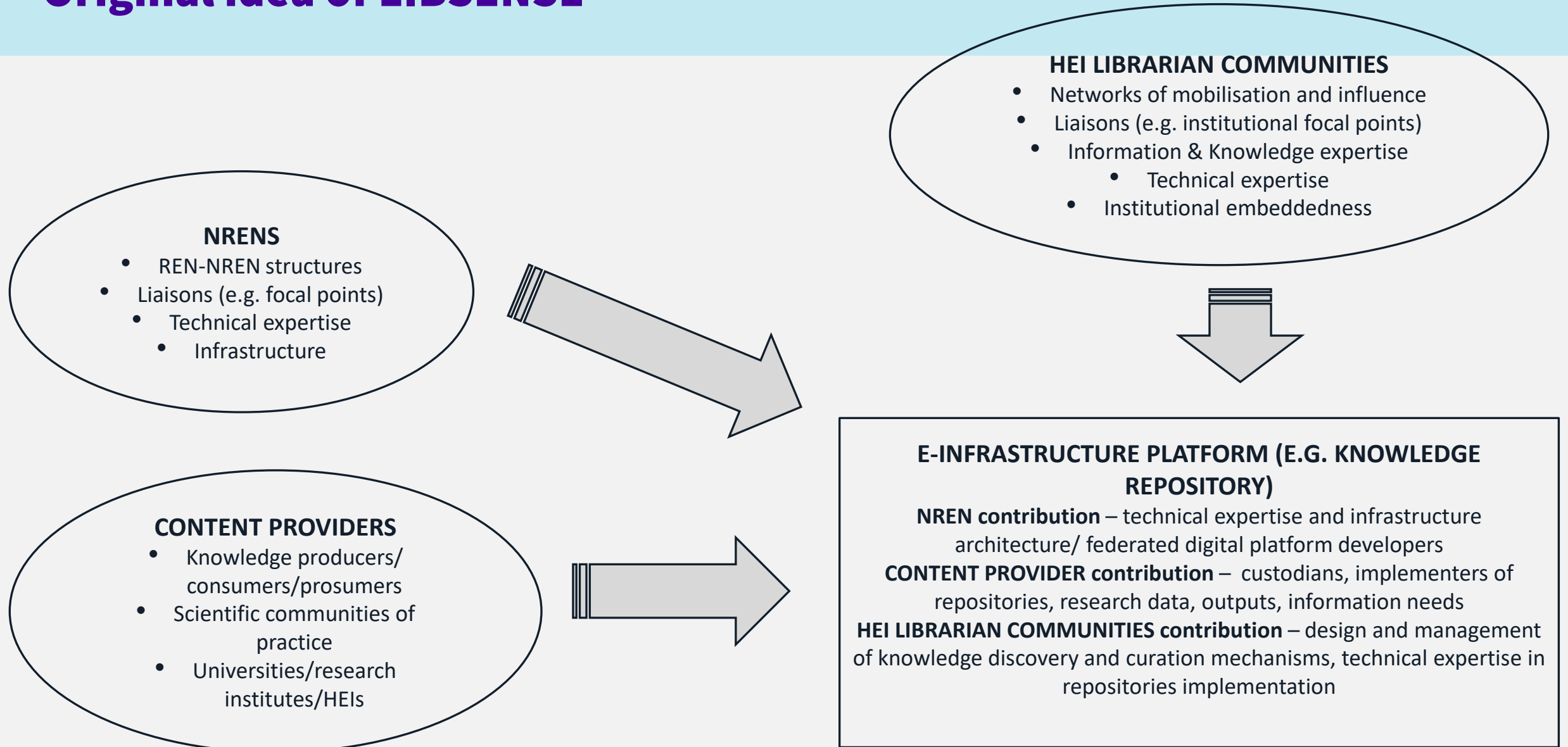
Typology Categories	Typology Sub-categories	Number of documents extracted
Research	Data Analyses; Data Gathering	187
Dissemination	Conferences; Articles/Papers	302
Interventions	Workshops; Webinars; Policy Development	320
Collaboration	Project Proposals; Partner Events; Partner Projects; Collaboration agreements	454

Introducing the Project

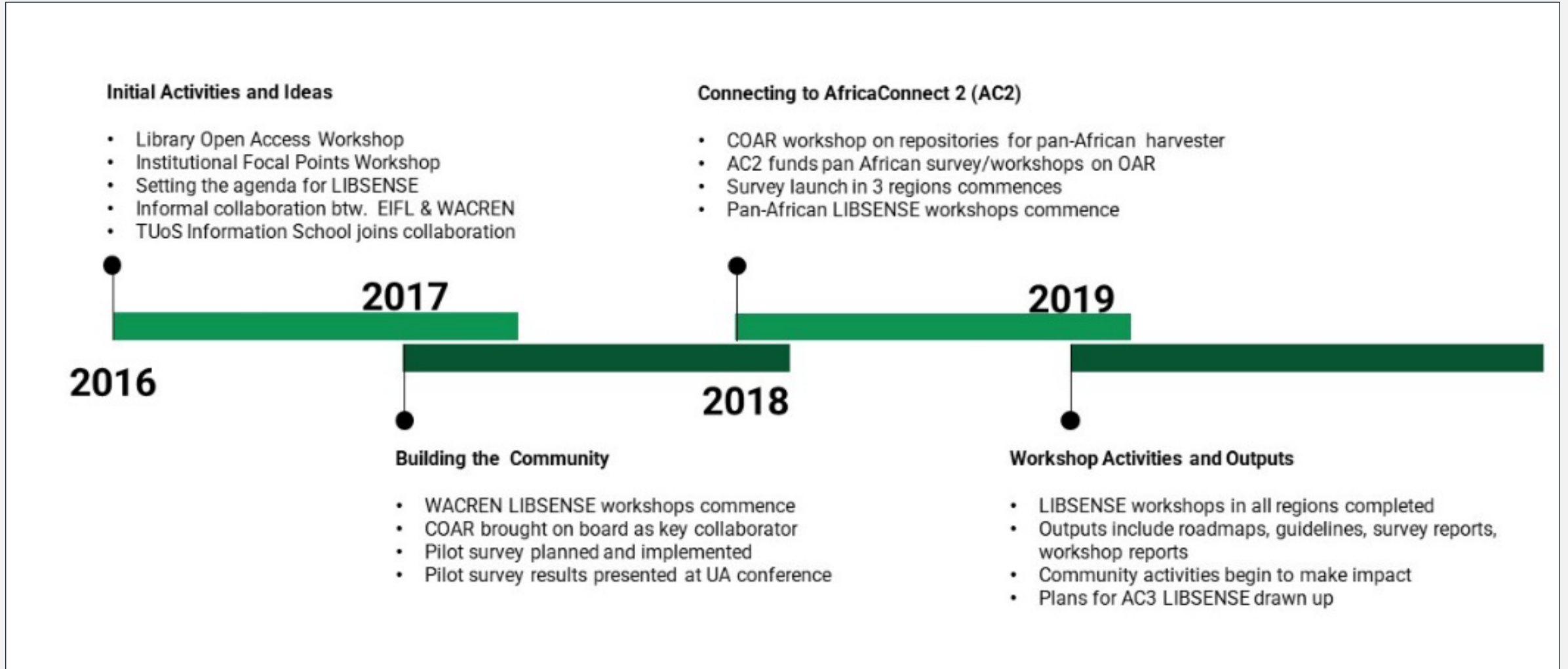
Library Support for EMBEDDING NREN Services and e-Infrastructure

- Formally launched in 2017
- Co-founded by four partners – 3 NGOs and 1 HEI :
 - West and Central African Research and Education Network (**WACREN**) [Lead Partner]
 - Electronic Information for Libraries (**EIFL**)
 - Confederation of Open Access Repositories (**COAR**)
 - The University of Sheffield (**UoS**) **Information School**
- Referred to as a **network**, i.e., the members of the community who identify with its goals and vision
- Referred to as an **initiative**, i.e. a broad-based programme of activities undertaken by members of the community it spawned
- Operating under the **broad remit** of advocacy work, agenda-setting, policy development, proof-of-concept work, through pilot projects, workshops and research activities

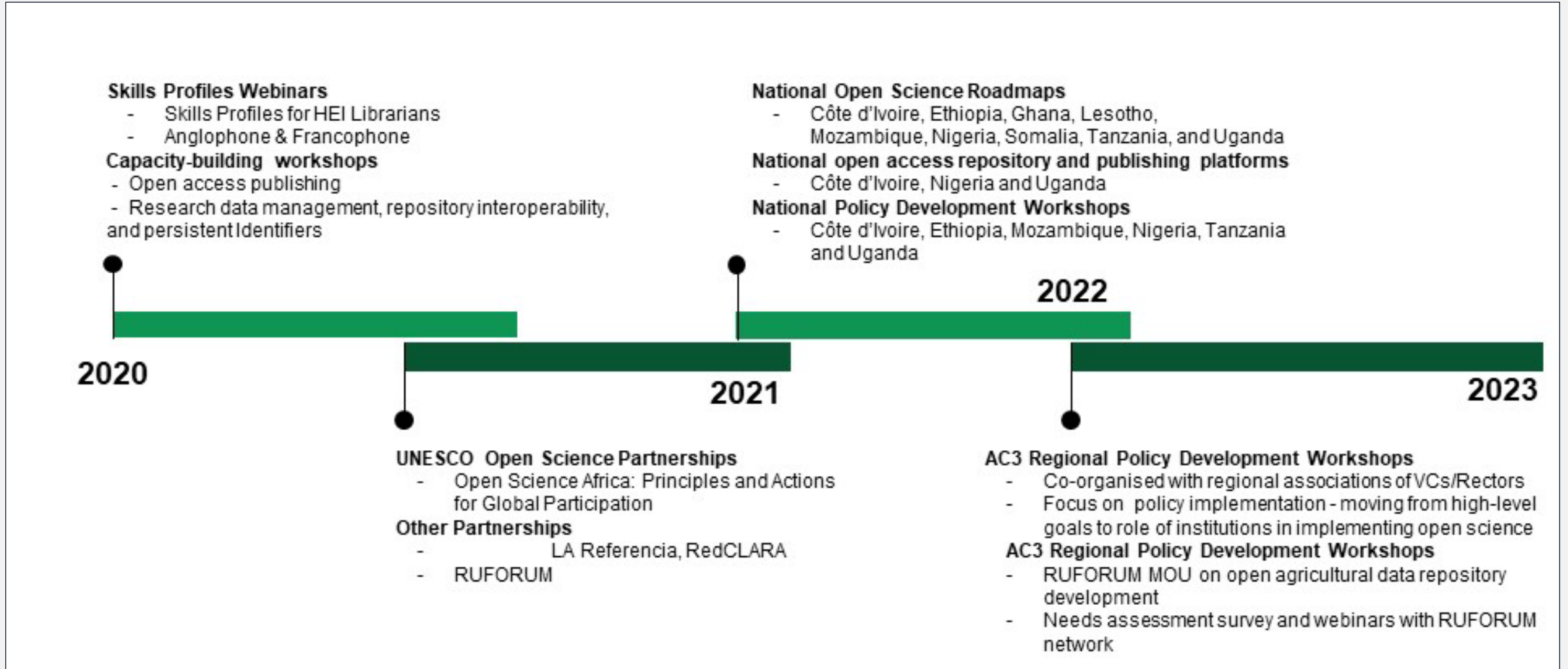
Original idea of LIBSENSE



LIBSENSE Timeline (2016-2019)



LIBSENSE Timeline (2020-2023)



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Analysis and Implications

Analysis of Interventions 1

Selected Intervention/Scope	Key Goal/Aim/Objective	Expected Outcome	Analysis
<i>Intervention:</i> LIBSENSE 3-region survey on Open Access Repository (OAR) development (2018 – 2019) <i>Scope:</i> continent-wide <i>Description:</i> A combination of a survey and workshop activity involving HE librarians and REN representatives in each of the three REN regions: East/Southern, West & Central and Northern Africa.	(1) to develop and implement a vision of African Open Scholarship led by African Librarian CoPs (2) to establish and understand the drivers for, and the hindrances against delivering this vision (3) to determine the extent to which HEIs were building the necessary resources and capabilities to deliver digital innovations (4) to determine the evolving role of the African HEI library in light of digitalization	More collaboration between academic libraries and the country-level national RENs in the servicing and management of open access repositories (OARs) in academic libraries Providing complementary technical skills to build the librarians' capacity in this area.	Action taken was to raise awareness and build communities of practice around OAR development which is <i>affirmative</i> since these worked within the status quo One <i>transformative</i> element was bringing together the communities of practice who had not had the opportunity to talk to each other before, thus addressing systemic issues around the knowledge domains each was traditionally exposed to.

Analysis of Interventions 2

Selected Intervention/Scope	Key Goal/Aim/Objective	Expected Outcome	Analysis
<i>Intervention:</i> Skills profiles development workshops (2020) <i>Scope:</i> continent-wide <i>Description:</i> The co-development with leading African HEI librarians knowledgeable in open science practices a set of future skills profiles that they believed their peers could aspire to if they wanted to meet digitalization challenges to their profession.	(1) to discuss evolving skills profiles of the HEI librarians (2) to determine a set of preferred skills profiles to support ongoing digitalization (e.g., OAR development, data analytics, support for Open Science) that suit an African HEI context.	To engage HEI librarians proactively with the foresight of how their professional roles could develop to cater for the technological advances inherent in supporting open science practices. The skills profiles would provide them with tangible insights into the knowledge, skills and abilities needed to progress into these roles.	Action was <i>affirmative</i> through capacity-building and raising the awareness of librarians about new types of skills in their profession, but working within existing structures to stimulate change. A <i>transformative</i> aspect was the potential to create a ‘future vision’ challenging the status quo of what the HE profession could aspire to. Being online also extended the reach of the intervention increasing its transformative potential.

Analysis of Interventions 3

Selected Intervention	Key Goal/Aim/Objective	Expected Outcome	Analysis
<i>Intervention:</i> Policy development workshop (2021-2022) <i>Scope:</i> regional and institutional <i>Description:</i> Workshop attendees were introduced to research assessment reform, presented with a compendium of active working open science policies in African universities, engaged in discussions developing similar policies in their own institutions.	(1) to establish how institutions could move from the high-level goals and principles articulated in the UNESCO recommendation to implementing policies (2) to share case studies to illustrate how African HEIs had developed/implemented open access/open science policies in their institutions (3) to expose attendees to research assessment reform ideas promoted through DORA (declaration on research assessment)	Senior executives expected to consider how open science policy development in their own institutions could encourage research assessment reform and consequent potential benefits. They were expected to understand how such reformed practices could free African scholars from the ‘publish or perish’ imperatives and inequitable representation in elite Western journals.	The action to raise awareness though the case studies and DORA-inspired research assessment reform information was <i>affirmative</i> as it worked within the status quo. This action could be <i>transformative</i> as well since it challenged the status quo of publishing African research outputs and the institutional incentive structures – setting agendas that work against a Western-dominated scholarly communications system.

Analysis of Interventions 4

Selected Intervention	Key Goal/Aim/Objective	Assumptions	Analysis
<i>Intervention:</i> RUFORUM Open Data Sharing Platform Collaboration (2021 - ongoing) <i>Scope:</i> continent-wide, regional, institutional <i>Description:</i> In collaboration with RUFORUM, a pan-African network of agricultural research institutions, LIBSENSE is developing and piloting an agricultural research data repository.	(1) to develop and pilot an agricultural research data repository to upgrade RUFORUM's existing Knowledge Repository (2) to create open educational resources (OER) training material on research data management to support the new repository	A new platform for agricultural open data hosted by RUFORUM with distributed access and stewardship across the RUFORUM membership.	The actions of infrastructure redevelopment and capacity building are both <i>affirmative</i> addressing digital readiness, access and open data literacy issues. This action was also <i>transformative</i> since it aims to empower RUFORUM members to direct the development of the platform themselves and assure sovereignty of their datasets as the repository evolves.

Implications for LIBSENSE

The ‘*infrastructuring work*’ aspect of LIBSENSE comprises ***shared goals and objectives of a network of actors***.

- The goals depend on the composition of the network at any point in time
- This demonstrates affirmative and potentially transformative *networks of action* throughout the LIBSENSE project’s lifetime.
- They broadly encompass the open science agenda espoused by the project and notions of cognitive justice related to enhancing the global visibility of African scholarship.

The ‘*work of infrastructuring*’ aspect can be seen in:

- The ***co-development of research infrastructure***, i.e., the building of physical and digital infrastructure on which services can be mobilized themselves shape the research environment, e.g. the RUFORUM open data collaborative project.
- This builds further outcomes on what the project initially achieves thus leading to potential transformative outcomes.

Networks of action are represented in:

- The ***contingent nature of the interactions, connections, relationships*** that are developed within the network and beyond, spawning projects, linkages, partnerships etc. that work together towards shared goals.
- These networks of action achieve affirmative outcomes and depending on the action, potentially transformative ones.

Caveats on *sustainability*:

- There is ***fragility but also sustainability in the network***
- Structures are developed, like the RENS, but are very dependent on heroic efforts of individuals to sustain them
- institutions are weak in their support, sustained activity is dependent on external funding, undermined by a constantly changing context e.g., librarian’s professions (digitalisation effects, e.g.), publishing (industry, access etc.).

Both affirmative and transformative actions are challenged by such an environment and may struggle to achieve long-lasting change.

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