LIBSENSE: Building Library/NREN Collaborations around Open Science

What is LIBSENSE?

In 2017, a new initiative called Library Support for embedding NREN[1] services and e-Infrastructure (LIBSENSE[2]) was conceived during the second annual conference of the West and Central African Research and Education Network (WACREN)[3].

WACREN had just come to the end of their participation in two collaborative European Union (EU) research projects in the region (Sci-GaIA[4] and TANDEM[5]), and were planning ongoing strategic engagements with the research and education community in West Africa to continue embedding network and connectivity services for this end-user group.

While one project was about infrastructure (Sci-GaIA), the other was about advocacy of the NREN as a catalyst for digital transformation of the sector (TANDEM). TANDEM project team members recognised the key role that librarian consortia within the research and education community could play in sustaining advocacy work in raising awareness of the digital/technological services that could be offered to universities and other higher education institutions (HEIs) within the West African region.

Due to this realisation, in the latter part of 2016, there were already some informal talks between WACREN and EIFL, an NGO active in developing library consortia across Africa and whose stated mission was to "*enable access to knowledge for education, learning, research and sustainable community development*"[6].

These talks centred around addressing a 'connectivity' issue that EIFL had already identified through their own research in the region, namely that inadequate connectivity was a major challenge for access to electronic resources in Africa.

EIFL wanted to work with WACREN to connect more higher education institutions (HEI) libraries to the Internet. WACREN wanted to find collaborators who could help address another TANDEM finding, i.e., that inadequate uptake and usage of open access repositories (OARs) was a key issue affecting HEIs.

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[1] The Role and Status of National Research and Education Networks in Africa: https://openknowledge.worldbank.org/handle/10986/26258

[2] Library Support for Embedding NREN Services and e-Infrastructure: https://spaces.wacren.net/display/LIBSENSE/Home

[3] WACREN 2017 Conference: https://indico.wacren.net/event/46/

[4] Energising Scientific Endeavour through Science Gateways and E-Infrastructure in Africa: http://www.sci-gaia.eu/

[5] Trans-African Network Development: https://www.tandem-wacren.eu/

[6] Electronic Information for Libraries: https://www.eifl.net/

Also, in 2016, a further opportunity arose to expand this developing collaboration through the involvement of the University of Sheffield (TUoS) Information School[7], whose role was to develop a research agenda related to librarians' information management capabilities to support the LIBSENSE initiative.

Their involvement coincided with a TANDEM meeting in Abuja, Nigeria, at the end of 2016 where the post-TANDEM role of HEI librarians as institutional focal points (IFPs) was starting to take root. With the growing emphasis on OARs, another key player, COAR[8], already affiliated with EIFL, joined the core foundational team, and collaborations began taking place around the second quarter of 2017, with a bid to involve WACREN in the EU-sponsored OpenAIRE Advance[9] project.

COAR and WACREN wanted to collaborate on the idea of an African harvester, a sort of regional aggregator of open access content across Africa. COAR also had key links with network and connectivity service providers already working with libraries in the US, like Internet2[10], for example.

With the core foundational team members on board, i.e., WACREN, EIFL, TUoS Information School and COAR, a vision of how that collaboration would evolve and what they would champion began to take shape.

In this paper, we present the development and evolution of this pan-African NREN/HEI librarian initiative to suggest a roadmap for how similar initiatives could work in other similar contexts.

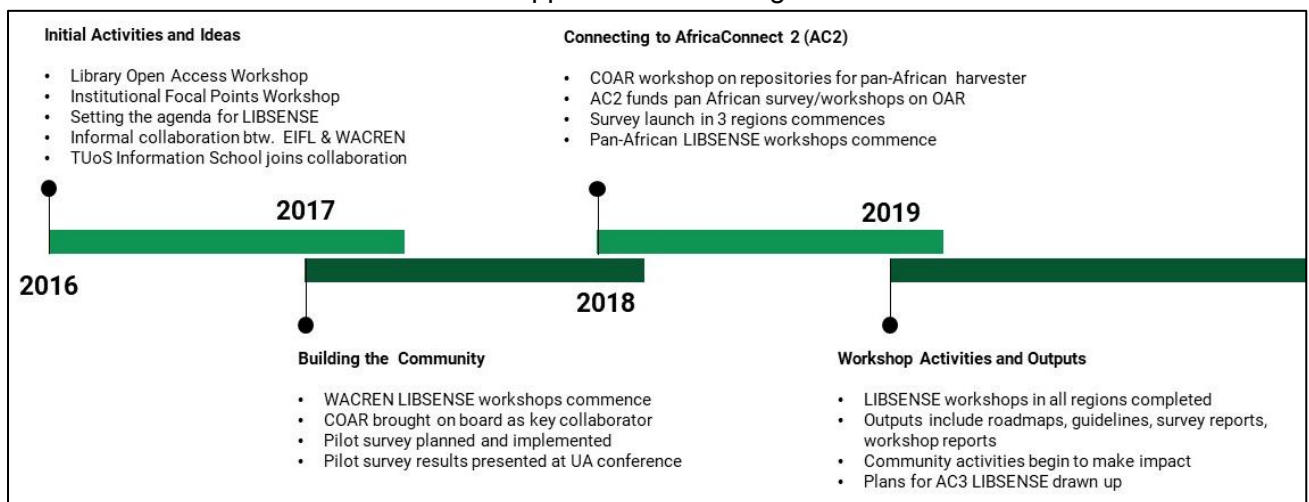A schematic of the LIBSENSE timeline appears below in Figure 1.

Figure 1. LIBSENSE timeline (2016 - 2019)

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[7] For more information see: https://www.sheffield.ac.uk/is
[8] Confederation of Open Access Repositories: https://www.coar-repositories.org/
[9] The OpenAIRE project: https://www.openaire.eu/openaire-advance-project
[10] For more information see: https://internet2.edu/

Why LIBSENSE?

LIBSENSE is an initiative to enable NRENs and HEI librarians to work together to achieve a common goal, that of delivering state-of-the-art digital services to higher education institutions at scale and with reduced costs.

The TANDEM project had produced a roadmap identifying digital service needs[11] but there was a significant missing element - service needs around information and knowledge assets and processes that were becoming increasingly digitised in these institutions.

The key to this information lay with a range of information specialists embedded in these institutions, whose expertise about their information/knowledge landscape was needed to push the NREN agenda forward.

Collaboration was therefore necessary between NRENs with their technical know-how and ability to deliver on the infrastructure for digital services and HEI librarian communities of practice with their breadth of knowledge about the information space and their institutions.

Originally, the idea was pitched at WACREN 2017 on a PowerPoint slide outlining the major goals of the new initiative (see Figure 2). Three key areas were already emerging and would serve as foundational pillars for the initiative: *infrastructure support*, *capacity-building* and *policy development*.

While the three pillars would come to define the initiative, three other aspects became important to ensure the delivery of it. The first was a vision of *Open Science* as an ideal future for research and education in Africa. After all, with little reliable built infrastructure for research and education in Africa, the idea of 'leapfrogging' to a more advanced future for these services was enticing.

The second was that this could not be achieved without *collaboration*. The research and education infrastructure would be built around information and communication technology (ICT) networks at national, regional and community levels, but the efforts to deliver and sustain services would be built around communities finding ways to collaborate with each other.

The third aspect was *research*, where 'research', in this case meant amassing enough evidence and input from the community to identify the specific needs to support them. The original LIBSENSE objectives highlighted these points (see Figure 3).

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[11] The TANDEM roadmap can be accessed at: https://www.tandem-wacren.eu/wp-content/uploads/2018/01/D3.4-WACREN-roadmap-recommendations-FINAL.pdf

LIBSENSE- **Lib**rary **S**upport for **e**mbedding **N**REN **s**ervices and **e**-Infrastructure

- Formal program and research agenda to develop sustainable institutional support for HE librarians to play a central role in NRENs
  - Build capacity to support Open Science
  - Bootstrap establishment of NREN Identity Federations by integrating into content acquisition strategies
  - Tracking research outputs, populating repositories and improving researcher visibility
  - Promoting National, Regional and Global Collaborations
  - Assess the feasibility of the adoption of a regional harvester
  - Undertake training in the area of repository management and support updating repository platforms in WACREN
  - Act as institutional focal points in a network of communication and collaboration
- On-going study in collaboration with University of Sheffield and AULNU to understand challenges and enablers.
  - Survey validation in #WACREN2017 and Extended to all members of WACREN
  - RITER is interface for francophone translation and management

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Figure 2. LIBSENSE pitch at WACREN 2017

To achieve this vision, collaboration had to happen at different levels. The core foundational team represented the first level of collaboration: the pillars of *infrastructure support* (WACREN/COAR), *capacity-building* (WACREN/EIFL), *policy development* (WACREN/EIFL/COAR), with *research* (WACREN/TUoS Information School) supporting them.

The second level of collaboration was related to the key communities of practice involved in building and sustaining open systems, like the development, deployment and uptake of OAR platforms in HEI libraries in Africa. Figure 4 depicts these communities as the core foundational team understood them at that time. These were: NRENs, HEI Librarian Communities (e.g. library associations or consortia) and Content Providers.

These three key groups needed to collaborate in order to build, deploy and maintain the e-infrastructures to support institutional repositories, especially those that would come to support open access.

The repository could be viewed as a collaborative output combining the expertise of the three groups: NRENs, HEI librarian communities and content providers.

NRENs would contribute with their technical expertise on how to support research and education infrastructure development and maintenance from initial conception of architectural components through to compiling the technological elements that are needed for the construction of these architectures and providing the technical expertise to maintain them. HEI librarians would contribute through their

<table>
<tr><td>LIBSENSE original objectives:
•   to identify and address the institutional enablers and barriers to librarians taking on new roles as higher education environments adapt to external pressures, digitalisation, open source/data/access, new forms of information management etc.
•   to develop expertise and build capacity for Open Science, Open Innovation and Open Data in African education through a network and community of practice, offering local support and advice to the research community as well as providing sustainable infrastructure and services such as repositories and local open access journals.
•   to federate these communities and infrastructures in national, regional and global collaborations for pervasive adoption of policies, services and infrastructures.</td></tr>
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Figure 3. Initial vision for LIBSENSE through a set of objectives around open services and integration at national, regional and community levels.
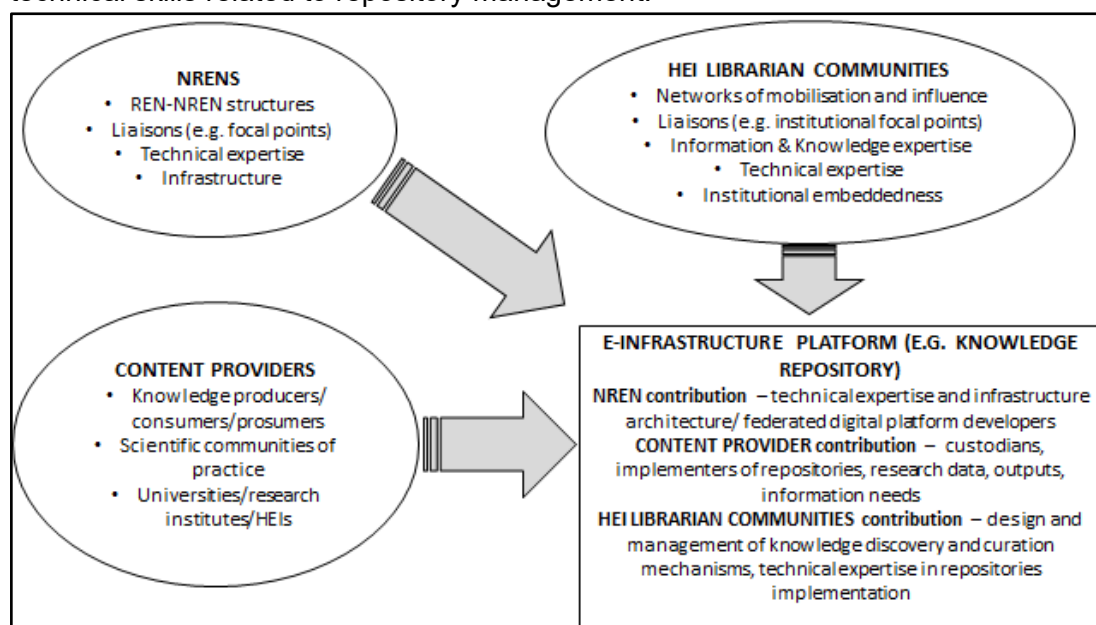
understanding of how to design and maintain information/knowledge repositories, how to curate knowledge assets and in general, how to manage the whole cycle of the creation, use, archiving and disposal of information/knowledge. Some may also possess specific technical skills related to repository management.

Figure 4. The three communities of practice needed to contribute to the development of e-Infrastructures to support research and education in HEIs

It was thought that librarian communities, especially those who were already organised into consortia and associations, could leverage their collective influence and mobilise their networks to support further advocacy for e-infrastructure development in their HEIs. Their institutional role was seen as being focal since they were embedded within their institutional structures and central to the support for information and knowledge assets.

Finally, content providers would comprise the wider research/academic community in HEIs, particularly early career researchers such as PhD and Masters students, whose dissertations and theses currently comprise a major component of these repositories. Content providers would be the key user community both producing and consuming digital content. Each user community would be embedded within a particular research area, e.g. computer science, health or agriculture.

What worked well in LIBSENSE

LIBSENSE was not built according to a specific framework or plan. It emerged from grassroots efforts of those involved, especially the core foundational team. Some of the aspects we felt worked well to build momentum and garner interest are outlined in this section.

Tangible outputs and actionable results

While the TANDEM project had been very successful in obtaining NREN service needs from research and education practitioners, the information community had been left out. Some initial conversations with HEI librarians in 2016/2017 suggested that they had issues with information management capability and capacity for initiating new projects requiring significant digital technical proficiency, like open access/open science. Therefore, one of the first LIBSENSE activities was to initiate their own research agenda around librarians' information management capabilities and the institutional support to enable these.

With funding from AfricaConnect2[12], the research agenda evolved into a pan-African survey of the information management capabilities of HEI librarians in the three regions serviced by the three regional research and education networks (RRENs), Ubuntunet Alliance (UA), WACREN and Arab States Research and Education Network (ASREN). The 3-region survey combined with three LIBSENSE workshops were co-located with three RREN conferences in 2018 and 2019[13]. The surveys were disseminated and discussed at the workshops and focus group discussions were also held. A report was later released presenting the results of this research to the LIBSENSE community[14].

Each LIBSENSE workshop was therefore preceded by a data gathering exercise from librarian participants from that region[15] about their perceptions of their information management capabilities especially in relation to OAR development and maintenance and relevant institutional support. The results were analysed and put into context for each region, highlighting issues specific to that region as reported by the participants. The format of gathering data, discussing those results and using this as a launch pad for further discussion on policy, roadmaps, frameworks and infrastructure to support repository

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[12] See more about Africaconnect2 at: https://www.africaconnect2.net/Pages/Home.aspx
[13] Links for the workshop websites can be found here:
https://spaces.wacren.net/display/LIBSENSE/Workshops
[14] The publication can be found online as: Pamela Abbott, Kokui Appiah, & Omo Oaiya. (2020, June 8). *Barriers and Enablers to Open Access Repository (OAR) Development and Management in African HLIs: Research from the LIBSENSE OAR Workshops in the UA, WACREN and ASREN Regions.* Zenodo. https://doi.org/10.5281/zenodo.3884974
[15] Survey documents can be accessed here: https://spaces.wacren.net/display/LIBSENSE/Survey

development seemed to provide an appropriate mix for bringing NREN and Library participants together focusing on topics of mutual interest.

Out of each workshop came written reports documenting these decisions, frameworks and roadmaps for future repository development within an NREN-Librarian consortium collaboration. A Wiki[16] was created to store this information and provide access for related workshops and other activities at the REN level. Additionally, the REN conferences where the workshops were co-located featured topics on open science/open access and librarian initiatives publicised through dedicated conference tracks and papers[17].

From these discussions and the results of the pan-African survey, new programmes were put forward to AfricaConnect3[18] to continue a new suite of LIBSENSE activities concentrating on its three pillars: infrastructure support, capacity building, and policy development[19].

The research agenda's emphasis would continue to focus on open science/open access while tangible sub-projects would evolve around specific initiatives at a country/institutional level, e.g. open access publishing, digital skills profiles development, national open science policy development. The format of workshops co-located with REN conferences would continue, but due to the necessity of moving conferences online, webinars are now a key delivery platform for LIBSENSE targeted workshops.

Building a sense of community

A major outcome of this initiative has been the creation of a pan-African community of practice around HEI librarians and Open Access/Open Science capacity-building.

Community-building gradually took place over the course of the growth of this initiative. At the beginning, once the TANDEM and Sci-GaIA projects were ending, meetings were being held to enable librarians to become IFPs to carry on the advocacy work. These meetings involved library associations within some West African countries. The idea of moving beyond the country focus to a more regional view had not yet been thought through.

Further community-building of a more regional nature was undertaken with the introduction of a simple tool - an online email "listserv", i.e., an email list to which HEI librarians could connect. WACREN began this listserv by enrolling librarians from the West African region.

One thread of discussion in this email list was the launching of a pilot survey based on the feedback from those country-level meetings with librarian associations. The key issue was that there was a problem with information management capabilities as reported by these

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[16] This wiki holds a repository of LIBSENSE outputs from its inception: https://spaces.wacren.net/display/LIBSENSE

[17] An example of a report on a collocated LIBSENSE workshop at WACREN 2019: https://www.wacren.net/en/news/report-libsense-repository-workshop-ii#:~:text=The%20second%20LIBSENSE%20workshop%20took,and%20the%20NII%20in%20Japan

[18] For more information about AfricaConnect3 see: https://africaconnect3.net/

[19] See the planned activities for LIBSENSE under AC3 here: https://spaces.wacren.net/display/LIBSENSE/LIBSENSE+in+AfricaConnect3

librarians, but it was not clear what those problems were, hence some kind of investigation was merited.

Members of the online listserv were asked questions about what they wanted to investigate about their information management capabilities. From this initial work, a draft pilot survey emerged. The first LIBSENSE workshop at WACREN 2017[20] was then used to test out and improve upon the pilot survey.

The discussions at this workshop showed already that there were different problems facing librarians in their different institutions and country contexts. Francophone and Anglophone participants were present and librarians from different levels of their institutions, each articulating a different set of issues from their standpoints. A few more iterations of the pilot survey were tested and then it was launched in the summer of 2017. This initial pilot confirmed what was until then just anecdotal and the findings were presented at UA conference 2017[21].

The pilot was also successful in laying the foundation for the wider research agenda for LIBSENSE. The listserv email list grew to accommodate more librarians' voices from outside of the West African region and to include other players at a pan-African level, e.g. the Association of African Universities (AAU)[22] and African Library and Information Associations and Institutions (AfLIA)[23].

But still the inclusion in this collaboration of content providers did not really materialise. Each workshop brought the technical NREN participants closer to the librarian communities of practice but the content providers remained a 'shadow' in the background - they were talked about but not present.

Networking - "Bringing everyone into the room"

LIBSENSE has had the advantage of organic growth. There were no real rules for entry into the growing community. Its main asset was access to a pan-African community of HEI librarians with an interest in improving their information management capabilities, digital skills and knowledge of Open Access/Open Science. Any group or organisation that could offer a useful dimension on how the initiative could grow could join and "bring their idea into the room". The core foundational team got involved in this way.

WACREN wanted to build sustainability into the NREN model and empower these organisations to support research and education infrastructure underpinned by some greater vision, e.g. open science. EIFL was interested in building library consortia in the region so that electronic resources could be lobbied for from a position of strength. With the emphasis on open science, EIFL could also leverage its own linkages into the international open science community, e.g. involvement in OpenAIRE and the European Open Science

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[20] The workshop agenda can be found here: https://indico.wacren.net/event/50/
[21] Available online as: Abbott, P. Y., & Oaiya, O. (2017). A Pilot Survey on Institutional Enablers and Barriers Affecting the Evolving Role of Librarians in African Higher Educational Institutions. Contribution ID 60. https://events.ubuntunet.net/event/10/contributions/41/contribution.pdf
[22] For further information see: https://aau.org/
[23] For further information see: https://web.aflia.net/

Cloud[24], therefore they had a view on how this collaboration could work to support and strengthen EIFL's existing involvement in capacity and resource development.

COAR was interested in national-level repository networks in Africa supported by their key focus on next generation technologies. COAR was also part of international networks promoting a view of open and collaborative science that could be brought to bear on the vision developing for African NREN-HEI collaborations in this space.

TUoS Information School was interested in how HEI librarians in the region were coping with ongoing digitalisation of their profession and work practices and saw this collaboration as providing a research agenda for that. As a school of library and information studies with international reach and strong research in open access, digital literacy and ICT4D[25], it was uniquely positioned to help drive the research agenda for LIBSENSE.

Each entity had a perspective and either a key role to play, a product to offer, resources to deploy or some other means by which to input a tangible element, while still achieving their own goals. It was an arrangement similar to a "loose coupling" or a "strength of weak ties"' approach common to many emergent organisations and cooperative networks. And these loose connections continue to develop drawing interest from a variety of actors.

As these actors become part of LIBSENSE, they also leverage their own networks and interests so that new initiatives emerge to strengthen the pillar activities of LIBSENSE. To provide a sense of how this loose coupling works, we present below a diagram (**Error! Reference source not found.**) of the array of network players that at one point or another were part of the initiative and we show how this translates into a set of interrelated activities and projects supporting the broader LIBSENSE goals.

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[24] For further information, see: https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy/open-science/european-open-science-cloud-eosc_en

[25] ICT4D is an emerging academic and practice-based field that studies how ICTs are used to support development outcomes, mainly in developing country contexts
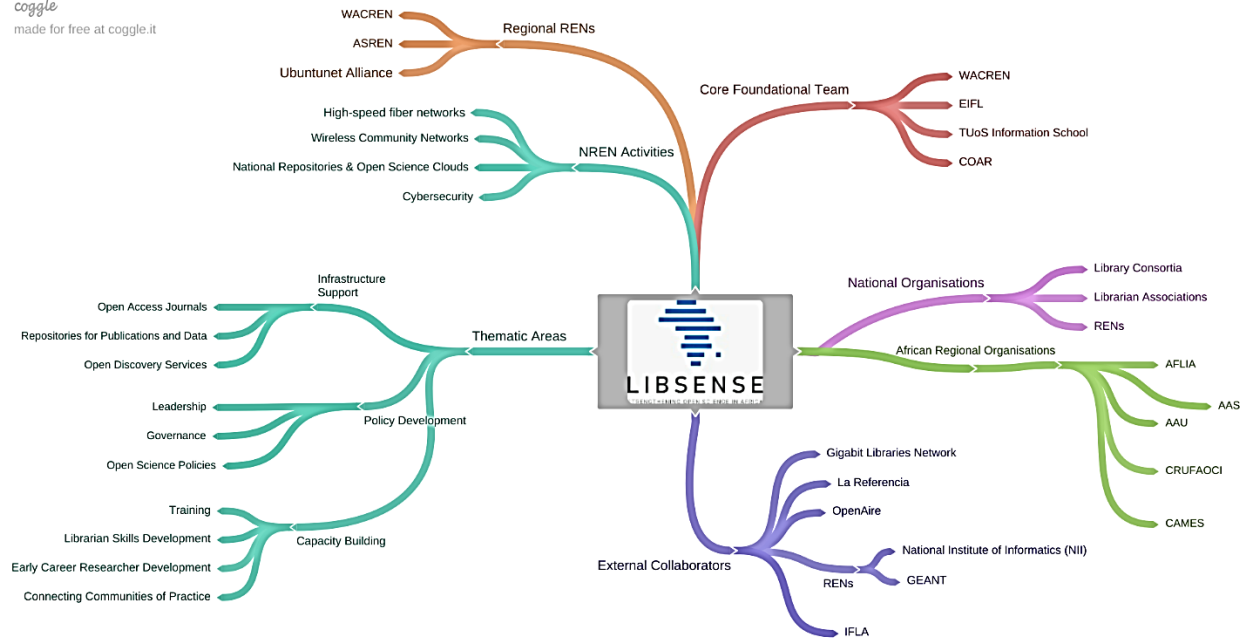
Figure 5. The 'loosely coupled 'network of actors, interests, entities and activities that enable the LIBSENSE goals.

LIBSENSE as a catalyst for other collaborations

Academic libraries in research and education institutions have been and continue to be the focus of current LIBSENSE NREN/Librarian collaboration efforts. With respect to the three pillars: *infrastructure support* has been focused on research and education infrastructure, like OARs, for example; *capacity building* has been focused on digital skills to support these kinds of infrastructure and the attendant services; while *policy development* is now focusing on national open science roadmaps[26]. However, the concept and models that we used to build and sustain this collaboration can be leveraged for other kinds of NREN-Librarian collaborations, for example, those with public libraries.

The overriding vision of the LIBSENSE initiative is to support open science, which is seen as the next level for knowledge production in the Academy. The idea is that with no reliable built infrastructure already in place, the adoption of new infrastructure can be a catalyst for newer services supported by that newer infrastructure. But it does need the concurrent push from the other pillars of capacity building and policy development. African HEIs can potentially 'leapfrog' into this new collaborative open science space. But open science enshrines principles such as the democratisation of knowledge, openness and collaboration and such principles promote the involvement of communities outside of academia in the production of knowledge.

So-called citizen science is an example of this. In response to environmental shocks created by climate change, for example, citizen observatories are becoming another way of gathering data to understand how, at a micro level, these changes are affecting local

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[26] For more information see:
https://spaces.wacren.net/display/LIBSENSE/National+Open+Science+Roadmaps

communities. The area of traditional and indigenous knowledge is also becoming quite pivotal in determining how local traditional practices, for example, those related to agricultural production, can be shared and contribute to sustainable development. There may be a role therefore, we think, for the public library to become involved in these wider visions around democratising knowledge production.

Applying the LIBSENSE model would mean identifying the service needs and institutional supports of public libraries in this space, and then applying the 3 pillars of infrastructure support, capacity building and policy development, supported by a bespoke research agenda and a loosely coupled collaborative network structure similar to what we already use.

We can see this applying, for example, to platforms supporting library hubs[27] integrated through academic/public library connectivity. NRENs could supply the technical know-how to create the supporting infrastructure, while library communities work together to determine what, by whom, and how, knowledge resources are shared and discovered.

Similarly, platforms could be developed to support community networks managing their own library resources[28] and spaces supporting citizen science[29]. Another area for collaboration could be NREN/library collaborations to support digital archive collections related to traditional and indigenous knowledge.

In all these example cases, the notions of open and collaborative networking would still apply and, in a participatory way, public libraries would get to shape the services they think they need. Such an extension of the LIBSENSE initiative would bring, of course, other collaborators and interested entities "into the room".

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[27] For an example, see: https://discover.libraryhub.jisc.ac.uk/
[28] See for example: https://communitylibrariesnetwork.org/
[29] See for example: http://lab.cccb.org/en/citizen-science-and-public-libraries/