



The Africa PID Alliance Initiative

# Title: Africa PID Alliance Digital Object Resolution Concept Note

Physical location  
Africa PID Alliance,  
Faculty of Science and Technology (Chiromo Campus),  
University of Nairobi,  
Kenya  
East Africa

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Co-authors: Joy Owango- [0000-0002-3910-2691](tel:0000-0002-3910-2691), Nabil Ksibi- [0000-0002-6872-7711](tel:0000-0002-6872-7711), Sara Elgeballi [0000-0003-1378-5495](tel:0000-0003-1378-5495)

Reviewers/Advisors: Laurel Haak-[0000-0001-5109-3700](tel:0000-0001-5109-3700) , Zach

Chandler-[0000-0003-2402-9839](tel:0000-0003-2402-9839) ,Christophe Blanchi -[0000-0003-2277-5176](tel:0000-0003-2277-5176)

Contributions by Meoli Kershoda, Mac Anthony Coblah- [0000-0001-9297-5945](tel:0000-0001-9297-5945), Abednego Corleley-[0000-0003-2597-6096](tel:0000-0003-2597-6096), Peggy Obi- Boateng- [0000-0001-9165-0831](tel:0000-0001-9165-0831)

Jonathan Clark ([0000-0001-9551-9662](tel:0000-0001-9551-9662))

## 1. Introduction

Persistent Identifiers are the pillars of an interoperable, persistent and reliable Open Research Infrastructure. This is the reason why a lot of countries/regions and organizations took the initiative to contribute to this network and help promote the use of PIDs through their academic and publishing ecosystems.

The objective of this document is to structure the feasibility, implementation and manageability of the project. A survey on the African continental level will shed light on or provide insights on the need of a DOI Registration Agency tailored to the continental context. One of the innovations that this agency will bring is a specific prefix for Africa that will provide;

Ownership to African researcher over their content,  
Promotion of African content and output in terms of research data, works, publications, patents, etc..



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Preservation of African indigenous knowledge and works and cultural heritage under a dedicated prefix.

This work is an effort towards embracing diversity, equity and inclusion, based on the different needs of the different communities as we know that different communities have different needs. The result of the survey will show the core issues keeping innovators, researchers, authors and indigenous knowledge and cultural heritage managers from registering their content and outputs online. Believing that an African participation to global collection of knowledge is important, TCC Africa and Helix Analytics Africa, that are part of University of Nairobi (Kenya) will help realize the project upon the results of the survey and studies.

## 2. Initiative Objectives and Goals

### Indigenous Knowledge Registration Objective

#### *Securing the Future of Indigenous Knowledge and Cultural Heritage*

Indigenous knowledge and cultural heritage DOI and associated metadata are used to help preserve and protect Indigenous knowledge (an interoperable registry and API) and cultural resources by providing information on their context, meaning, and significance, it can also be used to make these resources more accessible to Indigenous communities, researchers, and the general public.

Creating metadata for Indigenous knowledge resources is a sensitive process that requires engagement with Indigenous knowledge systems and cultural heritage warehouses and other stakeholders (Museums, governments, platforms, studies, societies and representatives from different communities). It's important to ensure that; the digital content and metadata is created together with the Indigenous knowledge communities based on their needs and, created with research institutions and that the information included respects their cultural protocols and intellectual property rights.

As noted from universities globally, patent DOI registration workflow should start from the work inception/abstract of the innovation or project.(from prototype / concept / design)

#### *Provenance in Indigenous Knowledge and cultural heritage*

Indigenous Knowledge metadata refers to information that describes Indigenous Knowledge Resources, such as *traditional stories, songs, dances, medicinal practices, and other cultural*



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*heritages*. This information can include details such as the *language, origin, creator, and context* of the resource, as well as any *rights and permissions* associated with it. The metadata can also include information on the *resource's format*, such as whether it is a *text, audio recording, or video*.

### Patent Registration Objective

*(Patent Information) Help scientists and inventors to commercialize their research and innovations.*

Patent metadata refers to information that describes patents, such as their *title, inventor(s), assignee(s), application and grant dates, and classification codes*. This information can be used to identify and retrieve patents, as well as to understand the context and significance of a patent. Patent metadata can also include information on the legal status of a patent, such as whether it has been granted, is pending, or has expired.

Patent metadata can be used by patent offices, businesses, researchers, and the general public to search and retrieve patents, conduct prior art searches, and analyze patent data. It can also be used to identify trends and patterns in patenting activity, such as changes in the number of patents granted in a particular field or the countries with the highest number of patents.

Patent metadata is typically generated by patent offices and made available through public patent databases, such as the USPTO's (United States Patent and Trademark Office) and EPO's (European Patent Office) databases, and in the case of Africa ARIPO (African Regional Intellectual Property Organization). The metadata is often in the form of text files or structured data, and can be searched and analyzed using specialized software.

A Patent DOI (Digital Object Identifier) is a unique and permanent identifier assigned to a patent by a DOI registration agency. Like other types of DOI, it provides a way to identify and retrieve a patent, as well as to understand the context and significance of the patent. A Patent DOI can be used to link to the full-text of a patent, its metadata, and to other relevant information such as legal status, ownership, and citation.

A Patent DOI is a string of numbers and letters that begins with "10.", followed by the DOI registration agency's prefix, and ending with a unique identifier for the patent. For example, a Patent DOI might look like "10.1234/5678".

Patent DOIs can be assigned by DOI registration agencies that are authorized by the relevant patent office. They are typically assigned to patents at the time of grant. Assigning DOIs to patents makes it easier to find and access patents, especially in instances when the patent numbers or the patent office's databases are difficult to navigate.



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It's worth noting that not all patents have DOI assigned, and not all patent offices have the capability to assign DOI to patents, as it depends on the office's capability and their agreement with the DOI registration agencies.

Patent metadata and DOIs will also help with international discoverability in comparison to siloed infrastructures with varied degrees of access to knowledge and different data models.

### Why registering patent and indigenous knowledge metadata content with DOIs?

Digital registration of content demands a reliable infrastructure and technology in place in order to secure and operate on a sustainable basis. There are several ways to persistently register contents online, some are very advanced and still at experimental stages as per the DIDs. Some are not very much popular, not FAIRly accessible or not persistent.

The choice of DOIs registration for patents, indigenous knowledge and cultural heritage metadata is relatively linked to a standard that is adopted by the global community of researchers as well as innovators and contributors.

DOIs are resolved based on the global [handle.net network](https://www.handle.net/) which is maintained by the [DONA Foundation](https://doi.org/).

As per DOI Foundation: "Actually most (but not all) DOIs are resolved through the dedicated DOI proxy infrastructure that the DOI Foundation maintains. This is an implementation of the handle resolution service but not the same as handle.net. For reasons of interoperability all DOI names will resolve using the handle proxy (<http://hdl.handle.net/>) and all handles will resolve using the DOI proxy (<http://doi.org/>)"

## Initiative goals

Goal 1: Identify stakeholders to target

Goal 2: Survey and Engage

Goal 3: Community building and design with purpose

Goal 4: Identify metadata standards relevant to each field to be used in registration of DOIs

Goal 5: Identify primary targets for registrations and register a number of items



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Goal 6: Build a database where the DOIs information can be readily available and discoverable

Goal 7: Train cohorts to register and build their resource

Goal 8: Expand types of items to be registered (e.g. starting with paintings/pictures, expired patents or upcoming ones)

### 3. Initiative Phases

#### Phase 1: Community Engagement

(Goals 1, 2 and 3) To make sure that what we are proposing is desirable by the community. A survey and a series of interviews to collect the community 'sentiments' are necessary to understand the feasibility of the initiative. Due to the sensitivities in African culture towards colonial and western attitudes on the appropriation of African knowledge and resources, this is of the utmost importance in African culture.

##### I. Identifying Stakeholders and benefiting communities

The aim is to target audiences from small to big organizations and communities, mature services and startups, individual researchers (from different career stages). Proposed primary stakeholders who will be recipients service are:

#### [APA Community Engagement Strategy](#)

##### **Patent DOI Registration**

With but not exclusive to:

WIPO - ARIPO

Industry & Innovation Centres

Universities and Research Institutions

Patent and Trademark Offices



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### **IK DOI Registration**

With but not exclusive to:

Local and global IK gov agencies

Local contexts

National Endowment for the Humanities (NEH)

Collection systems and harvesting platforms (example NIKSO)

Local Communities (when possible) through relevant IKS

### **Cultural Heritage DOI Registration**

With but not exclusive to:

Museums and conservation institutes

Archeology sites

Government institutes

### **General African Research Output**

With but not exclusive to:

Directors of Research and Library Sciences, Information Specialists

Regional and National University Commissions

Regional Higher Education regulators

Purpose of the survey:

This survey is an effort towards working with the community to acquire ownership to the African context, address fears and misconceptions, design the project with inclusion and respect, as well as raise awareness of the FAIR and Open research practices, highlighting the benefits of each, and devise strategies that are in line with and benefiting the African community. Thus we try to underline the most important aspects to consider to reply to the African community needs for a FAIR\* research output and innovation content registration. Then a need for a number of interviews.

Survey questions:

1. Do you know what is a Persistent Identifier? [Wiki Définition](#)
2. Are you or your institution assigning DOIs for research output and scientific content online?
3. When you look at the research lifecycle, what do you think should be registered and FAIRly accessible :
  - a. Data
  - b. Publications (Primary and Grey Literature)



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- c. Clinical Trials
  - d. Indigenous Knowledge (heritage, culture)
  - e. Patent Information
  - f. Research tools and instrumentation,
  - g. Protocols,
  - h. Individual researchers (ORCID),
  - i. Software (GH->Zenodo),
  - j. Reagents and biological entities,
  - k. Data management plans
  - l. All of the above without exception
  - m. Please add more
4. What would be the aspects to consider for you to register your/your institutions content and research data output online? (e.g: Local language, reliable platform, fee, etc..) Registering this content in Africa means something to you?
  5. Who should we interview to know how persistent identifiers are used in your community?
  6. What type of Digital Object suffix would be favorable to use (Alphanumeric or Numeric)
  7. Do you think Africa is ready and equally capable of hosting a Digital Object Identifier Agency ?

→ The survey will help understand not only the community needs but also to get more clarity on the feasibility in the timeframe available for the project.

*(20 days and we collect the results)*

Results are in format of graphic illustrations and pourcentages.

## II. Series of Interviews

To strengthen the application of the project, a series of interviews would be useful to understand how the leading community in Africa would appreciate the idea.

- PID providers
- Experts in sustainability and research information infrastructures
- Funders and Policy makers



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### Phase 2: Active Planning

#### I. Community building and design with purpose

##### A. Acquiring the community green light

The results of the survey and the interviews will reveal the next steps to realize the project.

- Collecting the result survey: TCC Africa will work closely with the continental partners to widely spread the survey. The aim is to have at least 100 responses.
- Preparing the next step: TCC Africa with the support of Helix Analytics Africa will analyze the results of this outreach and provide a report on the existing need for the initiative.
- The following are confirmed foundation partners :

##### **Africa**

- Africa Academy of Sciences
- Association of African Universities
- Kenya Education Network
- African Library and Information Associations and Institutions
- African Open Science Platform

Also part of the community:

- African Regional Intellectual Property Organization (ARIPO)
- Association of African Universities

Identified Global North Partners:

- ORCID
- CNRI
- Dona Foundation
- WIPO
- DOI Foundation
- Datacite
- Crossref
- The Lens
- Collection Trust
- Local Context
- RDO

##### B. Focus groups





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The initiative's co-leaders will work with representatives from the community who should be expert advisors on the best practices to launch the project.

There are also additional surveys during the Focus Groups meetings in order to narrow down the guidelines and the roadmap for the project.

A series of meetings organized online should help gather insights and guidance on the feasibility of the next steps as well as promoting and supporting the project's vision.

### Target candidates

*Other RA agencies*

*Member from the Indigenous Knowledge Community*

*Data Scientist*

*Funder(s)*

*Systems Vendor*

*Universities universities associations representatives*

*Library community representatives*

*Researchers*

*Indigenous Knowledge resources authors*

*Patent and IP agencies*

### C. Working Groups

The Working Groups will be divided into "Product Working Group" and "Solution Working Group". Both groups will take the technical requirements and the product roadmap and realize the implementation.

The objective of the focus and working groups is to propose relevant approaches and methods to goals 3, 4, 5 and 6.

## II. Identify metadata standards relevant to each field to be used in registration of DOIs

### A. Indigenous Knowledge and Cultural Heritage Metadata

As mentioned in the beginning of this document, Indigenous Knowledge metadata refers to information that describes Indigenous Knowledge Resources, such as *traditional stories, songs, dances, medicinal practices, and other cultural heritages*.



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This information can include details such:

- *language,*
- *origin,*
- *creator,*
- *context of the resource,*
- *rights and permissions*

The metadata can also include information on the *resource's* format, such as whether it is a *text, audio recording, or video.*

PID Group 15 annual meeting (<https://zenodo.org/record/3751555#.Y-ZPKOxBxQI>)

### B. Patent Metadata

Patent metadata refers to information that describes patents, such as:

- *title,*
- *inventor(s)*
- *assignee(s)*
- *application*
- *grant dates*
- *classification codes*

This information can be used to identify and retrieve patents, as well as to understand the context and significance of a patent. Patent metadata can also include information on the legal status of a patent, such as whether it has been granted, is pending, or has expired.

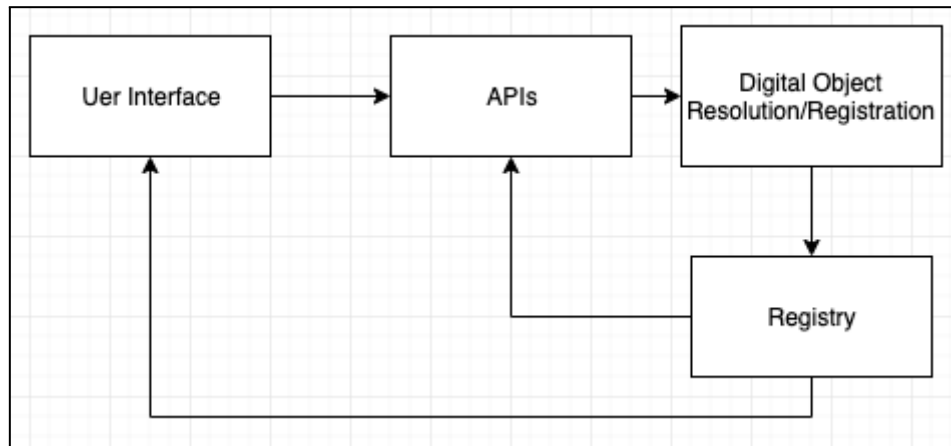
### C. Architecture

The idea is to start with a minimum system in place to resolve the first 10000 DOIs then scale accordingly.

After consultation with DONA Foundation, the most cost effective architecture might be to register the prefixes with [CNRI](#) , use CORDRA to manage the digital object and call for DOI Foundation services.



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Resolution Framework

Platform components:

- User Interface
- Registry
- APIs
- Identifier resolver
- Server Space (Cloud/Backup)

D. Build a database where the DOIs information can be readily available and discoverable

### Building blocks

1. Design the identifier resolver and choosing the [suffix](#)
  - a. Application architecture and system requirements (Included in the Technical roadmap drafted by the Working Groups)
  - b. Prefix choice:
    - Africa prefix (Under discussion- AfriDOI?)
    - Patent prefix patent metadata example: (<https://texashistory.unt.edu/ark:/67531/metaph165032/metadata/>)
    - Indigenous knowledge and cultural heritage metadata and prefix choice
2. (NodeJs or Python) Application Development  
+Github Repository, website and DOI metadata Schema
3. API Structure and Endpoints Design
4. Functionality implementation for creating and managing a DOI using a DOI registration agency or open sources libraries.



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5. Testing Phase: The API should be tested thoroughly to ensure it is functioning as intended.
6. Deploy the API to a server or hosting service:
7. Provide documentation and API usage instructions to make it easy for others to use.
8. Website development (Part of product roadmap)

### E. Securing data and server

KENET as a governmental agency will provide a guarantee that servers are healthy and 100% protected from any eventual intrusion or disfunction. KENET to provide certification of data security.

### F. Organizational Model & Roadmaps Framework

The organizational working model will be starting with; part time, volunteering and task based employment to reach an hybrid model including function based jobs (community building/management, operations, product, tech, support, etc..) + continue purpose driven initiatives as per; bootcamps, scholarly projects, inter-university collaboration projects, workshops, etc..

The community uptake and outreach, as well as initial founding partners and funders should help define/approve the relevant sustainability plan

#### ❖ [Communications Strategy](#)

TCC Africa and Helix Analytics will lead the communication efforts on the following major phases:

1. Draft and put together the AFRICA PID ALLIANCE 'entity'. Logo, reason for existence, objective and vision.  
Definition: AFRICA PID ALLIANCE is a community of PIDs enthusiasts in and from Africa aiming to lead and realize a FAIR sharing of access and data through the use of Persistent Identifiers in innovation, research and technologies in the cultural, scientific and research ecosystems. *Digitizing patents metadata persistently & Securing the future of African and cultural heritage Knowledge Digitization through provision of PIDs*
2. Share the survey with the vastest continental network possible, including (AAU, AAS, AFLIA, AJOL, LIBSENSE, Forbib TN, KLISC, Bibliothèque virtuelle Côte D'ivoire, .. )
3. Plan the series of interviews.
4. Helix Analytics Africa to consolidate the results of the survey and prepare a report.
5. Share publicly the survey and interviews results and findings.



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### ❖ Product Roadmap

#### 1) Product offering 1st phase October [2023]

Target: An infrastructure for a room to register 200,000 DOIs (*scalable*)  
Registry, APIs and User Interface.

Website (under development with Helix Analytics Africa): An accessible website should be in place showing the registration service, partners, stats, documentation, annual report, and contact details. (*scalable*). Language selection top 20 African languages (possible use of the googlebot).

#### 2) Link the registry system with ORCID DataCite ,ROR ,Crossref, and get the necessary access from the DOI Foundation. (Under agreement arrangements with Datacite and Crossref)

### ❖ Resource Mobilization Roadmap

- *Program Coordinator*
- *Comms Person (Prepare the logo, Distribute the Survey, and contact interviewers, consolidate and share the results and news via social media and with partners and collaborators)*
- *Legal and data protection contributor (Louise Bezuidenhout )*
- *Developer(s)*
- *Data Architect*
- *Metadata Specialist*
- *Advisory Board:*  
*Potential Invite the following:*
- **Open Science Infrastructure ,PIDS & Open Data**
  1. *Laure Haak*
  2. *Zach Chandler*
  3. *Meoli Kershoda*
  4. *Sara Elgebali*
  5. *Christophe Blanchi*
  6. *Dr. Caleb Kibet*



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### **Indigenous Knowledge & Cultural Heritage**

7. [Mr. Joseph Padfield](#)
8. [Mr. Kevin Gosling](#)
9. [Ameenah Gurib-Fakim](#)
10. [Anyse Pereira Essoh, PhD](#)
11. [Dr Peggy Oti-Boateng](#)

### **Patent Data Advisor**

12. [Dr.Fred Omukubi Otswong'o](#)
13. [Patrick Ogola](#)

### ❖ [Financial Roadmap](#)

### ❖ Infrastructure Roadmap

#### [Draft Infrastructure Roadmap](#)

(Follow up final implementation will be written in collaboration with the product focus group team members)

#### [CORDA Handles Resolution](#)

##### [Corporation for National Research Initiatives \(CNRI\)](#)

**Role: Provide guidance and knowledge to best implement the handles resolver**

##### [Digital Object Identifier Foundation](#)

**Role: provide services to register handles to DOIs**

##### [Amazon EC2/Google Cloud](#)

**Role: Backup storage**

##### [Kenya Education Network \(KENET\)](#)

**Role: Provide primary servers and storage infrastructure**

### G. Legal Framework



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- a. Legal registration of the entity and representation

Obtaining necessary legal and regulatory approvals, such as registering the agency as a business entity (or under the umbrella of a business entity), and obtaining any necessary licenses.

Local hosting in Kenya and implications: (..)

- b. Data protection impact and assessments

The Kenyan Data protection act

([http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/2019/TheDataProtectionAct\\_No24of2019.pdf](http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/2019/TheDataProtectionAct_No24of2019.pdf))

- c. Continental engagement and the different data protection acts to consider (e.g POPIA South Africa)
- d. Patterns conventions and regulation  
PCT: Patent Cooperation Treaty
- e. Indigenous knowledge conventions and acts  
[CARE principles implementation](#)  
Protection, Promotion, Development and Management of Indigenous Knowledge Act South Africa ([link](#)) and establishment of NIKSO

## Phase 3: Launch of a Registration Entity

*Goal 7: Train cohorts to register and build their resource*

*Goal 8: Expand types of items to be registered (e.g. starting with paintings/pictures, expired patents or upcoming ones)*



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### Sustainability Vision

Sustainability is key and in this context is very much linked to some common global community sustainability goals as per the UN SDGs, as the registration of the indigenous knowledge content and metadata is very much linked to what people and communities can produce in terms of sustainability models. The general observation of the indigenous knowledge collections are not representative of the full picture. Working with Esperx and community leaders and research groups on the long term is a guarantee to link this knowledge to the wide open research global network.

#### Sustainability Game Plan

One aspect to keep the initiative sustainable is to digitize the indigenous sustainable systems and practices and connect different cultures and data about cultures with each other to create a dynamic community to digitize this content widely.

As a reference to how this initiative is supporting realizing the UN SDGs is the fact that, it is notable that enhancing the education and scholarly infrastructure in different parts of the LIC and LMIC countries is helping bringing open, equal and innovant infrastructure for the communities in need of reliability on the digital world. (4, 9, 10, 16, 17)



Align with the global community of PIDs providers on the latest acts, regulations, certifications, technologies and conventions to strengthen engagement with the community.

Setup/acquire a user support system at the image of the continent and following international service standards.

Adopt a similar model for other research outputs e.g. biosamples. Training, community building and raising awareness. Onboarding more institutes and organizations.





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