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Influence of Indigenous data governance principles on Indigenous knowledge management: Lessons from the Southern African Intangible Cultural Heritage Project

Josiline Chigwada
School of Interdisciplinary Research and Graduate Studies, University of South Africa, South Africa

Jacob Mapara
Southern African Intangible Cultural Heritage Project, Chinhoyi University of Technology, Zimbabwe

Patrick Ngulube
School of Interdisciplinary Research and Graduate Studies, University of South Africa, South Africa

Tavhiringwa Chabvutagondo
Southern African Intangible Cultural Heritage Project, Chinhoyi University of Technology, Zimbabwe

Abstract
The study investigates the impact of Indigenous data governance principles on managing Indigenous knowledge. Indigenous communities possess rich knowledge systems that are crucial for sustainable development and community well-being. However, managing this knowledge faces challenges, including inadequate data governance frameworks that fail to align with Indigenous values, protocols and ownership rights. This research explores how integrating Indigenous data governance principles into knowledge management practices enhances cultural autonomy, strengthens community resilience and fosters sustainable development. Drawing on a qualitative methodology including web content analysis, document analysis and personal experiences, a case study of the Southern African Intangible Cultural Heritage Project was carried out. The data was analysed using qualitative content analysis. The FAIR (findable, accessible, interoperable, reusable) and CARE (collective benefit, authority to control, responsibility, ethics) principles were utilized as the guiding data governance principles. The findings highlight the importance of culturally sensitive data protocols, community-driven decision-making processes, and reciprocal partnerships between Indigenous communities and database managers. This research offers insights into transformative approaches for advancing Indigenous knowledge sovereignty.

Keywords
CARE principles, cultural heritage, FAIR principles, Indigenous knowledge, SAICH Project, Southern African Intangible Cultural Heritage

Introduction

In the era of digital transformation and the open science movement, the discourse surrounding data governance has evolved into a pivotal concern across various domains (Abraham et al., 2019). However, within the broader framework of data

Corresponding author:
Josiline Chigwada, School of Interdisciplinary Research and Graduate Studies, University of South Africa, 1 Preller Steet, Pretoria, Gauteng 0002, South Africa.
Email: chigwaj@unisa.ac.za

governance, the intersection with Indigenous knowledge (IK) management unveils a distinct and intricate landscape (Ngulube, 2023). Indigenous communities around the globe have long been stewards of invaluable traditional knowledge systems, deeply intertwined with their cultural identities, sustainable practices and spiritual beliefs (Carroll et al., 2020; Mdhluli et al., 2021). The introduction of digital technologies and data systems has resulted in both opportunities and challenges for the preservation, management and leveraging of IK (Carroll et al., 2019). At the heart of this dynamic lies a fundamental question: How do Indigenous data governance principles influence IK management? This study was undertaken to explore the relationship between Indigenous data governance principles and IK management. The study has significant implications in the areas of cultural preservation, data sovereignty, policy development and community empowerment (Giliberto and Labadi, 2021). By aligning data governance with Indigenous data governance principles, the study can help ensure that IK systems are preserved in a way that is culturally sensitive and respectful (Chigwada and Ngulube, 2024). This alignment can protect the integrity and authenticity of IK as it is managed and shared. In addition, Indigenous communities can gain greater control over how their data and knowledge are used and shared, which is crucial for maintaining sovereignty (Zhang et al., 2023). This control can prevent misuse and misrepresentation of IK by external parties. It is against this background that the study aims to:

1. Examine the implementation of Indigenous data governance principles in the operation of the Southern African Intangible Cultural Heritage (SAICH) Project.
2. Identify the challenges encountered in implementing Indigenous data governance principles within the SAICH Project.
3. Document best practices and lessons learned from the implementation of Indigenous data governance principles within the SAICH Project.

The SAICH Project

The SAICH Project was created in 2015. Through the utilization of open-source digital development tools and technologies, the SAICH information and communications technology team created a digital database of elements. The database was designed with the server configuration running on LAMP-Linux (OS), Apache (server) and MySQL (database), and using the following technologies: Hypertext Preprocessor (Php), Hypertext Markup (HTM), Cascading Style Sheets (CSS) and JavaScript. The database consists of seven subregional databases, each representing a member state (Botswana, Eswatini, Lesotho, Malawi, Namibia, Zambia and Zimbabwe). Each database contains elements that have been entered by an appointed person in the member state. The elements within each database are categorized according to their provinces and districts of origin. The database allows the entering of the element's name, title and description. The overall output of the work is a database that contains all the recorded elements and can be accessed online via a host website.

The project's focus was on strengthening subregional cooperation and national capacities in seven Southern African countries for implementing the 2003 Convention for the Safeguarding of Intangible Cultural Heritage, and was funded by the Government of Flanders, Belgium, through the UNESCO Regional Office for Southern Africa (Chimhundu, 2019a; UNESCO, 2014). The operational framework for the SAICH Project is the 2003 Convention for the Safeguarding of Intangible Cultural Heritage (UNESCO, 2022). In line with the convention's objectives, countries under the UNESCO Regional Office for Southern Africa cooperated in intangible cultural heritage (ICH) safeguarding and capacity-building. The work that the SAICH Project undertook was a continuation of activities that had been carried out in phases since 2010. A reason for creating the SAICH Project was also because there was a general feeling that a higher education institution with appropriate technical capabilities should take over the burden of coordination and provide much-needed secretariat and technical support. The result was that Chinhoyi University of Technology in Zimbabwe became the host institution (Chimhundu, 2019c). This project was wound up in 2019.

When the SAICH Project was set up, the objectives were to:

- Strengthen subregional cooperation and national capacities in the seven Southern African countries for implementing the 2003 Convention for the Safeguarding of Intangible Cultural Heritage.
- Coordinate training workshops to ensure that the critical mass for ICH activities in the region was maintained and built further.
- Provide quality secretariat services for the project and coordinate the ICH safeguarding

activities of the seven participating countries during and beyond the life of the project.
- Provide a forum for discussion and exchange of information on the ICH inventory-making processes of the subregions and other issues related to culture and the arts.
- Promote exchange activities and partnerships between the seven participating countries within the Southern Africa region and beyond.
- Provide opportunities for practitioners and researchers to connect both with the arts and culture sector in their own country and with their peers in sister institutions in the other participating countries, and vice versa.
- Create opportunities for the exchange and sharing of ideas on safeguarding activities and encourage networking through new media (Chimhundu, 2019b).

These objectives were achieved. It is also worth noting that during the first phase of the project (2016–2017), the technical team at Chinhoyi University of Technology developed an interactive website and a database of ICH information within the subregion, which serves as a collective resource for the member states, as well as for humanity (SAICH, 2024b). This was a huge accomplishment, which speaks to some of the objectives of the project, including supporting communities in their inventorying activities.

Another milestone was that, in 2018, the SAICH Project's coordination team successfully concluded a rigorous survey of ICH in tertiary education institutions in Southern Africa (Chimhundu, 2019a). This study, which covered eight countries, mapped ICH-related education programmes and identified opportunities and interests in developing ICH-related programmes. In addition, it explored the viability of founding a network of universities in the Southern Africa region to deepen discourse and engagement around ICH in the academic world. The findings were validated at a workshop in Harare. Out of the same workshop came an agreement to establish an ICH network of tertiary institutions in the region – the Southern Africa Intangible Cultural Heritage Academic Network (Magomelo, 2019) – which hosted its first conference in 2020.

The SAICH Project contributed to the joint nomination of *mbira/sansi*, which involved Malawi and Zimbabwe. This instrument was inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity at the International Committee Meeting of the Intangible Cultural Heritage in 2020 (Chimhundu, 2019a). The years 2018–2019 saw the execution of a new phase in the UNESCO–Flanders project titled 'Strengthening subregional cooperation and national capacities in seven Southern African countries for implementing the 2003 Convention for the Safeguarding of Intangible Cultural Heritage' (Chimhundu, 2019c). The two main drivers of the new phase of the project were to:

- Build a strong ICH technical hub with a vibrant and interactive project for ICH information dissemination, sharing and dialogue.
- Domesticate the 2003 ICH convention through translation into local languages and the production of awareness-raising materials in both print and audiovisual formats.

The objectives of this phase were met, and a book with the 2003 ICH convention translated into 10 languages was published (Mapara and Chimhundu, 2019). A technical hub was also established, and its database contains elements that were inventoried in the seven participating countries (SAICH, 2024a). Collectively, these countries own the ICH elements that are deposited in the project's database. Each country owns the rights over its elements, and to access and use them, one must obtain permission from the concerned state through an appointed person, who liaises with the ministry responsible. The new phase of the project ran from November 2018 to August 2019. Despite the end of funding from the Government of Flanders, the activities of the SAICH Project have somehow continued and are sustained through the Southern African Intangible Cultural Heritage Academic Network. The idea behind the Network is to ensure that the legacy of the SAICH Project is sustained through academic activities, where inventorying becomes part of the research agenda of institutions of higher education.

IK and the FAIR principles

IK management involves preserving, protecting and disseminating IK (Mdhluli et al., 2021). This knowledge is transmitted through stories, ceremonies and practices rather than written texts, and encompasses cultural, environmental, spiritual and social dimensions (Holt and Perry, 2023). IK is owned and controlled by a community, with protocols that govern its use and dissemination, and this knowledge is continuously evolving through interaction with the environment and community practices (Orlovic Lovren, 2019). The open science movement brought about challenges with regard to the digitization,

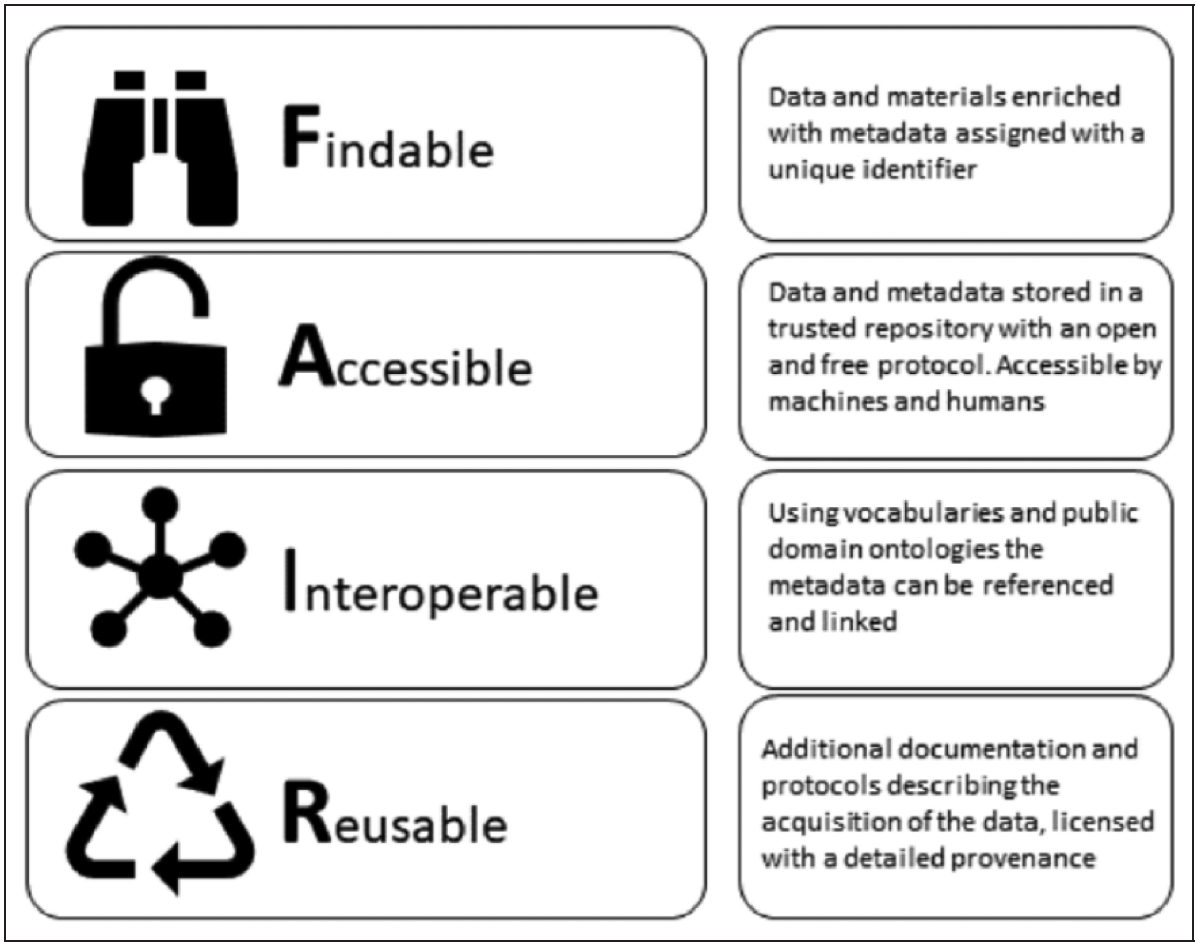

Figure 1. The FAIR data principles. Source: Kalendralis et al. (2021).

management and preservation of IK (Ngulube, 2023). The key considerations in IK management include cultural sensitivity, intellectual property rights and ethical sharing. These are important as a way of respecting the context and meaning of knowledge within Indigenous cultures, recognizing and protecting the ownership of IK, and ensuring that knowledge-sharing aligns with the values and protocols of Indigenous communities. The FAIR data principles (Figure 1) aim to enhance the management and sharing of scientific data by ensuring that it is findable, accessible, interoperable and reusable (Wilkinson et al., 2016). As a result, IK management and the FAIR data principles represent two distinct yet potentially complementary frameworks for managing and sharing knowledge. Understanding the intersections and challenges between these frameworks is crucial for respectful and effective knowledge-sharing and preservation. Integrating IK management with the FAIR data principles should respect cultural-specific and community protocols (Chigwada and Ngulube, 2023). This can be achieved by fostering collaboration and co-creation to develop data management practices that honour the richness of IK and the FAIR principles' goals. This integration can lead to more inclusive, respectful and effective knowledge-sharing practices that benefit Indigenous communities as well as the broader research community.

IK and the CARE principles

The CARE (collective benefit, authority to control, responsibility, ethics) principles (Figure 2) for Indigenous data governance were developed to complement the FAIR principles due to the challenges that are experienced when implementing the FAIR principles in IK management (Carroll et al., 2020, 2021; Chigwada and Ngulube, 2024). The CARE principles ensure that IK is managed, protected and shared in ways that align with the values and rights of Indigenous communities. The principles emphasize ethical, culturally appropriate data practices, and prioritize the sovereignty and well-being of Indigenous people (Carroll et al., 2021). 'Collective benefit' deals with promoting community well-being and ensuring that communities receive fair and equitable benefits from the use of their data (Jennings et al., 2023). 'Authority to control' concerns community

Figure 2. The CARE principles for Indigenous data governance. Source: Global Indigenous Data Alliance (2022).

governance, where Indigenous people have support for their inherent sovereignty over their data. 'Responsibility' covers accountability, where data practices should respect Indigenous cultural norms and values. And 'ethics' ensures that data practices do not harm Indigenous people or their cultural heritage, and data initiatives must be transparent and conducted with the free, prior and informed consent of Indigenous communities. Therefore, integrating IK management and the CARE principles involves aligning data governance with Indigenous values and rights (Carroll et al., 2020). One should ensure that data initiatives do not exploit IK for external benefit without reciprocating. Systems should be implemented that recognize and support Indigenous data sovereignty, allowing communities to manage their knowledge. There should be clear guidelines and accountability mechanisms for researchers and institutions working with IK. Finally, ethical guidelines such as obtaining informed consent and ensuring transparency in data practices, should be followed. This can be accomplished through community engagement, co-design, capacity-building, legal protection and undertaking ethical research.

Methodology

This study employed a qualitative research design, utilizing document analysis and web content analysis within a case study framework to examine the SAICH Project. The case study focused on understanding how the SAICH Project manages ICH across the seven participating countries, with an emphasis on adherence to the FAIR and CARE data governance principles in IK management. The SAICH Project was selected as a case study due to its regional significance in preserving and managing ICH through digital technologies. The scope encompassed an in-depth examination of the SAICH website (SAICH, 2024b), the UNESCO Intangible Cultural Heritage website (UNESCO, 2019) and the SAICH database (SAICH, 2024a). The study focused on the project's activities from its inception to the present day to ensure a comprehensive analysis. A systematic web content analysis was conducted to examine how SAICH and UNESCO present information regarding IK management. This involved:

1. Identifying relevant web pages and documents that discuss the project's activities, challenges and best practices.
2. Extracting data on how the SAICH Project adheres to the FAIR and CARE principles, using the EUDAT summer school checklist as an assessment tool (Jones and Grootveld, 2017; see Appendix 1).
3. Coding and categorizing the findings based on the research objectives to establish thematic patterns. This process was guided by Krippendorff's (2019) content analysis methodology.

SAICH-related documents, including news articles, reports, books and policy papers, were analysed to determine compliance with the FAIR and CARE

Table 1. Compliance with the FAIR principles.

Findable	A persistent identifier is assigned to your data.	The elements do not have DOIs.
	Rich metadata describes your data.	Metadata is available.
	The metadata is online in a searchable resource.	The database is searchable.
	The metadata record specifies the persistent identifier.	There is no persistent identifier.
Accessible	Following the persistent identifier will take you to the data or associated metadata.	There is no persistent identifier.
	The protocol by which the data can be retrieved follows recognized standards.	Metadata standards are followed.
	The access procedure includes authentication and authorization steps.	Yes, users sign in to access the elements.
	Metadata is accessible, wherever possible, even if the data is not.	The elements are accessible in digital formats by member countries.
Interoperable	Data is provided in commonly understood and preferably open formats.	Yes, but authentication is required.
	The metadata provided follows relevant standards.	Yes.
	Controlled vocabularies, keywords, thesauri or ontologies are used where possible.	Yes.
	Qualified references and links are provided to other related data.	Yes.
Reusable	The data is accurate and well described with many relevant attributes.	Yes.
	The data has a clear and accessible data usage license.	There are no usage licenses.
	It is clear how, why and by whom the data has been created and processed.	Yes, the names of the creators are provided.
	The data and metadata meet relevant domain standards.	Yes.

principles. The document analysis aimed to unpack key themes, such as challenges encountered, lessons learned and best practices in managing IK in the digital era. The documents were systematically reviewed using a coding scheme aligned with the research objectives (Selvi, 2019). As the authors are part of the SAICH Project team, their personal experiences were incorporated through reflexive analysis. This approach enabled the researchers to critically reflect on their roles, interactions and observations within the project, providing an insider perspective on decision-making processes and challenges encountered. To ensure objectivity, the personal reflections were cross-referenced with the document and web content analysis findings. The collected data was analysed using qualitative content analysis. A coding framework was developed based on the research objectives, and the data was manually coded to identify recurring themes and patterns. This process enabled a systematic synthesis of insights regarding IK management within the SAICH Project, offering a structured evaluation of the project's strengths and areas for improvement.

The potential limitations of the study include the limited generalizability of the findings since it focuses on a single case. Moreover, the websites and databases are continuously updated, which means that the findings reflect a snapshot in time and may not account for future developments in the SAICH Project.

Findings and discussion

The results showed that the SAICH Project has made some strides towards complying with the Indigenous data governance principles, although some areas could be improved. Table 1 documents how the database utilizes the FAIR principles to improve the findability and accessibility of the elements.

It has been noted that although a lot of metadata is available, there are no digital object identifiers that can assist in finding the elements in the event of location changes in the database. Metadata standards are followed and the main components of the elements are provided to assist in accessing them. There is also a sign-in page (see Figure 3), which restricts access and edits to those who have the right to do so. This is another layer of security, which is important in safeguarding the ICH of the SAICH Project.

A technical person – the database manager – is responsible for the maintenance of the website, including the database. Regarding reusability, it was noted that there is no usage license specified in the database, which could assist those who might want to use the archived elements. Table 2 documents how the

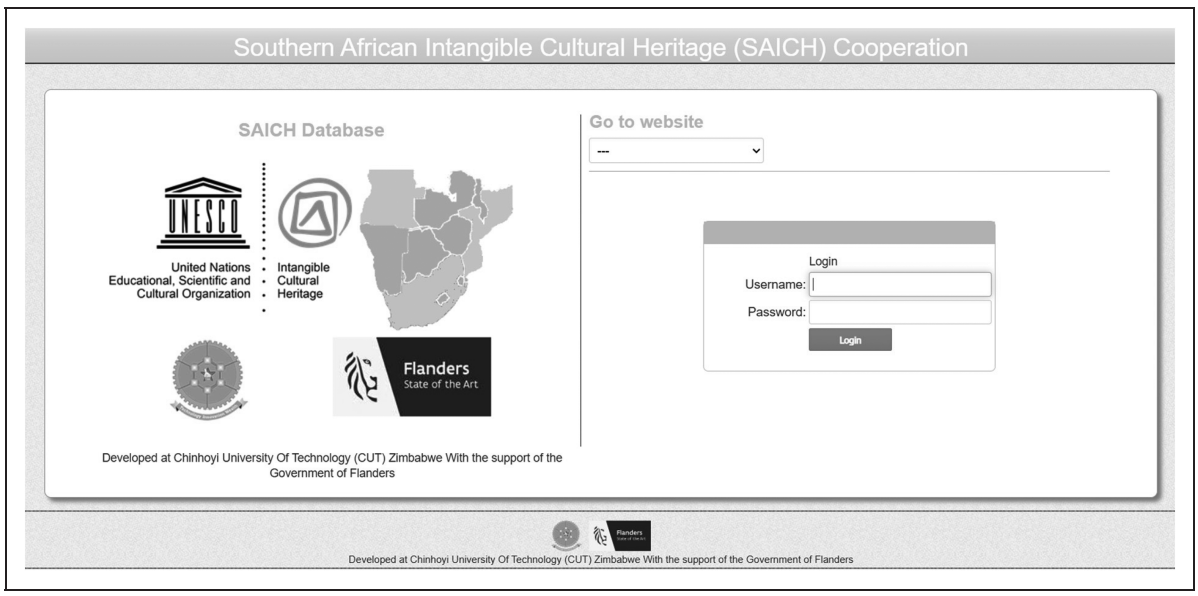

Figure 3. Sign-in page of the SAICH database.

SAICH Project complies with the CARE Indigenous data governance principles.

The findings showed that Indigenous communities benefit from the ICH archived as elements in the SAICH database. The elements are being preserved for future use, and the Indigenous people who own these elements can access them as and when the need arises. This is another way of documenting IK, which is in danger of becoming extinct due to its oral nature. The Indigenous people have total control of the elements since they are the source, and they determine who can access the Indigenous data and how it can be used. The researchers and other people involved in the SAICH Project follow the ethical principle of conducting research with Indigenous communities when engaging with Indigenous peoples.

Challenges

There were several challenges that bedevilled the SAICH Project (and challenges persist). While, as a project, it had a lifespan, it was not possible to just let its achievements gather dust because the funding period had ended. This created problems, and it is thus worth pointing out that the main challenges were the following:

1. The project was largely donor-funded. When the funding period ended, activities ceased, except on the academic side, where some intermittent activities continue. These activities are, however, lukewarm. There is not much of the zeal and drive that was there when the Government of Flanders was involved.
2. During the lifespan of the project, there were challenges related to changes in personnel in some government departments. This meant that instead of making progress, time was wasted when new members had to be inducted.
3. Some countries did not submit many elements of intangible heritage. This was driven by the fear of what would happen to the archived elements.
4. Bearing in mind that all the uploaded material is owned by the respective governments that seconded personnel to the project, the same governments are not comfortable with letting anyone access their data without their approval. Approval must be sought from each country's appointed person on ICH. However, with the challenges caused by staff transfers and changes in ministry composition, with some being unbundled, this becomes a serious issue.
5. There was the challenge of countries not undertaking activities they had agreed to work on together. For instance, the development of the file for *mbira*/*sansi* for submission to UNESCO for consideration for inclusion in the Representative List of the Intangible Cultural Heritage of Humanity almost fell through. However, the task was salvaged and carried out by Malawi and Zimbabwe, submitting it successfully. UNESCO listed the instrument in December 2020 at the 15th Intergovernmental Committee Meeting in Paris.
6. There is a challenge related to hosting the website where the elements are. Even though these are important heritage elements for the seven member states that were part of the project, no

Table 2. Compliance with the CARE principles.

Collective benefit	Do Indigenous people benefit from the elements?	The main reason for digital inventorying these elements is to preserve them for future generations. Indigenous people are the major beneficiaries of the elements. They can retrieve them whenever they need a reference from them.
Authority to control	Do Indigenous people have control over the elements and what is shared?	Indigenous people are the source of the elements. They contribute information and validate the information. They are the major authority and have full control of the elements.
Responsibility	Do those working with the Indigenous data share how the elements are used to support Indigenous people?	Yes, during the information-gathering process, Indigenous people consent to the process. They are also informed on how the elements will be used.
Ethics	Are Indigenous people's rights taken into consideration throughout the data life cycle?	Yes. First, during data collection, permission is requested from traditional leaders, relevant government agents, and so on. These groups will explain all the customary, traditional and government regulations to be observed during data collection. They will also explain the traditional ethos to be observed. All ethics relating to data collection will be followed, such as consent, respect for privacy, political liberty and respect for religion.

government has offered to pay the website hosting fees. As the situation currently stands, the information and communications technology member and current coordinator share the burden of meeting the costs. When they face challenges, the website's protection can fall away – something that is not healthy for material deemed in need of protection and accepted as such.

The above-listed challenges should be regarded as a learning curve, where member states should realize that they must fund matters related to their cultural heritage and not delegate this important task to donors. They also need to realize that while projects can drive safeguarding and promotion activities, there should be an exit plan with regard to the activities of these projects, which will help ensure sustainability – in this case, inventorying activities.

Lessons learned from the SAICH Project

Several lessons have been learned from the SAICH Project, including the following:

1. International assistance is important but should never be depended on for the maintenance of cultural safeguarding and promotion activities. Host and recipient governments should have budgetary allocations for this, especially where regional cooperation has been observed to provide impetus for related cross-border cultural activities.
2. Cooperation, especially between countries, pays.
3. Inventorying activities, including related ones that are linked to promotion and safeguarding, should not be the sole responsibility of the host ministry, but should also be made part of the education curriculum, from primary school right up to higher and tertiary levels.
4. Linked to the above is the importance of academic conferences that include participants in the field of cultural heritage and not just academics, to help shape and give direction to programmes of study and research.
5. Inventorying should not just be for the purpose of coming up with a catalogue but should be linked to a road map of what the archived elements should be used for.
6. Continuous capacity-building is important to cater for the changes in personnel in various ministries.
7. Access to ICH elements should be allowed but only if the user, whether Indigenous or not, adheres to the FAIR and CARE principles.

Conclusion and recommendations

The SAICH Project has been instrumental in utilizing the FAIR and CARE Indigenous data governance principles in documenting and archiving the elements of the SAICH database. Although there are notable areas for improvement, the rich metadata available makes the data FAIR. To improve the findability of the elements, there is a need to consider allocating persistent identifiers to the elements to ensure that they

have a permanent location, even if there are changes to the database. The challenges being faced include the issue of sustainability due to financial constraints with regard to continuing to run the project, as well as the lack of cooperation among member states. Several lessons were learned from the project. There is a need to educate the people who work within the SAICH Project and the researchers on the FAIR and CARE principles and how these affect Indigenous communities. Therefore, there is a need for the host and recipient governments to allocate a budget to run the project. This would also help improve cooperation among the member states and increase the number of elements that can be added to the database. A road map on access and the use of the elements is needed to improve accessibility, which would also create awareness of the SAICH Project among researchers and other Indigenous communities.

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ORCID iDs

Josiline Chigwada https://orcid.org/0000-0003-0964-3582
Patrick Ngulube https://orcid.org/0000-0002-7676-3931

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Author biographies

Josiline Chigwada is a postdoctoral research fellow at the University of South Africa. She is a librarian with 18 years of experience in academic librarianship. She holds a PhD in Information Science from the University of South Africa and a Postgraduate Diploma in Higher Education. She is a member of the Library and Information Association of South Africa, the Strategic Purchasing Africa Resource Centre management committee, the Zimbabwe Library Association, the Association for Information Science and Technology, the International Association for Social Science Information Service and Technology, and the Rotary Club of Msasa. She has authored on Indigenous knowledge, open science, research data management, information and digital literacy, academic librarianship, and contemporary library and information science issues.

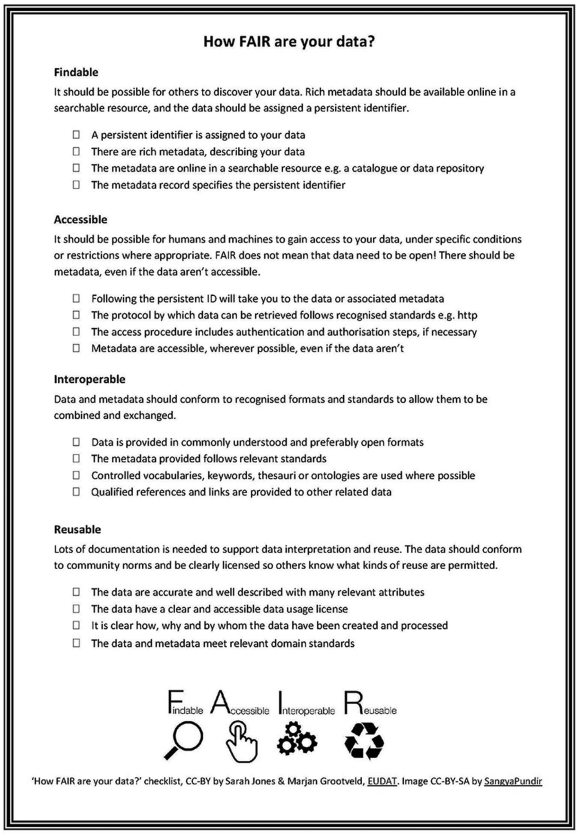
Jacob Mapara teaches modules on Indigenous knowledge and sustainable technologies, as well as Zimbabwe's higher education context, at Chinhoyi University of Technology. He also supervises postgraduate students in these areas. Professor Mapara has published in these areas in addition to onomastics and how it, as part of intangible cultural heritage, contributes to the development of robust Indigenous epistemologies. Professor Mapara is the current chairperson of the SAICH Platform, which is hosted by Chinhoyi University of Technology. He also serves as chairperson of the Zimbabwe National Intangible Cultural Heritage Advisory Committee. He holds a PhD in African Languages from the University of South Africa.

Patrick Ngulube is Professor of Interdisciplinary Research and Graduate Studies at the University of South Africa. He is a National Research Foundation of South Africa rated researcher. He is an Indigenous son of the soil who is widely published in the field of Indigenous ways of knowing and practice. He has mentored several PhD candidates and postdoctoral fellows in the field of Indigenous knowledge systems and African epistemologies.

Tavhiringwa Chabvutagondo is a multidisciplinary technology enthusiast with a passion for harnessing new technologies to preserve cultural heritage. Currently working as an information and communications technology consultant with SAICH, he brings a wealth of knowledge and expertise to the field. Holding multiple degrees, including a Bachelor of Arts (Honours) in Media and Communication, Postgraduate Diploma in Computer Science, Master of Science in Journalism and Media Studies, and Master of Science in Big Data Analysis, Tavhiringwa is a true polymath. He is also pursuing a PhD in Big Data Analysis at Chinhoyi University of Technology. His research interests focus on driving innovation in the field of cultural heritage preservation. With his unique blend of technical expertise and academic rigour, Tavhiringwa is a leading voice at the intersection of technology and cultural heritage.

Appendix 1

Checklist for FAIRness of the data in the SAICH Project



How FAIR are your data?

Findable

It should be possible for others to discover your data. Rich metadata should be available online in a searchable resource, and the data should be assigned a persistent identifier.

- ☐ A persistent identifier is assigned to your data
- ☐ There are rich metadata, describing your data
- ☐ The metadata are online in a searchable resource e.g. a catalogue or data repository
- ☐ The metadata record specifies the persistent identifier

Accessible

It should be possible for humans and machines to gain access to your data, under specific conditions or restrictions where appropriate. FAIR does not mean that data need to be open! There should be metadata, even if the data aren't accessible.

- ☐ Following the persistent ID will take you to the data or associated metadata
- ☐ The protocol by which data can be retrieved follows recognised standards e.g. http
- ☐ The access procedure includes authentication and authorisation steps, if necessary
- ☐ Metadata are accessible, wherever possible, even if the data aren't

Interoperable

Data and metadata should conform to recognised formats and standards to allow them to be combined and exchanged.

- ☐ Data is provided in commonly understood and preferably open formats
- ☐ The metadata provided follows relevant standards
- ☐ Controlled vocabularies, keywords, thesauri or ontologies are used where possible
- ☐ Qualified references and links are provided to other related data

Reusable

Lots of documentation is needed to support data interpretation and reuse. The data should conform to community norms and be clearly licensed so others know what kinds of reuse are permitted.

- ☐ The data are accurate and well described with many relevant attributes
- ☐ The data have a clear and accessible data usage license
- ☐ It is clear how, why and by whom the data have been created and processed
- ☐ The data and metadata meet relevant domain standards

'How FAIR are your data?' checklist, CC-BY by Sarah Jones & Marjan Grootveld, EUDAT. Image CC-BY-SA by SangyaPundir

Source: Jones and Grootveld (2017).