

# DEVELOPING A FRAMEWORK FOR WEB ARCHIVING OF INDIGENOUS KNOWLEDGE SYSTEMS (IKS) IN SELECTED REPOSITORIES IN SOUTH AFRICA

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**ABSTRACT:** *Indigenous Knowledge is a very important knowledge and developmental tool in Africa. There is a growing trend in the digitisation of heritage materials in Africa but while there is consensus on the importance of digitising IK in Africa, there are issues with ensuring long-term preservation so that digital information is permanently secured and protected. The purpose of this paper, therefore, is to discuss the Indigenous Knowledge Systems efforts in Africa. The scope of this paper is the digitisation of IKS in South Africa and how Web archiving can be adopted in ensuring the trustworthiness of IKS in academic institutional repositories. This paper adopted literature review and web content analysis to collect relevant information and make an inference. The paper, therefore, shows that South Africa is one of the few countries in Africa that has invested immense effort in the use of technology and digitisation of IKS. However, there is a need to consider issues related to the long-term preservation of these digital materials. There is currently a lack of policy and digital preservation frameworks, especially in Africa.*

**KEYWORDS:** *indigenous knowledge, digitisation, web archiving, digital preservation, repositories.*

## BACKGROUND

According to Fela Kuti:

*“Africa has to improve by its own methods... Africa has not been able to contribute its own knowledge to this universe, but we have knowledge in Africa... All these things need to be in the education system of African counties.” (ReelingInTheYears66 2018).*

This statement highlights the importance of Indigenous Knowledge (IK) as a key tool for development in Africa. IK is the collection of interrelated practices that are peculiar to a group of people and it influences the way of life of a local people (deniyi and Subair (2013, 2). It is the “basis for local level decision making in healthcare, education, and a host of other activities in rural communities” Anyaoku, Nwafor-Orizu, and Eneh (2015, 34). The Tassa irrigation system in the Niger Republic and the Gacaca community-based judicial system in Rwanda Brehm, Uggen, and Gasanabo (2014, 335); Ezeanya-Esiobu (2017) are good examples of how African Indigenous Knowledge Systems (IKS) has been applied successfully.

In 2004, recognizing the importance of Indigenous Knowledge, the South African government adopted the national Indigenous Knowledge Systems Policy which was a platform for recognizing, affirming, developing, and protecting IKS in South Africa. The Department of Science and Technology (DST) initiated the National Recordal System (NRS) through this policy framework to coordinate and standardize the capture, storage, maintenance, and dissemination of science and technology-related data on IKS in South Africa were formulated.

## PURPOSE OF THE PAPER

The purpose of this paper is to highlight the Indigenous Knowledge Systems (IKS) preservation efforts in South Africa and how Web archiving can be used to ensure the trustworthiness of digital materials through the management of Trusted Digital Repositories in academic institutional repositories in South Africa.

## METHODOLOGY

This paper used a qualitative research method that is anchored on the interpretivist paradigm. It largely used literature review and web content analysis to assess the current state of digitisation of IKS in South Africa.

## DIGITISATION OF INDIGENOUS KNOWLEDGE SYSTEMS (IKS)

One of the most important factors in ensuring long-term access to heritage materials is preservation Graham (2003, 224). In recognition of its importance, the International Federation of Library Associations and Institutions (IFLA) stated that libraries and archives are required to be involved in the collection, preservation, and dissemination of indigenous and local traditional knowledge resources (IFLA 2002). Libraries are also expected to consider the use of digitisation in preserving IK to ensure they do not become extinct Sraqu-Lartey, Acquah, and Djagbletey (2016).

Several countries like Venezuela, India, and China have managed to compile digital databases, inventories, or registries of traditional knowledge over many years Nair (2006, 224-225); Swanepoel (2008). Digitisation initiatives are usually driven by a variety of motives with preservation and access being the most common Swanepoel (2008). To ensure access to digitized IK, there are initiatives to ensure that IK is accessible online. Such initiatives include the:

- Traditional Knowledge Digital Library (<http://www.tkdl.res.in>);
- Korean Traditional Knowledge Portal (<http://www.koreantk.com>);
- Chinese Traditional Medicine Database System (<http://www.megabionet.org>);
- Seni Tradisi Indonesia (<https://www.piknikdong.com>); and the
- Smithsonian Centre for Folklife and Cultural Heritage (<https://folklife.si.edu/>).

In Africa, there are initiatives such as the:

- African Indigenous Science and Knowledge Systems (<http://africahistory.net/>); and
- Elimu Asilia - Kenya's Indigenous Knowledge Online (<http://www.elimuasilia.org/>).

Figure 1: Traditional Knowledge Digital Library (TKDL) website

## INDIGENOUS KNOWLEDGE SYSTEMS (IKS) IN THE SOUTH AFRICAN CONTEXT

In South Africa, the Ulwazi IKS Programme and the Digital Innovation South Africa (DISA) projects are examples of digitisation projects on IK available online Greyling and McNulty (2012); Pickover (2008, 193). The Ulwazi Programme in particular “operates as an integral part of local public library and information services in the eThekweni Municipal Area (EMA) in the province of KwaZulu-Natal in South Africa, using both conventional and the latest mobile technologies” Greyling and McNulty (2012). The DISA project, on the other hand, is a non-profit collaborative project which is funded by Andrew W Mellon Foundation and has been able to attract heritage and research stakeholders including academic institutions Pickover (2008, 193).

However, this paper focuses on DST’s NRS initiative. The 2004 IK policy laid the foundation for the NRS project which is an initiative of DST. It coordinates and standardizes the capturing, storing, maintenance, and dissemination of science and technology-related data on IKS in South Africa. The NRS is developed in phases and the first phase focuses on the African Traditional Medicine (ATM) and Indigenous Food (IF) for implementation because they are at the risk of Intellectual Property exploitation and bio-piracy. This is like India’s TKDL which also emanated from the attempt to document various medical formulations to save them from piracy. Through this NRS initiative, the National IKS Management System (NIKMAS) was developed to support, on a national scale, the recordal, management, and protection of IK and the mitigation of the risks associated with Intellectual Property and biopiracy. NIKMAS serves as the information management engine of the NRS, and it is accessible at [www.nrs.dst.gov.za](http://www.nrs.dst.gov.za).



Figure 2: National IKS Management System (NIKMAS) website

Moreover, IKS Documentation Centres (IKSDCs) have been created in different academic institutions across the 9 provinces in South Africa to cater to 50 communities. The University of KwaZulu-Natal (UKZN) is the main hub in South Africa and it also maintains an IKS website accessible at [www.iks.ukzn.ac.za](http://www.iks.ukzn.ac.za).



Figure 3: UKZN IKS website

The UKZN hub in collaboration with some academic institutions like the North-West University (NWU), University of South Africa (UNISA), University of Limpopo (UL), and the University of Venda (Univen) partners as the virtual IKS Centre known as the DST-NRF Centre in IKS (CIKS). It is managed by the NRF Directorate of Research Centres and Centres for Excellence (RCCE). The CIKS is expected to promote, protect, and preserve IKS, and this is to be achieved through research, postgraduate training, community engagement, networking, IKS curriculum studies, knowledge brokerage, and service rendering. Its focus areas are traditional medicine, food security, and biodiversity, and environmental management. The CIKS is also in strategic partnership with institutions within and outside South Africa like the University of Zululand, University of Fort Hare, University of Namibia, University of Nottingham, University of Western Cape, University of Bayreuth, the Innovative Pharmaceutical Association South Africa, KwaZulu-Natal Provincial Department of Social Development, Food and Agricultural Organization of the United Nations (South Africa), among others.

Apart from being responsible for the collection and organizing of information materials, the IKSDC in partnership with the communities involved also actively engages in the production of information that is shared, disseminated, and distributed. The IKSDC also has the responsibility of providing services to the various communities, national government, local government, and the public in terms of the captured IKS in the NRS. Despite links with repositories with academic institutions in South Africa, the NIKMAS has the responsibility of providing a single access point to IK captured in different points in the NRS initiative with links to other resources and databases which contains IK information managed in various institutions or government departments. Apart from the publicly available IK, NIKMAS also keeps IK that is yet to be in the public domain. The stored IK are confidential but accessible through application for limited confidential access. The UKZN IKS website also requires user login and password for access.

## **ISSUES WITH DIGITAL RECORDS**

The long-term preservation of these digital materials is saddled with problems of technological obsolescence, lack of awareness, financial sustainability, policies, legislation, security, and privacy Adu and Ngulube (2017); Biyela et al. (2016, 12). In addition to these issues, media degradation, and bad records management all threaten the survival of digital information Dryden (2009). According to Hockx-Yu (2006, 235), digital preservation is a complex process with several unresolved technical, organizational, and managerial issues making digital preservation a challenging task, especially for those managing institutional repositories. The issues of ensuring long-term digital material preservation to permanently secure and protect digital information for integrity, authenticity, and future access are not well researched Kalusopa (2018, 168); Ngoepe, (2017, 35). Issues related to policy and digital preservation frameworks are major problems in Africa Kalusopa and Zulu (2009, 106); Mutula (2014, 369).

The urgency and importance of paying attention to issues of trust online have been repeatedly emphasized at the international level Duranti (2010, 52); Duranti and Rogers (2014, 211); InterPARES (2011); Solodovnik and Budroni (2015, 252). For instance, hacking prohibits us from being able to access our trust in online records and data Duranti and Rogers (2014, 203). The issue of trustworthiness deals with components of digital records such as authenticity, accuracy, reliability, and authentication.

Apart from the trustworthiness of digital records, several studies have demonstrated that the ephemeral nature of the web makes web materials highly vulnerable to loss, degradation, and decreased access Davis (2010); SalahEldeen and Nelson (2012, 126); Antracoli et al. (2014, 156-157). Within a year, materials on the web retain about 20% in their original form, and the average lifespan of a webpage can be as short as 44 days (Sutton 2004). This means that about 80% of the materials on the web are likely to disappear or lost to the alteration within the first year. The half-life of URLs of online academic journals on the other hand is about 4-5 years Slania (2013, 112); Kumar and Prithviraj (2014, 37). Although this seems longer than the 44 days on an average website, there is a need to note that web contents are still vulnerable to loss and alteration after some time. However, studies have proven that the problems associated with vanishing URLs and long-term access to information on the web can be solved through different web archiving tools Kumar and Prithviraj, (2014, 36); Kumar and Kumar (2013); Habibzadeh (2013, 460).

Web archiving is considered as any form of deliberate and purposive preservation of materials on the web Brügger (2011). The Web archiving technology “enables the capture, preservation, and reproduction of valuable content from the live web in an archival setting, so that it can be independently managed and preserved for future generations” Pennock (2013, 1). That is, Web archiving is a form of digital preservation of web contents. Many academic institutions such as the Universities of Winnipeg, University of Manitoba, University of Columbia, Drexel University, the University of Texas at Austin, the University of Pennsylvania among others are involved in Web archiving projects. For example, The University of Texas at Austin also has a Latin-American Government Collection which includes full-text archives of official documents, original video

and audio recordings of key regional leaders, thousands of annual and “state of the nation” reports, and a collection of Latin-American elections and political parties Donovan and Haberle (2017).

## CONCLUSION

This paper has been able to highlight the digitisation efforts in different countries focusing on the IKS initiatives in South Africa. South Africa has taken major steps and still making serious efforts to ensure the preservation of IKS using technology and digitisation. The DST’s NRS project has archived a lot in the preservation of IKS while there are continuous and ongoing projects in this area.

However, there is a need to consider problems related to long-term digital preservation to ensure that digital information is permanently secured and protected for integrity, authenticity, and future access which are currently not well researched. There is currently a lack of policy and digital preservation frameworks, especially in Africa. Therefore, there is a need to develop Web archiving frameworks for digitized IKS accessible online to create and ensure Trusted Digital Repositories (TDRs) in academic institutions in South Africa. The TDRs should be Open Archival Information System (OAIS) compliant, and there is a need to incorporate how the web archives can be integrated with other digital collections for future research.

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