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Digital curation of records at the National Archives of Zambia

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Abstract

The Zambian government enacted the Electronic Government Act of 2021 to provide for digital transformation of government services. Through the SMART Zambia Institute, Zambia has been rolling out digital government services with the aim of improving service delivery and bettering the lives of Zambians. Digital transformation has resulted in the generation of electronic records which require curation and preservation in digital formats by the National Archives of Zambia (NAZ) for posterity. Therefore, this paper assessed the preparedness of the NAZ for digital records curation in light of Zambia's digital government. Using qualitative research methods and the Digital Preservation Capability Maturity Model (DPCMM), preparedness was assessed using parameters of awareness, knowledge and skills capabilities, and adequacy of infrastructure. A total of five (5) senior archivists in management positions were purposively selected and recruited to participate in interviews. The data were analysed using thematic analysis and presented using themes. Results revealed that there are efforts by the NAZ towards digital transformation including on-going engagement with the SMART Zambia institute on capacity building, establishment of, and recruitment of an ICT expert to lead ICT section and amendment of the National Archives Act of 1995 to ensure responsiveness to digital transformation. However, results also showed that the NAZ in its current state is inadequately prepared for digital records curation as participants showed limited awareness, were not knowledgeable in digital records curation and lacked the skills to champion digital records curation. Results also revealed inadequate infrastructure capabilities as there was no institutional policy and strategy to guide digital records curation at NAZ. Based on the findings, this paper ranked preparedness for digital records curation at level one or minimal preparedness "in which no systematic digital preservation program exists" or records management programme exists only on paper. Therefore, the study recommends training of archivist in digital records curation; revision of the NAZ Act and records management policy to include digital curation; investment in relevant infrastructure including a secure digital repository for preservation of records.

Keywords: digital records, digital curation, archives, National Archives of Zambia

Introduction

The Zambia government has earmarked digital transformation as a conduit for sustainable national development and bettering the lives of Zambians (Republic of Zambia, 2022; 2023). Consequently, government ministries and departments in Zambia are being equipped with digital technologies to be able to provide digital services. Digital transformation in Zambia is spearheaded by the “SMART Zambia Institute, whose goal is to accomplish “social and economic transformation by adopting a paradigm shift from traditional paper and file format approaches to that of electronic service delivery” (Sikaong and Tembo, 2020:1; Smart Zambia Institute, 2022; E-government Act, 2021). Digital services are offered in a number of sectors of the Zambian economy including education, health, finance, transport and logistics, and customs among others. This for the Zambian government means positive strides towards attainment of the sustainable development goals and national development (SGDs) (Vision, 2030; 8th. NDP, 2022).

Digital transformation and e-government imply change in the way that government information is created, distributed, captured and consumed (Kalusopa, 2010; De Saulles, 2012; Umbach and Tkalec, 2022). Digital government has a drastic impact on records management requiring a mindset shift and leadership. Therefore Maseh (2016:92) notes that e-government requires effective systems for management of e-records to ensure control and preservation of the “combination of content, context and structure which gives e-records meaning over time”. Wamukoya and Mutula (2005:74) add that effective systems in e-records forms the basis for “enhancing accountability, transparency, democratic governance, poverty eradication, elimination of corruption and efficient use of donor funded resources”. Therefore, while e-government improves public service, it poses challenges in archives and records management. Questions regarding the ability of archivists and records management professionals to care for e-records and/or conduct digital records curation in a way that maintains the integrity of records arise. E-government also challenges the capacity of records management systems in terms of infrastructure, policies and strategies, and skills in digital records curation (Maseh, 2016; Bwalya & Akakandelwa, 2023).

With Zambia's digital transformation shaped; supported by legislation and policies such as the Electronic Government Act of 2021, the National ICT policy, 2023 and the Digital transformation Strategy, 2023 among others (Republic of Zambia, 2022; 2023). It is therefore incumbent upon records management departments particularly the National Archives of Zambia (NAZ) and the Registry Control Unit (RCU) under the Public Service Management Division (PSMD) to put in place measures and prepared for digital curation of records which are created and used in Zambia's digital services. The underlying implication for the NAZ in particular is the need to take its obligatory position and ensure a framework for digital curation of records which result from digital service provision. The NAZ is mandated to preserve public records, archives, and printed and non-printed publications in order to facilitate lawful access to these public records (National Archives Act, Chapter 175, 1995). As service provision evolves to digital services, the mandates of the NAZ broaden, hence the need to prepare for digital records curation. Against this background, this paper investigated preparedness of the NAZ for digital records curation and to recommend ways of strengthening skills and knowledge as digital records curation becomes an additional service in archives and records management.

Background to the NAZ

The NAZ is a department in the Ministry of Home Affairs and Internal Security mandated through the National Archives Act of 1995, Chapter 175 of the Laws of Zambia to capture, manage and preserve Zambia's archival records. Consequently, the mission of the NAZ is to effectively manage and preserve public records, archives, printed and non-printed publications in order to facilitate lawful access to this information to all stakeholders, hence promoting efficiency and effective government administration. The NAZ collects all public records deemed to have archival value after appraisal through its provincial records centres located in the ten provinces of Zambia. The headquarters of the NAZ are in Lusaka, Zambia's provincial capital and storage of all archival materials is housed there. Through the Act, and other national policies (records management policy and e-records and data guide) the NAZ continues to operate under the mandate of management and preservation of Zambia's archival records hence digital records curation of archival records becomes an additional mandate born from e-government services.

Statement of the problem

The government of Zambia sees digital technologies as a means of improving service delivery to the millions of Zambians as well as a vehicle for attainment of the desired middle-income status (Vision 2030, 2006). Accordingly, the government of Zambia has embarked on *digitalizing public services across all sectors* through the National Electronic Government Plan (NEGP) 2023-2026, a driver for sector-based digitalization plans or strategies for digital transformation in Zambia (Republic of Zambia, 2022). As digital transformation actualizes, questions arise regarding preparedness' among key stakeholders. Questions such as the availability of qualified digital records curators to spearhead the capture and management of digital information through the life cycle need to be addressed. The Adequacy of technological infrastructure to support management and preservation of digital records, availability of institutional strategic plans, and policies on digital records curation are cardinal and need answering (Wamunkoya, 2012; M'kulama et al., 2023). Research (DPCMM, 2014; Shibambu & Ngoepe 2020) shows that to be successful with a digital records curation service, institutions need to ensure preparedness by investing in skills training, investing in technical infrastructure, developing policies and strategies and consistent funding. As the Zambian government through the "SMART Zambia Institute continues to promote and implement e-government services. The absence of a clearly written framework on the movement of digital records from creating offices to the national archives for long-term preservation creates a significant challenge to records management (Bwalya & Akakandelwa, 2023). Furthermore, while the lifecycle of paper records from creating offices into records centres and final disposition at the NAZ is clearly defined, it is not the case for e-government, and the records that are generated from digital services (Records Management Policy, 2012). Therefore, this research sought to investigate the preparedness of the NAZ to manage, and preservation digital archival records generated during the e-government era.

Purpose and objectives of the study

The purpose of this study was to assess the preparedness of the National Archives of Zambia (NAZ) for digital curation of archival records. The following specific objectives were set:

1. To assess awareness of archivists about digital records curation
2. To evaluate the knowledge and skills of archivists in digital records curation and preservation

- To determine the adequacy of infrastructure to support digital curation and preservation

Conceptual framework

The paper adopted the Digital Preservation Capability Maturity Model (DPCMM) by Dollar and Ashley (2014). The DPCMM is based on functions specified in internationally acclaimed standards including the “Open Archival Information System (OAIS)”, ISO 14721 and ISO16363 attributes and the “audit and certification of trustworthy digital repositories (TDRs)”. The DPCMM provides a process and performance framework against best practice, standards, and foundational principles of records management, information governance and archival science to assess the “current state of digital preservation” in organisations. The model constitutes high-level requirements for a trustworthy digital repository categorized into fifteen readily understandable components and thresholds (Policy, Strategy, Governance, Collaboration, Technical Expertise, Open Standard Technology Neutral Formats, Designated Community, Electronic Records Survey, Ingest, Archival Storage, Media/Device Renewal, Integrity, Security, Preservation Metadata, and Access) to facilitate dialogue and planning among stakeholders to address the challenges of long-term preservation of records and information. These components are arranged into two major categories namely infrastructure and services (Dollar & Ashley, 2015).

Therefore, the DPCMM framework is composed of three independent domains namely: infrastructure, digital preservation repositories, and services. The DPCMM combines the specifications, requirements and activities drawn from “ISO 14721 and ISO16363 standards and digital preservation standards best practices”. The model includes as major participants in a digital curation and preservation service: creators of digital assets, producers and consumers of digital assets. Figure 1 shows the key components of the DPCMM with their component features:

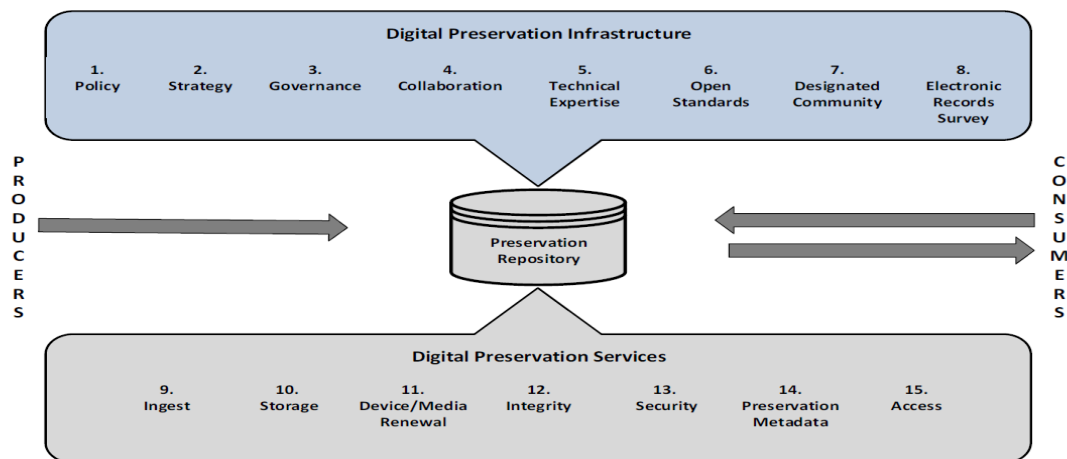


Figure 1: DPCMM (Source: Dollar and Ashley, 2014)

The DPCMM is used to identify the current state capabilities of digital preservation, which forms the basis for debate and dialogue regarding the desired future state of digital preservation capabilities and the level of risk that the organization is willing to take on. In many instances, this come down to the question of what constitutes digital preservation that is “good enough” to fulfil the organization’s mission and meet the expectations of its stakeholders. This study therefore used the DPCMM to guide the assessment of preparedness for digital curation and preservation of archival records in a low-resourced country situation, Zambia. The DPCMM framework underpins three research questions in this study as follows: The overall purpose of the study was to assess the preparedness for digital curation of archival records in a low

resource country. In doing so, questions about awareness, knowledge and skills of archivists were assessed as factors in determining readiness. Additionally, the infrastructure capabilities of the NAZ and possible challenges to providing digital curation were also evaluated based on the DPCMM.

The DPCMM use five levels or stages to measure the capacity of institution in digital preservation including optimal, minimal, intermediate, advanced and optimal levels. At Nominal level an organization is yet to have “a systematic e-records management and digital preservation program” or a digital preservation program exists only on paper and not yet addressing digital curation. At optimal level however, an organization has “sustained, trustworthy, digital preservation capabilities that are systematically managed through process improvement and optimization (Dolla & Ashley, 2015:9).

The framework is robust and has been successfully used in ensuring preparation for implementation of digital asset management of which archival records are a part. The DPCMM frame is useful in charting the way forward from “disorganized and undisciplined management of electronic records, or the lack of a systematic digital continuity approach, into increasingly mature stages of digital preservation capability” (Dollar & Ashley, 2014: 1).

Components of the DPCMM framework

The DPCMM framework is made of three (3) components namely the digital preservation infrastructure; trustworthy digital preservation repository; digital preservation services; producers and services modelling the activities and services required and provided in digital curation and preservation service. These are briefly explained below.

The digital preservation infrastructure component is made up of eight components essential for ensuring commitment to preservation of digital assets in a sustained manner. The digital infrastructure components focus on what the institution that is undertaking curation activities will do in order to preserve the digital assets. The eight digital preservation infrastructure components required for effective curation and preservation include digital preservation policy; digital preservation strategy; governance; collaboration; technical expertise; open standard technology neutral (“OS/TN”) formats; and designated community.

The digital repository helps to ensure that there is continuity of management of digital assets. Repositories can either be a simple system for storage of organisational digital assets, or a complicated and integrated repository that stores huge volumes of digital assets. Some of the commonly used trustworthy digital repositories are Dspace, E-prints and Fedora to mention only a few. These open-source software programmes provide for management and preservation of digital assets.

The digital preservation services component is concerned with ensuring “integrity, security, usability and accessibility of electronic information and records stored in preservation repositories” in a sustainable manner. Thus, to plan, implement and achieve digital preservation of digital assets sustainably, seven (7) digital preservation services components including: electronic records survey; ingest; archival storage; media/device renewal; integrity; security; preservation metadata and access are required. These components perform a series of activities necessary for ingest of digital assets into the repository as well as long-term and “continuous monitoring of technical environment upon which they depend”. The planning and execution of digital preservation actions in view of sustaining “integrity, security, usability and

accessibility” of digital assets currently stored in the repository is dependent upon the ability of the organization to “identify and transfer” the digital assets of long-term value in a methodical way while providing resources and direction.

The term producer refers to the creator of digital assets and has the obligation to own the digital assets for long term or permanently. Producers can be external creators or internal owners of the digital sets. The functions of the producers also include providing information to the repository on a consistent basis about the origin of the digital assets as well as usage of repository while ensuring long-term preservation. The users of the digital assets stored in the trusted repository consist of designated community from “external individuals or groups with an interest in and/or right to access records in the preservation repository.” The users usually represent a community of users with a variety of interest with access requirements that constantly change.

Review of the literature

The review of literature in this study focused on awareness, knowledge and skills in digital curation and infrastructure for digital curation and preservation as well as challenges faced.

The term digital curation refers to the process of providing care to digital assets. It is the process of managing and preserving digital content for current and future use (Deschain and Sharma, 2015). Digital curation involves selection and evaluation of materials to determine their value for current use, for long-term preservation and access whenever required. Therefore, digital records curation consists of appraising records to determine their “value and relevance to the community of potential users; determine the need for preservation; [maintaining] document provenance and authenticity; description of features or creation of metadata; arranging for long-term storage and preservation; and provide means for access and use” (National Research Council, 2015: 10; Smithsonian Institute Archive, N.D).

As digital curation and the need for skilled digital curators increases, research in the area of digital curation has also been rising. Digital curation research has generally covered various aspects concerned with care and preservation of digital assets including data curation, research data management and curation, curation of archives, and records management or digital records curation (Samupwa, 2019; Shibambu & Ngoepe, 2020; Smithsonian Institute, 2022; M'kulama, et al., 2023). Others have also attempted to deal with e-government and the implications of readiness for management of digital records in the e-government dispensation (Bhuiyan, 2011). For many professionals, preparedness for digital curation entails and requires putting in place factors such as “expertise, human and financial resources, technology infrastructure, adoption of standards, creation of guidelines and implementation of policies” (Ndhlovu & Matingwina, 2018:4).

Research shows that awareness and knowledge levels on digital curation are important in ensuring successful digital curation. However, this varies across countries and continents. In developed countries particularly the USA, UK, Japan and Australia high levels of awareness, knowledge and skills are reported with capacity in digital curation (Wanatabe, 2020; Shajitha, 2020), while research in low resourced countries has shown limited and low levels of awareness and knowledge in digital records curation (Keakopa, 2010; Hamooya, 2011; Shibambu & Ngoepe 2020; Adu, 2015; Ndlovu & Matingwina, 2018).

Watanabe (2020) in Japan reported a high level of awareness and skills in digital curation as well as existing national plans on digitization of government documents. The study showed

that impressive levels of knowledgeable personnel in digital curation are attributed to government policies and support for curation activities. Shajitha (2020) in South India also noted high levels of awareness and knowledge on digital curation and the reason for this included vast digital information being generated from various sources such as social media and on-line government platforms.

In low resourced countries however, research shows lack of knowledge and inadequate skills in digital curation. Odhiambo (2018) in Kenya at a United States International University-Africa researched 120 respondents on digital curation and found low level of awareness about digital archives among staff. Similarly, Shibambu and Ngoepe's (2020) study of the National Archives and Services of South Africa found that records management staff were not adequately aware and knowledgeable of curation and preservation technologies such as cloud storage solutions despite keeping records in a Dropbox platform. Adu (2015) in a study on digital preservation of e-government resources in Ghana involving 156 public sector organizations and more than 182 respondents indicated that information professionals viewed digital preservation as a conceptually simplistic exercise and did not recognize that it is an extremely complex field that requires a great deal of knowledge and understanding. This he argued showed a lack of knowledge among information professionals in low resource countries. Ndlovu and Matingwa (2018) in Zimbabwe showed low levels of awareness in digital curation and preservation among library professionals as more than 66% of respondents were not aware of digital curation. Similarly, Matlala (2019) also observed low level of awareness among University of KwaZulu Natal's archival staff regarding digital curation and preservation issues. Hamooya's (2011) critical review of the digitization project at the NAZ identified lack of awareness, knowledge and skills as the major challenge to digitization of historical records in Zambia.

Infrastructure is one of the vital elements in digital curation service. Shajitha (2020) alludes to human, technological and financial elements as important features of infrastructure in organizations. Social and technical readiness is required for the implementation of any digital curation service. Technical aspects included hardware and software needed for management and conservation of digital objects while social aspects including administration, consultation, and customer services. Research shows that availability of infrastructure for digital curation differs across countries and continents. Many commentators (Mutiti, 2005; Ngoepe and Saurombe, 2021; Onyancha et al., 2015; Wamukoya, 2012) from low resourced countries have emphasized a concern on the inadequacy of infrastructure to facilitate effective capture, management, and preservation of digital records. Okoh & Sambo (2014) in Nigeria reported the lack of adequate and up to date software and hardware technologies to meet current technological trends. Mutiti (2005), M'kulama et al (2023) and Bwalya and Akakandelwa (2024) all note the inadequacy of infrastructure as a major impediment to effective management of digital archives in Zambia. Keakopa (2010) and others lamented the poor state of infrastructure in low resource countries and noted that it was not up to standard across the continent. Kavishe and Dulle's (2016) research at Zimbabwe's National University of Science and technology rated the availability of desktops or workstations with a rating of 63% while digital curation workflow tools were at 62% because in 15 years, they had never received new machines and depended on donated ones. The Information technology infrastructure category was rated 52% denoting limited use of storage media, 55% on the digital preservation management systems and backup, and 48% use of disaster recovery tools because the required technologies were in the custody of the IT manager. Hamooya, Mulauzi and Njobvu (2012) in research on digitization and its impact on access to archival materials at the NAZ reported lack

of computer terminals for access to digitized materials as a major challenge to digital services provision in Zambia.

Challenges including lack of skills, inadequate infrastructure, lack of policies and inadequate funding dominate the barriers to the success of digital records curation in low resources countries (Odhiambo, 2018; McLeod, 2019). Other technical challenges include lack of standards, lack of a common vocabulary, lack of authority controls, lack of appropriate hardware and software, and limited storage spaces (Latham & Poe, 2012; Pryor, 2013). In terms of skills, David and Alayon, (2016) identified the lack of digital curation skills and inadequate numbers of trained staff as a major challenge in many countries. Watanabe (2020) and Gritsenko, Wijermars, and Kopotev (2021) identified political factors as one of the serious challenges to digital curation of archival records in Japan and Russia respectively were digitizing of archival records was considered to potentially put some of the country's sensitive information in public. Intrinsically, some governments halted their support for digital records curation because of fears of tampering with records. Other challenges reported were lack of systems that facilitate digital archiving at the records creation stage, resisting change from paper-based to digital environments, absence of standards for describing digital records, lack of migration paths for digital records and archives, legal organizational challenges and lack of deep infrastructure (Asogwa, 2012; Odhiambo, 2018; Ndhlovu & Matingwina, 2018).

Methodology

The study was qualitative in nature and employed in-depth face to face interviews for data collection. Thematic analysis was used to analyse and present the data. In qualitative research, data collection focuses on words, observation of participants and infrastructure rather than numbers or quantities as was the case in this study. Qualitative research as a method of inquiry collects data within the context that the phenomena take place and then uses the data as well as the context to describe and explain the occurrences, “as a means of determining the process in which events are embedded and the perspectives of those participating in the events, using induction to derive possible explanations based on observed phenomena” (Gorman and Clayton, 2005: 3). The various data collection methods that qualitative research encompasses and that one can use include interviews, observation and document analysis among others (Muijs 2005). Purposive sampling was used to draw participants from the National Archives of Zambia (NAZ) in which five (5) senior archivists based at the headquarters in Lusaka were sampled and recruit to the study. Participants were drawn from the records management and conservation department as these deal directly with management of records and archives. Additionally, document analysis of the NAZ Act of 1994 and the records management policy of 2012 was conducted to assess inclusion of digital records curation. Further, infrastructure was observed to determine its adequacy to conduct digital records curation. Results were recorded in the observation tool and interviews were also recoded and transcribed before analysis. Gray (2014) notes that observation and document analysis are adequate sources of data in qualitative research. Ethical clearance was conducted by the University of Zambia's Humanities and Social Sciences Research Ethics Committee and to ensure anonymity numbers rather than names were used to refer to participants.

Research findings

In this section, results are presented as per the objectives.

Awareness about digital records curation

The first objective of the study was to determine archivists' awareness about digital curation. Therefore, participants were asked if they were aware or had come across the concept of digital curation. Results showed that all the participants were aware and had been exposed in one or another about the concept of digital curation:

"I know about the concept of digital curation; it is becoming a talking point among archivists" (Participant 1).

"I attended a workshop organized by the library and Information Association of Zambia (LIAZ) in 2020 and we were introduced to digital curation there" (Participant 5).

"I have come across the concept but, I am yet to really explore it in detail" (Participant 3).

"I do know what to curate means, I think it's really about caring for records in both physical and electronic formats and provide access long term" (Participant 2).

"Of course I have heard about digital curation, I am just not sure what it involves. I may need to explore it" (Participant 4).

Knowledge and skills about digital curation

The next objective of the study was to explore knowledge and skills of archivist in digital records curation at the NAZ. Therefore, participants were asked to demonstrate their understanding of the concept by explaining digital curation and whether they were skilled to conduct digital curation. Also, participants were asked what they thought digital curation was to them? Results showed that the concept of digital curation is understood differently by archival professionals and that knowledge and skills were limited. For example, participant 1 explained what they thought digital curation was as follows: *"I was presuming curation involves the preservation, that's what I know. So basically, it's talking about how we care for and preserve these archives"*.

Also, on the question about what digital curation meant to participants. Results further revealed that archivists confused digitization and digital curation as others thought that digitization was actually digital curation. For instance, participant 2 and 5 had the following to say in this regard: *"digital curation is the digitization of materials or records of important value"*.

"Digital is converting paper into software and for curating, ...is coming up with strategies to convert information from paper to software and curating information to digital" (Participant 5).

Further, the study asked participants to indicate the sources of their knowledge about digital curation. Results showed that archivists acquired their knowledge about digital curation from various sources including workshops organized internally, during their graduate and postgraduate studies, and during work interactions. For example, alluding to an internally organized workshop of sorts, participant1 stated that: *"we once participated in a digitization program here at National Archives of Zambia"*.

Further on sources of knowledge, other participants had the following to say:

“Right here at National Archives of Zambia there came a time when we realized we need to improve on what we are doing” (Participant 2).

“I work in the archives, so I need to know these things” (Participant 5).

“I attended a workshop organized by the library and Information Association of Zambia (LIAZ) in 2020 and we were introduced to digital curation there” (Participant 5).

“Digital preservation was one of the topics in class and then curating as well but not into details” (Participant 4).

To determine whether archival staff at NAZ were equipped with skills for digital curation, participants were asked to share opinions regarding their skills capacity and that of staff at NAZ. Results showed that archivists feel as if they have what it takes but will need capacity building to be able to conduct digital curation. There also was a lack of confidence regarding digital curation skills among participants. Below are some of the sentiments about whether they were skilled in digital curation:

“We still have a long way to go. We have the librarians and the information specialists but to have a robust digital curation you also need people that are trained in software management or computer engineering” (Participant 2).

Participant 2 shared a situation where some members participated in a digitization project at the NAZ but wondered whether they acquired skills as they have not used the experience to pass on the skills to others:

“...some members of staff were selected to work with the consultants on digitization project. One of the objectives was to train these members of staff in digitization so that when they leave there will be that continuity. That has not happened well and we may still need training for capacity building” (Participant 1).

Participants 2 and 3 while agree with others about the lack of skills and the need for capacity building alluded to NAZ organizing workshops and straining to try and impart skills:

We’ve been conducting workshops to train workers and help them revise and review how to use simple systems to help sharpen their skills” (Participant 2).

“We’ve been having short workshops here and there to ensure that people are trained, encourage people to take certain short courses” (Participant 3).

Infrastructure for digital curation

To determine preparedness in terms of digital preservation infrastructure which according to the DPCMM includes policy, strategy, governance, expertise and open standard technology among others (DPCMM, 2014). This study focused paid particular attention on technological infrastructure as well as policies and strategies to support digital curation at the NAZ. Therefore, participants were asked to share their thoughts regarding the adequacy of technology or information and communication technology (ICTs) facilities to be able to support digital curation. Results revealed that technology at the NAZ was available but felt that might not be inadequate and not up to standard for digital records curation. For instance, some equipment that had been used in a previous digitization project that was meant to digitize and preserve district notebooks is still available at the NAZ (Hamooya, 2011).

However, physical observation of the technology revealed that NAZ had some decent technology capable of supporting digital records curation at a minimal stage. Some of the technology identified included scanners, internet connection, standalone computers, printers, saver and digital repository. However, the software tool installed for storage of the digitized

“district notebooks” archives was not format neutral but a proprietary one. Commenting on technology infrastructure, participant 1 lamented as follows:

“...ICT infrastructure is [limited] at the NAZ and that there only exist specialized scanners to digitize printed formats that are stored on a non-server based commercial software called ALCHEMY”.

In addition, on the adequacy of infrastructure, some of the participants were of the view that the infrastructure was generally okay in relation to what NAZ was trying to do at the moment:

“I think I’d put that at 50%. Why do I say so? ICT infrastructure mostly is in place, what is most lacking is the technical expertise. We have the computers, we have the simple scanners, we need advanced technology that will be able to capture information fast but looking at where we are coming from there was nothing and then we began to put in place certain things. I think I am going to give a 50%.” “Curation requires government commitment because this is a government institution, as the pawns down here we can stir up something but the political will should be to put funds to achieve that so there are insufficient funds” (Participant 3).

While others such as Participant 2 alluded to the availability of ICT infrastructure which they however stated was not adequate enough due to insufficient funding. *“The existing infrastructure is becoming obsolete and needs to be replaced. However, funding towards the NAZ and for such activities have generally not been good”.*

Digital repository

Under the sub-theme infrastructure, researchers sought to determine if the NAZ has a functional digital repository for storage and preservation of their born digital or migrated archives. Results revealed that staff either did not know about the repository or that the NAZ does not have a functional digital institutional repository at the moment. For example, participant2 and participants3 indicated that the NAZ has a software tool called KOHA for Library Management and ALCHEMY a digital repository for storage of some digitized archives. It was stated further that the decision to use the software was suggested by donors but current plans were under way to upgrade to a more cost-effective software:

...we are positioning ourselves because you need to understand that government now is going electronic, meaning we will now have records that will be born electronically and we will be archived electronically. So what it is, is that we are going to engage SMART Zambia which is in charge of the management of e-records in government so when we engage them, we tell them what we want here and they will be able to design something so that we have digital repositories on our end.”

Digital content management

Following up on the existence of the software (ALCHEMY) participants we asked if they ever manage content digitally. Results showed that some aspect of digitization is taking place and the digitized content is stored and managed in ALCHEMY: *“Basically we were doing that initially, because when we are digitizing, whatever we digitize we throw it on the software called ALCHEMY” (Participant 2).*

Archivist experience working with software (ALCHEMY)

Further probing was done to assess the experiences of archivists with the software and the measures taken towards long-term preservation. It was discovered that archivists who have had the chance to use the software enjoyed using it even though they felt that it is used to store small [limited] amounts of records: *“the ...software is only compatible with smaller quantities of information and is centrally located within the archives requiring users to physically visit the organization to obtain information (Participant 2).*

A more decentralized system such as Dspace as well as good internet connection was also recommended: *“I’ve used it before; it’s a good software if you are targeting smallholdings. But there is something that I do not like. I believe information should be used in its most strived sense as long as it’s not classified it’s not causing legal issues it should be used, and as far wide as possible to improve people’s lives this is why I’m saying if we can have systems like Dspace and good internet connection that would be better because I believe it’s not a good thing for someone to come all the way from Mkushi for example, just to come and consult materials here and they are not sure whether the materials are in there or not” (Participant 2).*

Policy and Strategy on digital records curation

Further, we asked participants whether the NAZ has an institutionalised policy and strategy to guide the digital curation of records in light of Zambia’s digital transformation. It was revealed that currently, the NAZ does not have a localised policy, nor does it have a strategy addressing digital records curation. Participants had the following to say in this regard: *“As far as I know the NAZ does not have a policy or strategy on digital curation” (Participant 1).*

“No, we don’t have apart from the national strategies and ICT policy that government uses” (Participant 2).

“I have personally not come across one, so I think we do not have localised policies or a strategy showing how we will move with digital transformation or digital curation as you call it” (Participant 4).

Further, observation and analysis of the NAZ Act of 1995 and the national records management policy of 2012 showed that both the Act and the Policy do not address digital curation and digital transformation and they both require revising and amending in order to deal with emerging issues in records management.

Challenges to undertake digital curation

Finally, we asked participants to share the challenges faced in their efforts towards digital records curation, and the major themes identified were inadequate funding, inadequate staffing and lack skills, and inadequate infrastructure. Participants unanimously stressed that inadequate funding was the major challenge at NAZ. For instance, participant 2 submitted that *“Number one funding, number two manpower challenges, and with insufficient manpower [and] you also have a limited manpower trained”.*

Other challenges related to infrastructure particularly technological obsolescence, software licensing issues, funding and skilled labour. For example, Participant 2 lamented as follows: *“...we don’t have software developers; we don’t have historians. Now we are talking about technology being obsolete sometimes”*

Discussion of findings

The study sought to investigate preparedness for digital records curation in Zambia through the lens of the NAZ. To determine readiness, researchers evaluated awareness, knowledge and skill and infrastructure adequacy at the NAZ. Results showed that archivists in Zambia have come across the concept of digital records curation. However, there is need for awareness raising so that archivists and other records management officials can be confident about digital records curation if they are to work and champion the need for it.

Further, as regards knowledge and skills, the study revealed that some archivists had some knowledge about digital records curation but generally participants felt that they lacked the skills and knowledge to champion digital curation and therefore need capacity building in this regard. Literature on digital curation in many low resourced countries show that there is a lag in preparedness due to lack of awareness, limited knowledge and skills and existence of a myriad of challenges (Keakopa, 2010; Ogbemor, 2011; Ndhlovu, Phillip & Matingwina, 2018; Odhiambo, 2019; Shibambu & Ngoepe, 2020; Chaputula, 2022). Knowledge and technical skill fit under the digital infrastructure component of the DPCMM focusing on the activities that are to be undertaken in order to curate and preserve digital records. Further, technical expertise and collaboration are critical in ensuring effective digital curation and therefore preparedness. Results show that this was not the case at NAZ and as Hamooya (2011) observed, some staff at the NAZ lacked computer skills and showed a lack of knowledge and skills in digital preservation.

Regarding adequacy of infrastructure to support digital records curation at the NAZ, findings revealed that while the NAZ has infrastructure such as scanners, internet connectivity, printers and servers. The infrastructure was generally inadequate for digital records curation as the existing repository software used for storage of digitised district archives was not an open standard technology but proprietary and needed updating. While standalone computers were available as Hamooya (2011) noted, there was need to invest in capacity building for technical expertise, workstations, high-speed servers, development of a dedicated NAZ website, and installation of a secure digital repository for storage available users. Additionally results revealed that while the NAZ is anchored by the NAZ Act of 1995, the records management policy of 2012 and other legislation. The lack of a localised policy or strategy document to provide guidance regarding curation of archival records in light of Zambia's digital transformation denotes a lack of preparedness. This is because these are essential elements or requirements for sustainability for an institution to be considered prepared for digital preservation (Dollar & Ashley, 2014).

The study also revealed that the NAZ is faced with a myriad of challenges in its attempts for digital curation and preservation. Chief among the challenges is the lack of skilled personnel to spearhead digital records curation, inadequate infrastructure and funding. Technical expertise is one of the components and thresholds required to facilitate dialogue and plan for a successful digital service (Dollar & Ashley, 2014). The lack of technical expertise as Ogbemor (2011) rightly observed is one of the key reasons why low resourced countries have lagged behind in projects such as digital curation. Further, as noted in the findings, the NAZ does not have a localised policy or strategy outlining key their plans, objectives and activities to be carried out in order to explain their role in Zambia's digital government, their plans for targeted training of staff and the way forward. Regarding the lack of technology, Hamooya, Mulauzi and Njobvu (2012) a decade ago observed that access to digitised materials at the NAZ was impeded by

inadequate numbers of computer terminals and guiding manuals to aid researchers in accessing and using digital databases.

Conclusion and recommendations

In conclusion, this paper investigated preparedness for digital records curation in Zambia: case of the NAZ and employed qualitative research methods and the DPCMM. Results revealed low awareness about digital curation even though some archivists were aware. Further, results showed limited knowledge and a lack of skills to be able to champion digital records curation. Findings also revealed inadequate infrastructure as there was no written institutional policy or strategic plans to guide digital curation at the NAZ. Additionally, while the NAZ has computers, scanners and a digital repository for storage of scanned documents, the equipment requires upgrading and migration to format neutral software. Therefore, when evaluated against the requirements of the DPCMM components of digital preservation infrastructure; trustworthy digital repository; and digital preservation services, the NAZ fit into level one (1) or minimal level maturity. At a minimal maturity level, critical issues such as systematic digital preservation programs do not exist yet or the records management programme exists only on paper (Dollar & Ashley, 2014).

Based on the results and the review of literature, the following is recommended:

- Need to improve archival education and training of archival professionals in digital records curation in Zambia.
- Revision of the NAZ Act of 1995 in order to address the gaps in the existing Act.
- Develop institutional digital curation strategy and policy to guide migration.
- Increased financial support towards development of technical infrastructure such as a server to host website and repository.

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