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Ingesting digital records into an archival system: conceptual framework within a South African perspective

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Abstract

The National Archives and Records Service of South Africa Act (No. 43 of 1996) as amended (NARSSA Act) (Republic of South Africa 1996) requires that the National Archives and Records Services of South Africa (NARSSA) should identify records with archival value. In addition, it requires that such records be preserved as part of the national archive heritage. The receipt of digital records from government bodies is a crucial responsibility of NARSSA. Through the National Automated Archival Information Retrieval System (NAAIRS), NARSSA aims to ensure that records are preserved. Transferring digital records to NAAIRS is a responsibility assigned to NARSSA by the NARSSA Act to enable citizens and researchers to access preserved digital records. In this way, its commitment to nation building and social cohesion by taking archives to the people is achieved by NARSSA. The purpose of this paper is to explore the key components to be considered when ingesting digital records into the NAAIRS, South Africa. This study is based on a conceptual framework based on standards endorsed by NARSSA and the Access to Memory (AtoM) NAAIRS database. This qualitative study uses document analysis as a data collection tool. The findings recommend that a framework be considered for standardising the ingestion of digital records on the NAAIRS.

Keywords: National Archives of South Africa, ingestion, digital records, National Automated Archival Information Retrieval System (NAAIRS), Access to Memory (AtoM), trustworthiness of digital records

Introduction and background

The National Archives and Records Service of South Africa Act (No. 43 of 1996) (NARSSA Act), as amended, (Republic of South Africa 1996) defines a record as any form or medium of recorded information. Similarly, Nyampong (2015), the National Archives of the United Kingdom (2021) and Law Insider (2022) describe a record as recorded information of continuing and enduring value that is useful to the citizens of a country and is required to advance the administrative functions of governmental bodies. With the advancement of technology, paper-based records have been replaced by what is referred to as digital and digitised records. According to Nyampong (2015) and Rahman (2020:21), a digital record encompasses a combination of text, data, graphics, images or audio information created, maintained, modified or transmitted in digital form by information and communication technologies (ICTs). Jacobs and Lemekoana (2021:2) argue that digital records encompass records that can be accessed and read with the aid of computers and associated technology, including electronic, born-digital and digitised records.

Determining the archival value of, among other things, digital records is the responsibility of the National Archives and Records Service of South Africa (NARSSA). Section 3(e) of the NARSSA Act (Republic of South Africa 1996) requires that the NARSSA should manage and make digital records created or collected by government departments and participating institutions, accessible. The National Automated Archival Information Retrieval System (NAAIRS) serves as a finding aid to help users of archives identify and locate digital records that are relevant to their information needs. According to NARSSA (NARSSA 2022), digital records preserved in the NAAIRS database should include oral records, photographs, books, cartographic material, non-public records and audiovisual material. The NAAIRS must thus provide access to collections of digital records, regardless of form or medium, that are earmarked as archival in nature by the NARSSA. Records of lasting value are required to be transferred to ensure its future accessibility (Mojapelo & Maleka 2023). In the context of the transfer, the authenticity of records should be maintained. This requires of the transferring institution and the new custodian institution to establish controls to demonstrate an uninterrupted chain of custody. In the context of digital records, control over the transfer of records becomes increasingly important to ensure trustworthiness through the archival bond. Duranti (2009:52) posits that the trustworthiness of the transferred digital records is reliant on ensuring the accuracy, reliability and authenticity of such digital records. Supporting trustworthiness during the ingestion of digital records into the NAAIRS is crucial to advance the commitment of NARSSA to nation building and social cohesion. Due to technological advancements, the extent of digital records to be ingested into databases such as the NAAIR, aimed at supporting nation building, has increased. Veeramootoo, Nunkoo and Dwivedi (2018:161) explain that technological advancements have led to a shift in the manner in which government renders services to citizens. In an effort to modernise public administration processes, governments around the world are providing services and access to records online. As the number of digital records expands, so has the need to ensure that the archival bond and trustworthiness of digital records are maintained. In instances where digital records are transferred to a custodian organisation such as the NARSSA, strict guidelines and processes are required during the ingestion process to secure the archival bond of transferred records. Hence, the study explored guidelines to ensure the ingestion of digital records to the NAAIRS, while ensuring the trustworthiness and security of the archival bond.

Contextualisation

The NAAIRS was implemented in 1974 to make provision for the transfer of records of enduring value to the NARSSA. In 2011, the NAAIRS database was reported to have become obsolete and had to be upgraded, as no new entries could be added (NARSSA 2022). The limitations of the NAAIRS were cited by Pieterse (2021:53), who states that NARSSA traditionally focused on paper-based records, with the old NAAIRS pointing to paper-based records (metadata only), rather than the digital record itself. A new NAAIRS database was needed to ensure that access to digital records could be extended, so that actual records, and not just references to the records or its metadata, were available. Towards expanding the goal of increasing access to digital records of lasting value, the NARSSA chose Access to Memory (AtoM) as the solution. AtoM is a web-based archival description software system based on the International Council on Archives (ICA) standards. It uses encoded archival description to make it easier for archival institutions worldwide to ensure online access to archival holdings. The new NAAIRS in AtoM enabled NARSSA to link digital records to previously captured data and to new data in the database. The first digital object to be made accessible online was the Rivonia sound recordings. As part of an international cultural agreement, NARSSA entered into an agreement with France to digitise the sound recordings of the Rivonia Trial. Five hundred and ninety-one (591) dictabelts were digitised by the French Audio-visual Institute (INA) as part of this collaboration project. Using AtoM, digital records are now accessible through the NAAIRS database (NARSSA 2022).

The NAAIRS database functions as an integrated archival information retrieval system due to AtoM capabilities. AtoM gives the NAAIRS database the ability to identify archival records on a given subject, as well as store and locate digital records. Although important historical events, such as the Rivonia trials, are now available online, there are other archival collections that require online access to support and build social cohesion. Towards the enhanced utilisation of the NAAIRS with its AtoM capabilities, NARSSA (2022) is in the process of digitising collections related to the Truth and Reconciliation Commission (TRC), State Secretary (SS), Department of Native Affairs (NTS), Independent Electoral Commission (IEC) and the 1994 election records. In addition, and in accordance with section 3 of the NARSSA Act (1996), it is essential for NAAIRS to receive transfers of digital records from government bodies. A framework to ingest digital records into the NAAIRS can provide guidelines for the inclusion of digital records related to the above and other collections.

Problem statement

Although NARSSA is aware of the growing need to support access to digital records, the institution acknowledges that aspects, such as infrastructure and policy directives, are impeding the extent to which digital records can be archived for future use (National Archives and Records Service of South Africa 2016). For example, Ngoepe (2017:32) explains that digital records of enduring value created by Rand Water since 1991 are long overdue for transfer to NARSSA as per the disposal authority. For most NARSSA archival holdings, only metadata of digital records are available and not the actual digital records. This fact coincides with the concerns raised by Pieterse (2021) who states that although national archives in countries such as Canada, Australia and the United Kingdom have made policy changes to facilitate the transfer of digital records to their

archives. the same is not the case in South Africa. NARSSA (2022) argues that even after the NAAIRS overhaul, the transfers of digital records into the NAAIRS from governmental bodies are lacking. Failure to ingest digital records into the NAAIRS implies that NARSSA is contravening the NARSSA Act (1996). As per section 3 of the NARSSA Act (1996), NARSSA is responsible for the collection and preservation of records of enduring value from governmental bodies. Failing to ingest digital records into the NAAIRS is creating historical gaps in the holdings of the NARSSA as records relating to specific periods of the activities and decisions taken by governmental bodies are not available. Mojapelo and Maleka (2023:7) explain that the failure of organisations to transfer digital records to an archival repository led to loss of records required for decision-making and contextualising historical events. If NARSSA does not ingest digital records from governmental bodies, there is a risk that valuable archival information and digital documented memories would be lost (Ngoepe 2017). Furthermore, records at offices of origin may be lost as government organisations run out of resources to manage and store digital records. Towards creating enhanced opportunities to encourage the ingestion of digital records to the NAAIRS, it is essential for NARSSA to propose an ingestion framework that will encourage government organisations to transfer digital records for preservation and access purposes.

Purpose and objectives

Aligned to the consequences of not ingesting digital records into the NAAIRS, the purpose of this article was to propose a framework to guide the ingestion of digital records of archival value from governmental bodies into the NAAIRS. Towards achieving this purpose, the objective of this article was to:

- propose a framework for the ingestion of government organisations' digital records into the NAAIRS database.

The proposed framework is based on an extensive literature review, as well as observations and viewpoints of the researchers who acted as participants in the formulation of the proposed framework.

Literature review

Aligned to the research objectives, the aim of the literature review was to explore requirements that focus on ingesting digital records into the NAAIRS database. In relation to existing directives, section 3 of the NARSSA Act (1996) requires government organisations to manage records, whether paper based or digital. Toward ensuring the effective management of records, the NARSSA Act (1996) emphasises the importance of each government organisation to develop its own records management policy, processes and procedures in accordance with the requirements of the NARSSA Act (2006:51). Policies, processes and procedures should further align with the overall mandate and mission of each government organisation and cover digital record management practices towards effective preservation in detail (Mojapelo & Maleka 2023:6). Research by Marutha (2016) and Jacobs and Lemekoana (2021) highlights a lack of existing guidelines pertaining to the management of digital records. In addition to a scarcity of guidelines, Mojapelo and Maleka (2023:6) also explain that existing procedures and policies are often outdated because of the speed at which technology changes.

Despite limitations that impact the existence of digital record management practices, the NARSSA Act (1996) provides clear guidelines on the importance of managing different record management practices. For example, section 13(2)(b)(i) of the NARSSA Act (1996) requires government bodies to create and maintain their electronic records by using the functional subject file plan. NARSSA (2006:15) states that in order to ensure that authentic and reliable digital records are created and maintained according to the file plan, the context of digital records to be created, captured and managed should be identified. Gregory (2005) and Modiba, Ngulube and Marutha (2023:39) assert that file plans should be created to ensure that records are categorised according to the functions of an organisation and stored in an organised manner, which will allow timely retrieval and easy access to records. Similarly, Mosweu and Bwalya (2023) add that a file plan should continuously be reviewed and, where necessary, updated to ensure that digital records are preserved.

In addition to file plan information, section 13(2)(a) of the NARSSA Act indicates that no public record under the control of a governmental body shall be transferred to an archives repository, destroyed, erased or otherwise disposed of without the written authorisation of the national archivist. According to Sodring, Reinholdtsen and Massey (2020:221), digital records management practices should thus also include detail related to the disposition, metadata management and preservation of digital records. Disposal authority guidelines that will lead to the full automation of records management practices should be included in the digital records guidelines of government organisations (Mosweu & Bwalya 2023). To ensure the effective transfer of digital archival repositories, NARSSA (2006:5) emphasises the importance of linking metadata to digital records prior to the transfer.

Joseph, Debowski and Goldschmidt (2012) define metadata as any data about the organisations' data. Adequate metadata must be captured by government organisations in order to allow long-term access to digital records. Metadata ensure the integrity of the records' dependability, trustworthiness, usability and integrity over time. NARSSA (2006:5) emphasises that metadata must be controlled to guarantee their accuracy in assisting with the appraisal and accessibility of digital records. Metadata controls must ensure that digital records are organised systematically through schemas (Rolan 2017) and provide details on activities, people and organisations, geography, timing and motivation for the preservation related to digital records (Masenya 2021).

Metadata controls should not only facilitate the discovery of digital records, but should also ensure the existence of control to access digital records. Masenya (2021) opines that unless the content of digital records is described with descriptive, structural, administrative and technical metadata, access to digital records becomes problematic. To encourage the development of sound and relevant guidelines to govern digital records management practices, NARSSA provides guidance to government bodies to assist them in designing metadata strategies. NARSSA (2006:6) asserts that metadata should provide context to individual documents to ensure legally admissible records with evidential weight. It is essential that adequate metadata is captured at the office of origin in order to give context to the digital records. Metadata are required to ensure the authenticity, reliability, integrity, accuracy, adequacy and completeness of digital records. All events that affect the reliability of digital records must be recorded, and that audit trail must be kept as an unalterable record. It is also important that a system should log the history of all the changes that have been made to a digital record, including the date on which the changes have been made and the identification of the person who has taken the action. Moreover, the system must be able to log

changes to the digital records and to the metadata to ensure that the records remain reliable and trustworthy (NARSSA 2006:24).

To develop an electronic system that can ensure effective metadata management, the North Carolina Department of Natural and Cultural Resources (2019) uses Bagger (a Library of Congress tool). The Bagger tool can be used to create unique identifiers for files, subdirectories that contain the actual files and metadata, and a file structure of an entire directory (called a bag). In the South African context, the Bagger tool may be an essential tool to ensure that the authenticity of digital records is verified while in the custody of the governmental body, during the transfer and after ingesting it into AtoM. The consideration and use of such a tool require clear stipulation in the digital records management policy of a government organisation develops. NARSSA (2006:50) emphasises the importance of infrastructure specifications as part of digital record management practices. The importance of the inclusion of such infrastructure is to ensure that poor ICT does not hamper the effective implementation of an e-records management system. Current recording media for digital materials are at risk of deterioration and catastrophic loss. Duranti and Preston (2005) state that digital records must be carefully managed throughout their entire existence to ensure that they are accessible and readable over time with their form, content and relationships intact to the extent necessary for their continuing trustworthiness as records.

More challenging than media deterioration is the problem of obsolescence in playback technology. Rapid innovations in the computer hardware and software industry result in new storage products and methods on a regular basis. These new products replace old storage devices and media, and hardly ever provide fully backward compatibility. Besides physical obsolescence, the logical obsolescence of the digital data is often overlooked. The rapid development of file formats and the strong dependency between digital objects and the software environment are becoming a pressing problem. As part of decisions to ensure the long-term preservation of digital records, key considerations should thus be given to emulation or migration (Duranti & Preston 2005). Only through predetermined decisions can government organisations prepare for the effective management and preservation of digital records. Without clear guidelines, informed by sound conceptual constructs, many digital records of enduring value may be discarded or simply become inaccessible because of media deterioration. Towards securing the access to historic documents that can be used to inform society, improve decisions and act as evidence of community existence, the lack of access to digital records may pamper the achievement of the fundamental tenants of democracy (Mojapelo & Ngoepe 2020:3).

Research methodology

As information on the ingestion of digital records for future preservation is unique in the South African context and given the legislative guidelines as per the NARSSA Act (1996) that require such ingestion of records into the NAAIRS database, the focus of this article is on conceptualising a framework that may be utilised to achieve the legislative guidelines. This framework is important as its aim is to provide guidance on policy development and directives of government organisations so that the preservation of digital records can be ensured. Towards proposing such a framework, a non-empirical research design was followed. Non-empiricism relies on theories, methods and personal observations to draw conclusions (Dan 2017). Although different in context from empirical research where the focus is on variables or measurements, the non-empirical approach

stems from an interpretivist paradigm, where the emphasis is on gaining an in-depth understanding of aspects relevant to the phenomenon. Social reality as part of interpretivism in this research remains the underlying construct, as the complex issue of policy development towards enhanced digital records management practices cannot be fully understood without considering multiple realities and interpretations (Kivunja & Kuyini 2017:33). From the perspective of the researchers, these realities included individual perceptions and experiences from the National Archives of South Africa, government organisations as well as literature that contextualises the problem and suggests possible solutions. Considering various realities required the researchers to allow for the collection of in-depth, non-numerical data related to variables that should be considered in the planning of a sound records management policy framework to guide the effective management of digital records. A content analysis design was followed to understand the research phenomenon. The researchers acted as participant observers while analysing practical situations and legislation about the phenomenon (Creswell 2014:236) to propose a framework for ingesting digital records as part of the NAAIRS and AtoM databases. This framework, as envisaged, provides the foundation for the development of policies that will ensure the effective management of digital records in South African government organisations.

Proposal of a conceptual framework for the ingestion of digital records – key suggestions

Linked to the objective of this article, this section suggests a conceptual framework that should be considered for the ingestion of digital records into an archival system in South Africa. As explained before, government organisations are required by the NARSSA Act (1996) to comply with the requirements prescribed by the National Archives when creating and managing digital records in their custody. The need for compliance as per the NARSSA Act (1996) aligns to the view by authors such as Matlala, Ncube and Parbanath (2022), who state that government organisations should manage their records in compliance with the legislative framework of their country of origin. Furthermore, Matlala et Al. (2022) suggest that in order to meet legislative mandates, national archival organisations need to propose ways that will address the preservation of records created in various formats in government organisations. To comply with the requirements of the NARSSA ACT, government organisations are required to ensure that there are policies and procedures in place to outline the procedures for managing digital records in their respective entities. The systems storing and managing records should be able to incorporate a file plan, which must be approved by the national archivist in terms of section 13 of the NARSSA Act (1996). Government organisations are also required to establish mandatory metadata guidelines, as prescribed by NARSSA, that will promote the authenticity and trustworthiness of archival records. Furthermore, as required by the NARSSA Act (1996), digital records must remain available, usable, understandable and authentic over a long period of time. As such, steps must be taken to ensure that the records are adapted or migrated to be compatible with new technological formats, storage media and software. This is of particular concern, as Ngoepe (2017) and Mojapelo and Maleka (2023) indicate that arrangements for the transfer of electronic records after 20 years, as per current legislative requirements, are not feasible due to the continuous changing nature of digital records. A revised directive is needed to assist government organisations in planning for the ingesting of digital records into the national archives collection from their creation, to ensure future accessibility.

To offer such a revised directive, the aim of this article is to propose a conceptual framework that can help provide a picture or visual representation of how digital records can be preserved (Modiba 2021). The framework as presented in Figure 1 is based on three key considerations related to the

NARSSA requirements, the standards endorsed by NARSSA and the standards embedded in AtoM. The standards endorsed by NARSSA include SANS 23081, SANS 15489 and SANS 16175, all of which are adopted from the respective International Organisation for Standardisation (ISO).

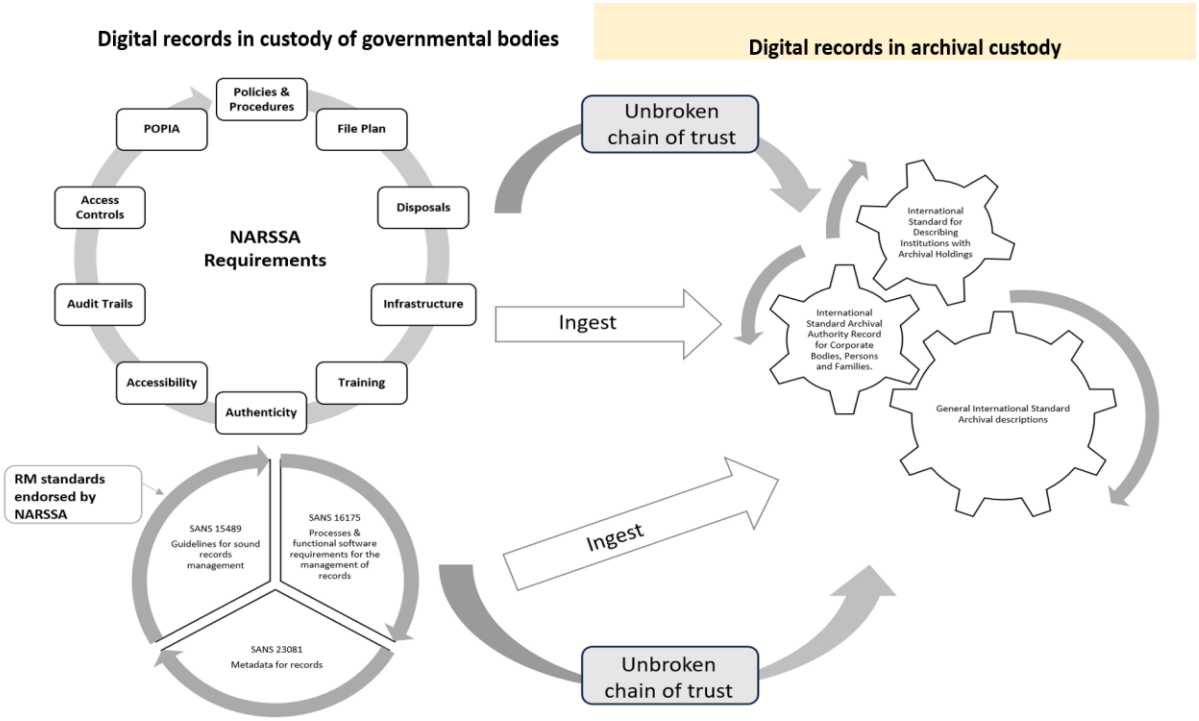

Figure 1: Framework to ingest digital records into the NAAIRS in South Africa

The NARSSA requirements, as per Figure 1, relate to the establishment of policies and procedures, file plans, disposal schedules, ICT infrastructure, offering training and ensuring authenticity, accessibility and audit trails through the effective use of metadata. In addition, metadata are to be used to ensure access control so that requirements of the Protection of Personal Information Act (4 of 2013) can be met. By implications, metadata should provide clear directives as to what information should be disclosed and for which period of time, as per the guidelines of the Protection of Personal Information Act (2013). Other legislation such as the National Archives and Records Management (POPI) Act (1996) and the Promotion of Access to Information Act (PAIA) (2000) should also be considered. Key information of these and other legislation, as it may guide the activities of a government organisation, should be utilised towards ensuring that standards endorsed by NARSSA are achieved.

NARSSA endorses the following standards as the required benchmarking tool for records management: SANS 15489, SANS 16175 AND 23081 (NARSSA 2006). In terms of its statutory mandate, NARSSA requires governmental bodies to put the necessary infrastructure, policies, strategies, procedures and systems in place to ensure that records in all formats are managed in an integrated manner (NARSSA 2006). Part 1: General of SANS 15489 presents a high-level framework for recordkeeping and covers the benefits of record management, regulatory concerns

that affect its operation and the significance of allocating recordkeeping tasks (South African Bureau of Standards 2004). It also covers general records management requirements, the design of recordkeeping systems, and the actual records management practices. Finally, the standard focuses on records management, audit procedures and training needs for an organisation's entire workforce. Part 2: Guidelines of SANS 15489 focuses on the application of the framework established in Part 1: General. It covers considerable detail on developing a record management policy and accountability statements. In addition to detailing the process of creating recordkeeping systems, it also gives practical recommendations for the establishment of electronic record procedures and controls, including important recordkeeping mechanisms, disposal authorities and security and access classification schemes. Part 2 of SANS 15489 discusses the use of the tools involved in capturing, registering, classifying, storing, providing access to and managing digital records. It also includes detailed instructions for establishing monitoring, auditing and training programmes to promote and execute records management within the organisation (South African Bureau of Standards 2004).

SANS 16175 (2014) focuses on processes and functional software requirements for the management of records. Part 1 of this standard deals with functional requirements and associated guidance for any applications managing digital records. The aim of this standard is to define the model, high-level functional requirements and explanatory information and usage recommendations for any software programme designed to handle digital records (South African Bureau of Standards 2014). SANS 23081 (2009) defines metadata for records as "structured or semistructured information that allows the formation, registration, categorisation, access, preservation, and disposition of records through time and with and between access domains" (South African Bureau of Standards 2009). Furthermore, metadata can be used to identify, authenticate and contextualise documents, as well as the people, processes and systems responsible for their creation, management and maintenance, as well as the regulations that govern them. SANS 23081 posits that metadata defines a record at its point of creation, fixes the record into its business context and establishes management control over it. Furthermore, there are metadata schemas that are required to ensure that records can be proven to be reliable and authentic (South African Bureau of Standards 2009).

These standards and NARSSA requirements must be considered and applied in the development of a stable and effective ICT infrastructure to ensure that digital records are ingested into the NAAIRS and AtoM database. The ICT infrastructure should ensure that records determined to be archival in nature should be ingested into the archival system. This is important because it provides information on the extent of archival records that exist in governmental bodies and should thus be ingested into the archival system. Related to the ICT infrastructure and particularly the AtoM, the International Standard for Describing Institutions with Archival Holdings (ISDIAH) (2008) establishes broad guidelines for standardising descriptions of institutions with archival holdings (International Council on Archives 2008). This permits the provision of detailed guidance on discovering and contacting archive holdings organisations, as well as accessing holdings and associated services. Similarly, the International Standard Archival Authority Record for Corporate Bodies, Persons and Families (ISAAR) applies to the AtoM in that it provides guidelines for creating archival authority records that include descriptions of entities (governmental bodies, individuals and families) involved in the development and upkeep of archives (International Council on Archives 2003). According to ISAAR, the archival descriptive system should be used to describe the entity of archival authority records as a unit, as well as to manage the creation and use of access points in archive descriptions. Furthermore, the ISAAR requires that links be used

between distinct record creators and between those entities and the records they create and other resources about or by them. Finally, when utilising the AtoM to ingest digital records, the General International Standard Archival Description must be used (International Council on Archives 2002). The General International Standard Archival Description provides general guidance for preparing archival descriptions with the goal of identifying and describing the content and context of archival material in order to improve its accessibility. This standard is imperative for this study, as it provides structure and standardisation related to metadata of the archival records captured in AtoM.

Of importance to note about the proposed framework is that all components are required to create an infrastructure that will support the ingestion of digital records into the AtoM. The aim is to maintain an unbroken chain of custody so that digital records transferred from government organisations to the National Archives of South Africa can ensure the trustworthiness of the digital record. Presenting the archival bond is imperative to show the relationship that connects each record to its original creator, as well as the structure of the records. Without following clear guidelines set by the NARSSA, international standards and standards related to the establishment of the AtoM, such an archival bond will not be maintained and the trustworthiness of digital records ingested to the NAAIRS will be affected.

Conclusion

The NARSSA requirements and NARSSA-endorsed SANS complement each other in that their combined analysis shows how digital records in the custody of governmental bodies can be managed effectively until they are ingested into the archival system. They also serve as a foundation for assessing the extent to which digital records and systems exist in government bodies, in preparation for ingesting into the archival system. NARSSA requirements, SANS and standards embedded in AtoM provide details on key components to consider when managing digital records from creation to final transfer to NAAIRS. Incorporating the key information of these concepts will provide government organisations with key guidelines to consider in creating a conceptual construct for the ingestion of digital records of individual government organisations to the NAAIRS.

Identified requirements and endorsed standards are critical to ensuring that digital records in the public sector are managed in such a way that their authenticity is maintained even during their transfer to archival custody. Furthermore, the requirements and standards approved by NARSSA must be in alignment with the standards embedded in the archival system to ensure seamless transfers. Based on evolving technology, which has a direct impact on records management, records management staff need to create opportunities to improve their expertise in digital record management. There is also a need for research into the technologies available to facilitate the entry of digital records into archival custody and ensure that the authenticity of the records is maintained throughout. The framework proposed in this article acts as a starting point for further engagement to improve and strengthen the ingestion of government records to the NAAIRS and AtoM. For the NARSSA to fulfil its mandate and ensure that digital records of archival value are transferred from governmental bodies and ingested into the NAAIRS, a framework as proposed in this article requires further exploration. If NARSSA does not ingest digital records from governmental bodies

, there is a risk of valuable archival information being lost (Ngoepe 2017) and digital documented memories not being retrievable due to the limited use of databases to collate digital records.

Note: Thulisile Lemekoana is a PhD student in the Department of Information Science at the University of South Africa

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