EVALUATION OF DIGITAL PRESERVATION INITIATIVES IN CULTURAL INSTITUTIONS: A CASE OF TOORO KINGDOM

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DECLARATION

I hereby declare that this dissertation titled: **Evaluation of Digital Preservation initiatives in Cultural Institutions: The Case of Tooro Kingdom** is my own initiative and has not been copied from any other institution of higher learning? All secondary sources used have been properly cited.

Obunaka Sam

4 March 2025

APPROVAL

I certify that this dissertation has been presented with my approval as supervisor.

MR. FRANCIS SSEKITTO

Date: 4 March 2025

DEDICATION

I dedicate this research to my family. They have always believed in my potential and inspired me to pursue my goals with determination. This work is a testament to their sacrifices and commitment to my education and personal growth. Thank you for being my greatest supporters.

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ABBREVIATIONS

CCPA:	California Consumer Privacy Act
CTDA:	Connecticut Digital Archive
CCSDS:	Consultative Committee for Space Data Systems
DACHS:	Digital Archive for Chinese Studies
DPC:	Digital Preservation Coalition
DPN:	Digital Preservation Network
GDPR:	General Data Protection Regulation
ICA:	International Council on Archives
ISO:	International Organization for Standardization
ICESCO:	Islamic World Educational, Scientific and Cultural Organization
LOCKSS:	LOCKSS
MakIR:	Makerere Institutional Repository
MoES:	Ministry of Education and Sports
NCHE:	National Council for Higher Education
NCS:	National Council of Sports
NCDC:	National Curriculum Development Center
NDIIPP:	National Digital Preservation Strategy
NDSA:	National Digital Stewardship Alliance
NESTOR:	Network of Expertise in Long-Term Storage of Digital Resources
PREMIS:	Preservation Metadata Maintenance Activity
RCM:	Records Continuum Model
UAHEB:	Uganda Allied Health Examinations Board
UBTEB	Uganda Business and Technical Examinations Board
UNEB	Uganda National Examinations Board
UNMEB	Uganda Nurses and Midwifery Examinations Board

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ABSTRACT

Digital preservation is necessary to ensure the longevity of archives in cultural institutions. This study examined the digital preservation initiatives at Tooro Kingdom and their impact on accessing archives. The primary aim was to assess the effectiveness of these initiatives in preserving the Kingdom's cultural heritage and to identify the challenges faced in this process. The research focused on four key areas: identifying the types of archives that have been digitized, analysing the current digital preservation efforts, exploring the challenges affecting these initiatives, and developing a framework to enhance digital preservation practices. The study was qualitative involving 20 participants from Tooro Kingdom and Mountains of the Moon University. The findings revealed that Tooro Kingdom has made significant progress in digitizing various archives, including historical documents, audio recordings, economic records, government agreements, and public health information. This digitization is crucial for safeguarding the Kingdom's rich cultural heritage and ensuring that valuable historical narratives remain accessible for future generations. However, the study also highlighted several critical challenges, including the absence of specific policies guiding the selection and management of digital archives, technological limitations, funding constraints, and organizational issues. These barriers hinder the effective management and accessibility of digital archives, emphasizing the need for improved infrastructure and dedicated resources. To address these challenges, the study proposes a comprehensive framework that integrates established best practices from recognized models in digital preservation, such as the OAIS reference model and the NDSA Levels of Digital Preservation. This framework emphasizes the importance of collaboration between Tooro Kingdom and Mountains of the Moon University, aiming to strengthen resource sharing and expertise in archive management. Additionally, the framework advocates for the establishment of clear policies and guidelines to prioritize preservation efforts, enhance metadata management, and ensure long-term accessibility of digital materials. By implementing this framework, Tooro Kingdom can significantly improve its digital preservation capabilities, ensuring that its cultural heritage is not only preserved but also celebrated and shared with future generations. The study ultimately underscores the importance of strategic planning and collaboration in the realm of digital preservation, contributing valuable insights to the broader field of cultural heritage management.

CHAPTER ONE
INTRODUCTION

1.1 Background to the study

Digitization is recognized as a powerful tool for long-term preservation and global access (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2019). Digital preservation offers a solution, ensuring continued access and ensuring the authenticity and meaning of digital objects remain intact for future generations. Digitization is recognized as a powerful tool for long-term preservation and global access (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2019). Digital preservation offers a solution, ensuring continued access and ensuring the authenticity and meaning of digital objects remain intact for future generations. Digital preservation initiatives are essential for cultural institutions globally as they seek to maintain access to digital archives. Globally, many countries have developed significant digital preservation initiatives to ensure that digital information remains accessible for future generations. In the United States, the National Digital Preservation Strategy (NDIIPP) plays a crucial role in safeguarding digital content. This strategy focuses on creating a collaborative network of preservation partners to address the challenges of digital preservation, such as format obsolescence and the need for sustainable practices (Kumar, 2020). The NDIIPP has funded various projects, including the Data Preservation Alliance for the Social Sciences and the Web-at-Risk initiative, which aim to preserve valuable digital resources and ensure their accessibility over time (National Digital Information Infrastructure and Preservation Program, 2023). In Europe, the European Union has been proactive in supporting digital preservation through various projects. The Digital Preservation Partnership is one such initiative that fosters collaboration among member states to enhance preservation practices. This partnership encourages the sharing of best practices and resources, allowing institutions across Europe to work together in preserving digital heritage (Jones & Smith, 2021).

Additionally, projects like the Network of Expertise in Long-Term Storage of Digital Resources (NESTOR) in Germany focus on developing expertise in managing digital information, ensuring that cultural heritage is preserved and accessible (Teper & Shaw, 2011). In Asia, New Zealand's National Digital Heritage Archive highlights the importance of preserving the country's digital heritage. This initiative aims to collect and maintain digital materials that reflect New Zealand's

culture and history, ensuring that future generations can access these resources (Nguyen, 2022). Other countries in the region are also taking steps to enhance their digital preservation efforts. For example, the Digital Archive for Chinese Studies (DACHS) at the University of Heidelberg in Germany aims to archive and provide access to internet resources relevant to Chinese studies, demonstrating an international collaboration in digital preservation (Holdsworth, 2021). In addition to these initiatives, various projects across Europe focus on specific aspects of digital preservation. The e-Depot project in the Netherlands, for instance, is designed to archive online electronic publications and content stored on offline media, ensuring that these resources remain accessible (Ras, 2019). Similarly, the Netarchive.dk project in Denmark collects and preserves the Danish portion of the internet, fulfilling legal deposit requirements and ensuring that important digital content is not lost (Danish Royal Library, 2020). These global initiatives reflect a growing recognition of the importance of digital preservation in cultural institutions. By collaborating and sharing resources, countries can enhance their efforts to protect digital heritage and ensure that valuable information remains accessible for future generations.

Several African countries have also implemented digital preservation initiatives to safeguard their cultural heritage, recognizing the importance of maintaining access to historical and contemporary materials in the digital age. These efforts are crucial for ensuring that valuable cultural resources are not lost due to technological changes and resource limitations. In South Africa, academic libraries have made significant strides in preserving digital materials. However, they face challenges such as inadequate resources, lack of expertise, and software obsolescence, which can hinder effective preservation efforts (Ngulube, 2019). To address these challenges, Ngulube suggests that library management should implement comprehensive policies, allocate sufficient resources, and build robust technology infrastructure. For instance, the University of Cape Town has developed an institutional repository to archive and provide access to digital content, but it requires ongoing support and training to ensure sustainability (Masenya, 2018). Additionally, collaborative efforts among libraries can enhance knowledge sharing and resource pooling, making digital preservation more effective across the region. In Kenya, the Kenya National Archives and Documentation Service has begun digitizing its collections to improve accessibility and preservation of national heritage (Adu & Ngulube, 2016). Similarly, Nigerian universities are increasingly focusing on digital preservation practices to protect their unique

collections, but they often face challenges related to funding and training (Olatokun, 2008). These examples illustrate the diverse approaches to digital preservation across Africa, each tailored to the specific needs and resources of the respective institutions.

The Panjab Digital Library (PDL) serves as a notable example of a successful digital preservation initiative. Although it primarily focuses on the cultural heritage of the Panjab region, its model has inspired similar efforts in Africa. The PDL has digitized over 65 million pages of historical documents, making it the largest digital resource on Panjab (Panjab Digital Library, 2021). Its mission is to locate, digitize, preserve, and make accessible the accumulated wisdom of the Panjab region, regardless of language, religion, or nationality. This initiative highlights the potential for digital libraries to serve as vital resources for cultural preservation and education, which can be replicated in African contexts to preserve local heritage. Digital preservation initiatives have had a positive impact on accessing archives in African cultural institutions. By digitizing and preserving materials, these initiatives have made previously inaccessible collections available to a wider audience. However, the literature also highlights the challenges faced by African institutions in implementing effective digital preservation practices. Inadequate resources, lack of expertise, and software obsolescence hinder the long-term preservation of digital materials (Ngulube, 2019). Collaborations and partnerships with other institutions can help address these challenges by exposing institutions to new ideas, strategies, and tools (Ngulube, 2019).

In Uganda, the Makerere University Library (Africana Section) has evolved a new niche of harvesting "born-digital" news articles on and about Uganda and Africa from local and international news portals for inclusion in the Makerere Institutional Repository (MakIR) (Kasusse et al., 2016). This initiative aims to preserve important news and information about Uganda and Africa for future access. However, the rapidly changing technology environment poses challenges to the preservation of this content, as repositories may become obsolete and limit access to digital content. Recently, the Ministry of Education and Sports (MoES) in Uganda launched a digital Information Centre and organized a comprehensive two-day training session on Digitization Mechanisms for Digital Repositories (UNESCO, 2021). The training, organized by the Uganda National Commission for UNESCO in partnership with the Islamic World

Educational, Scientific and Cultural Organization (ICESCO), aimed to equip participants with the necessary skills for digitizing information, efficient organization and storage of digitized data, and an understanding of legal and ethical considerations in digitization. The training was attended by 40 participants from various educational agencies, including Uganda National Examinations Board (UNEB), National Council for Higher Education (NCHE), Uganda Business and Technical Examinations Board (UBTEB), Uganda Nurses and Midwifery Examinations Board (UNMEB), Uganda Allied Health Examinations Board (UAHEB), MoES, National Council of Sports (NCS), and National Curriculum Development Center (NCDC).

Digital preservation initiatives have significantly improved access to archives in cultural institutions. By digitizing materials, institutions can provide broader public access to their collections. For example, the California Revealed project has made numerous historical documents available online, enhancing public engagement with California's history (Miller, 2021). However, challenges remain, particularly regarding the sustainability of digital formats and the need for ongoing funding and support (Patel, 2024). Despite the positive impacts, the literature also notes that the rapid pace of technological change poses risks to digital preservation efforts. Cultural institutions must continuously adapt their strategies to keep up with evolving technologies and user expectations (Chen & Lee, 2023). The Open Preservation Foundation has highlighted the importance of adopting a comprehensive approach that includes both technological and organizational strategies to ensure effective digital preservation (Thompson, 2023). Short-term strategies include refreshing and migrating data, while long-term strategies focus on emulation and format migration (Arora, 2023). The World Digital Library has partnered with many cultural institutions, including Buganda Kingdom to digitize and share their cultural heritage online (Rakesh et al., 2021). Other renowned digital preservation initiatives include that of Europeana, National Digital Stewardship Alliance, DigitalNZ and National Library of Australia (Rakesh et al., 2021). Makerere University Library also holds a sizeable collection of Buganda Kingdom records, highlighting the importance of preserving traditional kingdom archives (Makerere University, 2024).

Kaddu (2019) recognizes the Tooro Kingdom as one of the cultural institutions preserving its archives. All these have comprehensive digital preservation strategies for archives in cultural

institutions. However, despite the benefits of digital preservation, challenges still remain. Implementing and maintaining digital preservation programs requires sustained funding, which can be a barrier for cultural institutions (Däßler & Preuß, 2019). Additionally, building and maintaining digital preservation expertise requires ongoing training and development. There is also a challenge of keeping pace with evolving technologies and ensuring compatibility with future systems is crucial (Zahara & Salim, 2022). Despite these challenges, numerous cultural institutions are working collaboratively to develop best practices and share resources. International partnerships, capacity-building programs, and open-source tools are helping to make digital preservation more accessible and sustainable for cultural institutions worldwide (Abdelhak et al., 2017). Uganda lacks a national-level digital preservation policy, and smaller institutions like the Tooro Kingdom often struggle with resource constraints (Kaddu & Kigongo-Bukenya, 2016; Pandey & Kumar, 2020). However, initiatives like the World Digital Library collaboration with the National Library of Uganda demonstrate progress in cultural heritage digitization (Kaddu, 2019). It is against this background that this research examined digital preservation of the Tooro Kingdom's archives.

1.2 Background of Tooro Kingdom

The Tooro Kingdom in Western Uganda is one of Uganda's cultural institutions. Its history stretches back to the 18th century where it emerged from the Bunyoro Kingdom. Tooro, like other Ugandan kingdoms was subordinated to the central government, however, the kingdom was restored in 1993 as a cultural institution (Derek, 2015). The kingdom's first king, Omukama Kaboyo, was instrumental in uniting various clans and establishing a centralized authority (Mugisha, 2020). Over the years, the Tooro Kingdom has maintained its cultural significance, with the royal family playing a crucial role in preserving traditions, language, and customs. The Tooro Kingdom is known for its rich cultural heritage, which includes traditional ceremonies, music, dance, and crafts. These cultural practices are vital for the identity of the Tooro people and contribute to Uganda's overall cultural diversity. The kingdom is also home to the famous Amabere ga Nyina Mwiru caves, which are linked to local legends and serve as a tourist attraction (Kagaba, 2021). Preserving these cultural elements is essential for future generations, and digital preservation initiatives can help document and protect this heritage. In recent years, various digital preservation initiatives have emerged in Uganda, including efforts specifically

related to the Tooro Kingdom. For example, the Makerere University Library has been active in digitizing cultural materials, including those related to the Tooro Kingdom, to enhance access for researchers and the public (Kasusse et al., 2016). These initiatives aim to create a digital archive that preserves historical documents, photographs, and oral histories that are essential for understanding the kingdom's past. Furthermore, the Uganda National Museum has also begun digitizing its collections, which include artifacts and materials from the Tooro Kingdom. This effort is part of a broader strategy to improve access to cultural heritage and promote awareness of Uganda's diverse history (Nabudere, 2023). In 2013, the kingdom signed a Memorandum of Understanding with archivists from Mountains of the Moon University granting them temporary custody of its archives (papers) (Derek, 2015). Here, the papers were cleaned, re-covered, catalogued and scanned. These were organized under administration, finance, education, sports and miscellaneous (Derek, 2015). In spite of this initiative, there was not much known about the state of digital preservation of these archives necessitating the need to conduct this study.

1.3 Statement of the problem

Digital preservation is an essential process for cultural institutions, especially in regions like Uganda, where rich histories and cultural heritages are at risk of being lost due to technological changes and resource limitations. Archives held by cultural institutions are important for historical preservation and the promotion of cultural heritage (Wang & Meng, 2023; Flanagan, 2020). To increase access and enhance the longevity of archives, digital preservation is recommended as a viable strategy (Baucom, 2019; UNESCO, 2019; Pandey & Kumar, 2020). However, although the Tooro Kingdom has taken strides in preserving its archives as reported by Kaddu (2019) who recognizes it as one of the cultural institutions in Uganda preserving its archives digitally, there have been reports on accessibility issues. It was reported that Tooro Kingdom was failing to utilize the Archives Centre at Mountains of the Moon University which other kingdoms such as Bunyoro, Rwenzururu and Bwamba, had embraced. Inefficiencies in the digital preservation of archives may result in loss of critical information. This study sought to evaluate the digital preservation initiations at the Tooro Kingdom.

1.4 Aim of the study

The aim of this study was to evaluate digital preservation initiatives in cultural institutions using Tooro Kingdom as a case study.

1.5 Specific objectives

The study intended to achieve the following objectives:

i. To find out which archives are digitally preserved at the Tooro Kingdom.
ii. To analyse the digital preservation initiatives for archives at the Tooro Kingdom.
iii. To investigate the challenges affecting the digital preservation of archives at the Tooro Kingdom.
iv. To develop a framework to enhance digital preservation initiatives at the Tooro Kingdom.

1.6 Research questions

The study was guided by the following questions:

i. Which archives are digitally preserved at the Tooro Kingdom?
ii. What are the digital preservation strategies for archives at the Tooro Kingdom?
iii. What are the challenges affecting the digital preservation of archives at the Tooro Kingdom?
iv. What framework can be developed to enhance digital preservation initiatives at the Tooro Kingdom?

1.7 Scope of the study

1.7.1 Content scope

The content scope of this study focused on digital preservation initiatives in cultural institutions. specifically, within the Tooro Kingdom in Uganda. It explored which archives are currently being digitally preserved, analysed the existing digital preservation initiatives, and challenges affecting the preservation of digital archives. Additionally, the study aimed to develop a framework that can enhance digital preservation of archives, ensuring that the rich history and culture of the Tooro Kingdom are preserved and made available for future generations.

1.7.2 Time scope

The time scope for the study was restricted to the period of 2013-2024. This was because in 2013, it is when the Tooro Kingdom signed a Memorandum of Understanding granting temporary custody of their archives to Mountain of the Moon University archivists to manage them (Derek, 2015). Therefore, taking this timeframe into consideration provided a more accurate picture of the state of digital preservation of the archives.

1.7.3 Geographic scope

The study was conducted in Western Uganda, particularly at the Tooro Kingdom and Mountains of the Moon University. Western Uganda borders Democratic Republic of Congo in the West, Rwanda in the North and Tanzania in the South. It is known for its hilly terrain and cattle keeping (City Population, 2020). By concentrating on this specific area, the study aimed to provide valuable insights into the unique challenges and opportunities faced by the Tooro Kingdom in preserving its cultural heritage.

1.8 Significance of the study

The findings of the study are expected to generate knowledge on digital preservation in cultural institutions which can enhance research potential. This is because the findings may be of interest to other scholars who can use them to contribute to their research. The findings also contribute to improving information management in cultural institutions since digital preservation is one of the key methods that can be employed.

The findings of the study are also expected to inform the necessary stakeholders at the Tooro Kingdom on effective digital preservation strategies which they can use to safeguard their archives for future generations.

The findings of the study are also expected to be of interest to policymakers, other cultural institutions and the government of Uganda. This is because they will provide measures for enhancing digital preservation of archives which they can use to protect cultural heritage.

1.9 Justification of the study

Cultural institutions like the Tooro Kingdom hold invaluable historical and cultural records. Digital preservation initiatives offer a chance to safeguard these archives from physical deterioration and ensure long-term accessibility (Kaddu, 2019; Flanagan, 2022). Evaluating these initiatives is crucial to ensure the effectiveness of these efforts. However, little is known about digital preservation initiatives in Tooro Kingdom. This study contributes valuable insights related to existing digital archives, initiatives and challenges at the Tooro Kingdom. Analyzing the Kingdom's specific case may inform best practices for similar institutions in Africa or with limited resources.

1.10 Chapter summary

This chapter introduced the study. It provided the background to the study and to Tooro Kingdom, statement of the problem, aim of the study, specific objectives, and research questions, scope of the study, significance of the study and justification of the study. The next chapter provides the literature review.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

A literature review provides a summary of published literature on a given research topic (Snyder, 2019). It is used to present existing knowledge on a given subject. This literature review provides a summary of what other researchers have said about the key themes of the proposed research. It includes the theoretical framework, a discussion of what has been discussed about the research objectives and the research gaps.

2.2 Theoretical Framework

The study was guided by the Records Continuum Model (RCM), developed by Frank Upward and his colleagues in the 1990s. This model represents a significant shift in the understanding of recordkeeping practices, moving away from the traditional lifecycle approach to a more integrated and continuous perspective (Matlala & Maphoto, 2020; Frings-Hessami, 2021). The RCM was first introduced in Upward's 1996 paper, "Structuring the Records Continuum – Part One: Post custodial principles and properties." It emerged as a response to the evolving challenges of managing digital records and archives, particularly in the context of increasing electronic documentation (Upward, 1996). The model emphasizes that recordkeeping is not a linear process but rather a continuum where activities related to records—such as creation, capture, organization, and access—are interconnected and occur simultaneously across different contexts (Frings-Hessami, 2021). In recent years, the RCM has gained traction as a framework for understanding the complexities of digital preservation. Scholars have explored its applications in various contexts, emphasizing its relevance in contemporary recordkeeping practices. For instance, research has shown that the RCM can effectively address the challenges posed by electronic records, as it allows for a more flexible and adaptive approach to preservation (Maceviciute & Wilson, 2021). Additionally, the model has been discussed in relation to the need for collaboration between archivists and records managers, highlighting the importance of integrating their roles to enhance information management strategies (Lucidea, n.d.). Recent studies have also pointed out the need for practical applications of the RCM in organizations. For example, organizations are encouraged to implement the RCM by establishing

clear guidelines for record creation and management, ensuring that records are captured with appropriate metadata, and facilitating access to records throughout their lifecycle (Frings-Hessami & McKemmish, 2021). This approach not only enhances the preservation of records but also promotes their accessibility for various stakeholders.

The RCM has several applications that make it particularly useful for the study of digital preservation initiatives, especially in the context of cultural institutions like the Tooro Kingdom. The model's focus on the continuous nature of recordkeeping allows for a comprehensive examination of how records are managed from their creation to their eventual use as evidence or memory. The model emphasizes the importance of establishing guidelines for record creation, which ensures that records are generated with future preservation in mind. This is crucial for cultural institutions where cultural artifacts and historical documents need to be documented accurately. The RCM encourages the capture of records with relevant metadata, which enhances their usability and context. This aspect can help cultural institutions maintain detailed records of its cultural heritage, making it easier for researchers and the public to access valuable information. The organization of records is vital for ensuring that they can be easily retrieved and accessed. The RCM promotes the idea that records should be structured in a way that facilitates long-term management and accessibility, which aligns with the goals of the Tooro Kingdom's digital preservation initiatives. Finally, the pluralization dimension emphasizes the importance of making records available to various stakeholders. This is particularly relevant for the Tooro Kingdom, as it seeks to engage the community and promote awareness of its cultural heritage through digital archives. The Records Continuum Model provides a robust theoretical framework for examining digital preservation initiatives and their impact on accessing archives in cultural institutions. By focusing on the interconnectedness of recordkeeping activities and the ongoing nature of preservation, the RCM aligns well with the goals of this study. Despite some criticisms regarding its complexity and abstract nature, the model's emphasis on sustainability and accessibility makes it a valuable tool for understanding how the Tooro Kingdom can effectively manage its digital archives.

2.3 Archives preserved digitally in cultural institutions

Cultural institutions play a vital role in preserving various types of archives, including both born-digital materials and digitized physical materials. Born-digital materials are archives that have been created in digital formats from the outset. This category includes a wide range of content, such as documents, photographs, audiovisual recordings, websites, and social media content that exist only in digital form (Flanagan, 2022). Cultural institutions prioritize the preservation of these materials due to their inherent vulnerability to obsolescence. As technology evolves, formats can quickly become outdated, making it difficult to access or retrieve these digital records (Zahara & Salim, 2022). However, one of the significant challenges with born-digital materials is their ephemeral nature. For example, social media content can be particularly fleeting, often disappearing or becoming inaccessible as platforms change or shut down. This impermanence highlights the urgency for cultural institutions to preserve born-digital materials to ensure their availability for future generations (Frings-Hessami, 2021). Additionally, the rapid pace of technological advancement means that formats and software used to create and store these materials can become obsolete within a short time frame, leading to potential data loss if not managed properly (Maceviciute & Wilson, 2021). The second category of digital archives consists of digitized physical materials. These are traditional archival holdings that were originally created in physical formats but have been converted into digital formats for improved access and preservation. This includes a variety of items such as historical documents, artwork, artifacts, and other culturally significant materials (Flanagan, 2022). Digitization is essential for cultural institutions as it enhances public access to valuable resources and helps preserve items that may be at risk of deterioration. For example, the National Library of Uganda has digitized several cultural heritage records to enhance public access and engagement (Kaddu, 2019). Similarly, Makerere University has digitized archives related to the Buganda Kingdom, making them accessible to researchers and the public (Kaddu, 2019). These initiatives not only help preserve important cultural artifacts but also promote education and research by making these materials widely available.

Some cultural institutions are also adopting a hybrid approach to digitization, where they selectively digitize physical materials based on their significance, condition, or research value. This approach allows institutions to prioritize resources effectively, focusing on materials that

have high historical, cultural, or research value (Wang & Meng, 2023). By implementing a hybrid strategy, institutions can ensure that they are making the best use of their limited resources while still preserving important cultural heritage. Selective digitization is crucial because not all materials are equally valuable or at risk. Institutions often target materials that are deteriorating or have significant historical importance. For example, documents that are fragile or have high research value are prioritized for digitization to ensure they are preserved for future generations (Däßler & Preuß, 2019). This method not only helps in safeguarding important records but also enhances access to materials that are of interest to researchers and the public.

Several initiatives aim to promote the digital preservation of archives in cultural institutions worldwide. These programs encourage institutions to recognize the importance of preserving their unique cultural heritage and to take action to digitize and archive important materials. One of the most prominent initiatives is the UNESCO Memory of the World Programme. This program identifies and promotes the preservation of documentary heritage, including digitized archives (UNESCO, 2019). Through this initiative, UNESCO raises awareness about the significance of preserving cultural heritage and provides guidance to institutions on best practices for digitization and preservation. The Memory of the World Programme also maintains a register of documentary heritage that has been nominated by countries and deemed to be of global significance (UNESCO, 2019). The International Council on Archives (ICA) also plays a crucial role in promoting digital preservation. The ICA has established several expert groups and programs focused on digital preservation, such as the Expert Group on Digital Records Preservation (ICA, 2021). This group develops standards, guidelines, and tools to assist archives in managing and preserving digital records. The ICA also organizes conferences and workshops to facilitate knowledge sharing and collaboration among archivists and cultural heritage professionals. The Digital Preservation Coalition (DPC) is a non-profit membership organization that promotes digital preservation in the United Kingdom and internationally. The DPC provides resources, training, and guidance to help institutions develop and implement digital preservation strategies (DPC, 2021). It also facilitates collaboration among its members, who include libraries, archives, museums, and other cultural heritage organizations. The Digital Preservation Network (DPN) is a collaborative initiative that aims to ensure the long-term preservation of digital scholarly and cultural materials. DPN works with universities, libraries, and other

institutions to develop a distributed digital preservation infrastructure (DPN, 2021). By pooling resources and expertise, DPN helps to ensure that digital content remains accessible and usable for future generations. These initiatives demonstrate the growing recognition of the importance of digital preservation in safeguarding cultural heritage. By providing guidance, resources, and platforms for collaboration, these programs empower cultural institutions to take action and preserve their digital archives. As technology continues to evolve, it is crucial that institutions remain committed to digital preservation to ensure that valuable cultural materials remain accessible for years to come. This served as a backdrop for finding out the archives digitally preserved at the Tooro Kingdom.

2.4 Digital preservation initiatives for archives in cultural institutions

In today's digital age, cultural institutions face the crucial challenge of preserving their valuable archives. Unlike traditional physical materials, digital archives are vulnerable to obsolescence, format migration needs, and resource constraints. Digital preservation strategies can help institutions safeguard their digital heritage for future generations. These strategies include several key components:

2.4.1 Policy and planning

Cultural institutions must develop clear policies that outline selection criteria for materials, establish preferred file formats, and define metadata management practices (Pandey & Kumar, 2020). Effective policy and planning ensure that institutions prioritize their digital preservation efforts and allocate resources efficiently. This structured approach is essential for managing the complexities of digital preservation and ensuring that valuable cultural heritage is maintained for future generations. Having a well-defined selection policy helps institutions identify which materials are most significant for preservation. For instance, the British Library has established selection criteria that prioritize items based on their historical significance, uniqueness, and research value (British Library, 2020). By focusing on high-value items, such as rare manuscripts or historically important documents, institutions can make informed decisions about which materials to digitize and preserve. This targeted approach allows them to use their resources more effectively and ensure that the most important cultural artifacts are safeguarded. Establishing preferred file formats is another critical aspect of digital preservation policy.

Different digital formats have varying levels of longevity and accessibility. For example, the National Archives of Australia recommends using open and widely adopted formats, such as PDF/A for documents and TIFF for images, to ensure long-term accessibility (National Archives of Australia, n.d.). By specifying preferred formats, institutions can reduce the risk of obsolescence and ensure that their digital materials remain accessible over time. Several institutions have successfully implemented digital preservation policies that serve as models for others. The National Library of Israel, for instance, has developed a comprehensive digital preservation policy that includes guidelines for selection, digitization, and metadata management (Kasnett, n.d.). This policy not only outlines the institution's commitment to preserving its digital heritage but also provides a framework for ongoing evaluation and improvement of its digital preservation practices. Similarly, the Digital Preservation Coalition offers a model digital preservation policy that organizations can adapt to their specific contexts (Digital Preservation Coalition, 2021). This model includes sections on purpose, mandate, and objectives, helping institutions articulate their commitment to digital preservation and identify the resources they will allocate to these efforts.

2.4.2 Format migration and emulation

Digital formats can become obsolete over time, necessitating migration to new formats that are still accessible (Zahara & Salim, 2022). Format migration is the process of transferring data from an outdated format to a newer one, ensuring that digital records remain usable. This is essential for maintaining access to important digital materials as technology evolves. However, migration can sometimes lead to data loss or changes in the original content's appearance, which means institutions must carefully consider when and how to migrate their files (Kondayen, 2015). Format migration involves several steps, including identifying outdated formats, selecting suitable new formats, and using appropriate tools for the migration process. For example, the National Archives of Australia has adopted a proactive approach by migrating content upon receipt into a small number of carefully chosen formats (National Archives of Australia, n.d.). This strategy helps ensure that materials are preserved in formats that are more likely to remain accessible over time. While format migration is a common preservation strategy, it can introduce risks. For instance, during the migration process, some data might be altered or lost, which can affect the integrity of the digital object (Digital Preservation Coalition, 2021). To mitigate these

risks, institutions should establish metrics to measure potential data loss and conduct tests to ensure the correctness and quality of the migration (Digital Preservation Coalition, 2021). Keeping detailed records of all transformations, including any detected losses of information, is also vital for maintaining the authenticity and authority of the digital records**.** Emulation offers an alternative to migration by recreating the original computing environment needed to access older formats (Granger, 2000). This method allows institutions to preserve the "look and feel" of digital objects, maintaining their original functionality. Emulation can be particularly beneficial for complex digital objects, such as interactive applications or multimedia content, where the original experience is essential for understanding (D-Lib Magazine, 2000). For example, the LOCKSS (Lots of Copies Keep Stuff Safe) program has implemented emulation strategies to preserve web content. By maintaining the original software and environment needed to access older web formats, LOCKSS ensures that users can still interact with the content as it was originally intended (Rosenthal et al., 2005). However, emulation requires significant technical expertise and resources, making it a more complex solution than straightforward migration. While emulation can effectively preserve digital content, it also presents challenges. Maintaining the original software and hardware environments can be costly and labour-intensive. Additionally, as technology continues to evolve, ensuring that emulation tools remain functional and compatible with new systems can be difficult (Granger, 2000). Institutions must weigh the benefits of emulation against the resources required to implement and maintain these systems.

2.4.3 Metadata management

Robust metadata acts as the digital object's "passport," providing crucial information for identification, understanding, and access over time (Gesek, 2019). Effective metadata management is essential for ensuring that digital archives remain searchable and usable. Metadata serves multiple purposes, including providing context, supporting discovery, and facilitating long-term preservation. As digital collections grow, the importance of high-quality metadata becomes even more pronounced. Metadata is essentially data about data. It describes various attributes of digital objects, such as their content, format, creation date, and rights information. This information is critical for users who need to find and understand digital materials. For example, the Digital Preservation Coalition emphasizes that metadata must support the goals of long-term digital preservation, including maintaining the availability,

identity, persistence, renderability, understandability, and authenticity of digital objects (Digital Preservation Coalition, 2021). Using standardized metadata schemas enhances the searchability and interoperability of digital objects, making it easier for users to find and access the materials they need. Common standards include Dublin Core, which provides a simple and effective way to describe a wide range of resources, and PREMIS (Preservation Metadata Maintenance Activity), which focuses on the preservation aspects of digital objects (Gartner & Lavoie, 2013). For instance, the PREMIS Data Dictionary outlines specific entities and properties that institutions should consider when documenting their digital materials, ensuring that essential preservation information is captured (PREMIS, 2015). The National Archives in the UK has developed a comprehensive metadata framework that categorizes metadata into seven pillars: Legacy, Primary, Secondary, Supplementary, Derived, Control, and 'Meta' metadata (National Archives, 2021). This framework emphasizes the importance of understanding the provenance of metadata, which helps institutions maintain context and integrity over time. By distinguishing between different types of metadata, institutions can better manage their digital collections and ensure that users have access to relevant information. Institutions must prioritize the creation and maintenance of high-quality metadata to support their digital preservation efforts. High-quality metadata includes accurate, consistent, and complete information that is regularly updated to reflect any changes to the digital objects (Gesek, 2019). For example, the Library of Congress employs a rigorous metadata quality control process to ensure that its digital collections are well-documented and easily searchable (Rakesh et al., 2021). Moreover, as technology evolves, institutions should regularly assess and update their metadata practices to align with new standards and technologies. This proactive approach helps prevent metadata obsolescence and ensures that digital archives remain accessible and usable in the future (Zahara & Salim, 2022). Despite its importance, managing metadata can be challenging. One significant issue is the sheer volume of digital content that institutions must catalog. As the amount of digital material increases, creating and maintaining metadata for each item can become overwhelming (Martinez, 2001). Institutions may need to invest in automated tools for metadata generation to alleviate this burden. For instance, automated metadata generation tools can help create descriptive metadata based on the characteristics of the digital object, making it easier to manage large collections (D-Lib Magazine, 2000). Additionally, institutions must navigate issues related to intellectual property rights and privacy when creating metadata. Ensuring that metadata complies with legal

and ethical standards is essential for protecting both the institution and the users of its digital collections (Gesek, 2019).

2.4.4 Storage and Infrastructure

Secure and reliable storage infrastructure is critical for preserving digital archives (Rakesh et al., 2021). As cultural institutions increasingly rely on digital formats to store their collections, the need for robust storage solutions becomes paramount. Institutions must implement strategies that protect against data loss and ensure that digital records remain accessible over time. One of the most effective strategies for safeguarding digital archives is to implement redundant storage solutions across multiple locations. This redundancy ensures that if one copy of the data is compromised—due to hardware failure, natural disasters, or cyberattacks—other copies remain intact. For instance, the Digital Preservation Coalition recommends maintaining at least three copies of digital content in different geographic locations to mitigate the risks associated with localized disasters (Digital Preservation Coalition, 2021). Institutions like the International Council on Archives have adopted similar strategies, emphasizing the importance of offsite backups and distributed storage systems to protect digital assets (International Council on Archives, 2021). This approach not only enhances data security but also facilitates easier access for users who may need to retrieve materials from different locations. In addition to redundant storage, disaster recovery plans are essential for maintaining accessibility in case of emergencies. A well-developed disaster recovery plan outlines the steps an institution will take to recover its digital assets following a disaster, such as a flood or cyberattack (Anderson Archival, n.d.). For example, the Texas Department of Transportation emphasizes the importance of having written disaster recovery procedures to ensure that vital electronic records can be accessed during a disruptive event (Texas Department of Transportation, n.d.). Institutions should regularly review and update their disaster recovery plans to reflect changes in technology and potential threats. This proactive approach helps ensure that staff are prepared to respond effectively to emergencies, minimizing downtime and protecting valuable digital collections. Access controls are another critical component of storage infrastructure. These controls prevent unauthorized modifications to digital records, ensuring their integrity over time. Institutions must establish clear policies regarding who can access and modify digital content, as well as implement technical measures to enforce these policies (Rakesh et al., 2021). For instance, the Library of

Congress employs strict access controls to protect its digital collections, ensuring that only authorized personnel can make changes to metadata or content (Rakesh et al., 2021). By implementing robust access controls, institutions can safeguard their digital archives against accidental or malicious alterations. This is particularly important in an age where cyber threats are increasingly common, and maintaining the authenticity of digital records is essential for preserving cultural heritage. Many institutions are turning to cloud storage as a viable option for digital preservation. Cloud storage provides secure, scalable, and accessible solutions for storing digital content. By utilizing cloud services, institutions can benefit from offsite redundancy and minimize the risks associated with physical disasters (Hurley, 2024). For example, the National Archives of Australia has embraced cloud storage as part of its digital preservation strategy, allowing for efficient data management and recovery (National Archives of Australia, n.d.). However, while cloud storage offers many advantages, institutions must also consider potential challenges, such as data privacy concerns and the need for reliable internet access. It is crucial for institutions to conduct thorough evaluations of cloud service providers to ensure they meet the necessary security and compliance standards.

2.4.5 Collaboration and partnerships

Collaboration and partnerships can significantly enhance digital preservation efforts. By sharing resources, expertise, and best practices with other institutions, national libraries, and digital preservation organizations, cultural institutions can amplify their capabilities (Abdelhak et al., 2017). Collaborative initiatives can lead to more comprehensive preservation strategies and help institutions address common challenges. Collaborative efforts in digital preservation allow institutions to pool their resources, which can be particularly beneficial for smaller organizations that may lack the necessary funding or expertise. For example, the Connecticut Digital Archive (CTDA) is a successful partnership between the University of Connecticut Libraries and the Connecticut State Library. This initiative provides long-term preservation services to non-profit institutions, including community archives, enabling them to preserve their digital materials effectively (UNESCO, 2021). By working together, these institutions can share the costs and expertise needed for digitization and preservation, making it easier to safeguard cultural heritage. Partnerships can facilitate joint digitization projects, allowing institutions to work together on preserving more materials. For instance, the Digital Repository of Ireland offers a Community

Archive Scheme that fosters collaborative training environments while balancing the need for community ownership of their data with long-term preservation (Digital Repository of Ireland, n.d.). Such partnerships not only enhance the preservation of digital content but also promote community engagement and awareness of cultural heritage. Additionally, the European Union's Europeana initiative exemplifies how collaboration can lead to significant advancements in digital preservation. By bringing together thousands of cultural institutions across Europe, Europeana provides a platform for sharing digitized collections, enhancing accessibility, and promoting the cultural heritage of Europe on a global scale (Europeana, n.d.). This collaborative approach allows institutions to reach wider audiences and encourages the sharing of knowledge and best practices among participants. Despite the benefits of collaboration, there are often barriers that hinder effective partnerships. Research has identified challenges such as differing organizational cultures, lack of trust, and incompatible digital preservation workflows (Hofsink et al., 2024). To overcome these barriers, institutions must foster open communication and build relationships based on mutual respect and shared goals. For example, the Fostering Collaboration Between Research Libraries and Community Archives project highlights the importance of dismantling paternalistic attitudes and creating equitable partnerships that empower all involved parties (Hofsink et al., 2024). Collaboration can also enhance access to funding and resources. Many grant programs prioritize collaborative projects, recognizing that partnerships can lead to more impactful outcomes. Institutions can leverage these opportunities to secure funding for joint initiatives, such as digitization projects or the development of shared preservation infrastructure (Brown, 2023). By working together, institutions can present a stronger case for funding, demonstrating the collective impact of their efforts.

2.5 Challenges affecting the digital preservations of archives in cultural institutions

The task of preserving digital archives presents a complex and evolving set of challenges for cultural institutions across the globe. While digital formats offer unique opportunities for access and dissemination, numerous hurdles threaten the long-term accessibility and authenticity of these valuable resources. Some of the key challenges affecting digital preservation of archives in cultural institutions include:

2.5.1 Technological obsolescence

Digital formats and technologies have short lifespans, becoming obsolete relatively quickly (Zahara & Salim, 2022). As technology advances, the software and hardware needed to access digital archives can become outdated, making it difficult to retrieve and use these materials over time. This phenomenon, known as technological obsolescence, poses significant challenges for cultural institutions tasked with preserving digital records. Technological obsolescence refers to the risk of data loss due to the inability to access digital assets because the hardware or software required for retrieval has become outdated (Wikipedia, n.d.). This issue was not widely recognized until the 1990s, but it has since become a pressing concern for archivists and information professionals. Digital preservation strategies, including data migration and emulation, have been developed to address these challenges and mitigate the potential damage caused by obsolescence (LeBlanc, 2023).

2.5.2 Resource constraints

Implementing and sustaining digital preservation solutions requires significant investment in infrastructure, personnel, and software. Smaller cultural institutions and those in developing countries often lack the necessary resources to establish and maintain effective digital preservation programs (Pandey & Kumar, 2020; Däßler & Preuß, 2019). Inadequate funding can limit an institution's ability to acquire the necessary storage systems, software, and staff training needed for successful digital preservation. Digital preservation is resource-intensive, requiring ongoing funding for technology upgrades, staff training, and maintenance of digital assets (Zahara & Salim, 2022). Many smaller institutions operate on tight budgets, making it difficult to allocate funds for comprehensive digital preservation initiatives. For example, a study by Däßler and Preuß (2019) highlights that institutions in developing countries often struggle to secure adequate funding, which hampers their ability to implement effective digital preservation strategies. In addition, the costs associated with digital preservation can be unpredictable. As technology evolves, institutions may need to invest in new tools and systems to keep pace with advancements. This unpredictability can strain already limited budgets, making it challenging for institutions to plan for the long term (Abdelhak et al., 2017). Beyond financial limitations, the infrastructure required for digital preservation can be a significant barrier. Many institutions lack the necessary hardware and software to store and manage digital collections effectively. For

instance, the National Archives of Australia emphasizes the importance of having robust storage solutions to protect digital assets, but smaller institutions may not have the means to implement such systems (National Archives of Australia, n.d.). Additionally, the technical expertise needed to manage digital preservation systems is often lacking in smaller institutions. Staff may not have the training or experience to implement and maintain digital preservation tools, leading to gaps in preservation efforts (Baucom, 2019). This lack of expertise can hinder an institution's ability to develop effective digital preservation strategies and respond to emerging challenges.

2.5.3 Expertise and capacity building

Managing and preserving digital archives demands specialized knowledge and skills, including format identification, metadata management, and risk assessment. Gaps in expertise can hinder effective preservation efforts, as staff may lack the necessary training to implement and maintain digital preservation systems (Baucom, 2019; Abdelhak et al., 2017). Building and retaining skilled personnel is crucial for ensuring the long-term sustainability of digital preservation initiatives. Digital preservation involves a variety of technical tasks that require specific expertise. For example, staff must be proficient in identifying the formats of digital files, understanding how to manage metadata effectively, and assessing risks associated with digital assets (Baucom, 2019). Without this specialized knowledge, institutions may struggle to implement effective preservation strategies, leading to potential data loss or inaccessibility of important materials. Budget constraints can limit the ability to invest in training programs or hire specialized staff (Däßler & Preuß, 2019). Additionally, the rapid pace of technological change means that staff must continually update their skills, which can be difficult to manage alongside their regular responsibilities. To address these challenges, institutions should prioritize capacity building as a core component of their digital preservation strategies. This may involve seeking external funding sources, such as grants specifically aimed at enhancing digital preservation capabilities (Brown, 2023). By recognizing the importance of expertise and capacity building, cultural institutions can work towards creating a knowledgeable workforce that is equipped to tackle the challenges of digital preservation.

2.5.4 Sustainability and long-term commitment

Digital preservation necessitates long-term planning and commitment beyond initial implementation. Securing sufficient funding and ensuring continuity of efforts over time presents a significant challenge for cultural institutions (Däßler & Preuß, 2019). Preservation strategies must be adaptable to accommodate changes in technology, organizational priorities, and funding sources to maintain the accessibility of digital archives. One of the most significant barriers to sustainability in digital preservation is securing adequate funding. Cultural institutions often operate on tight budgets, which can limit their ability to invest in the infrastructure and personnel needed for effective digital preservation (Däßler & Preuß, 2019). This lack of funding can lead to a reliance on temporary solutions that do not address long-term needs. The rapid pace of technological advancement means that tools and systems used for digital preservation can quickly become outdated (Zahara & Salim, 2022). Institutions must remain vigilant and be willing to invest in new technologies that enhance their preservation capabilities.

2.5.5 Data integrity and security

Digital archives are vulnerable to data corruption, accidental deletion, and cyberattacks. Ensuring data integrity and implementing robust security measures are crucial for safeguarding authenticity and reliability (Zahara & Salim, 2022). Cultural institutions must adopt rigorous backup and disaster recovery strategies to protect against data loss and ensure the ongoing integrity of their digital collections. Data integrity refers to the accuracy, consistency, and reliability of data throughout its lifecycle. It is essential for maintaining the trustworthiness of digital archives. According to ScoreDetect (2023), preserving data integrity involves protecting digital records from unauthorized changes and ensuring that they remain complete and accurate. Threats to data integrity can arise from various sources, including hardware failures, software bugs, and malicious attacks. To maintain data integrity, institutions can implement checksums or hash functions, such as MD5 or SHA-256. These functions create a unique digital fingerprint for each file, allowing institutions to verify that the data has not been altered over time (ScoreDetect, 2023). Regularly recalculating and comparing these checksums helps identify any discrepancies, enabling institutions to take corrective action if data corruption occurs. Digital archives are also increasingly susceptible to cyber threats, including hacking, ransomware, and malware attacks. These threats can lead to unauthorized access, data loss, or manipulation of digital records

(Hurley, 2024). To mitigate these risks, cultural institutions must implement comprehensive cybersecurity measures, including firewalls, encryption, and intrusion detection systems. Regular security audits and staff training on cybersecurity best practices are also essential to create a culture of security awareness (Zahara & Salim, 2022). For example, the National Archives of Australia emphasizes the importance of cybersecurity in its digital preservation policy, highlighting the need for robust security measures to protect digital assets from potential threats (National Archives of Australia, n.d.). By prioritizing cybersecurity, institutions can help ensure the long-term integrity and accessibility of their digital collections. Maintaining data integrity also involves navigating legal and ethical considerations. Cultural institutions must comply with data protection regulations, such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA), which impose strict requirements on how personal data is collected, stored, and used (Hurley, 2024). Institutions should implement access controls and anonymization techniques to protect sensitive information and ensure compliance with relevant laws (Brown, 2023). Moreover, ethical considerations play a crucial role in preserving the integrity of digital archives. Institutions must develop and adhere to ethical guidelines that respect individuals' rights and the integrity of the information being preserved (Pandey & Kumar, 2020). This includes being transparent about data handling practices and ensuring that users understand how their data will be used and protected.

2.5.6 Copyright and intellectual property

Digitizing materials raises complex legal and ethical issues regarding copyright ownership, access restrictions, and potential conflicts with rights holders (Pandey & Kumar, 2020). Cultural institutions must navigate these challenges to ensure that they comply with applicable laws while respecting the rights of creators and owners of the digital materials in their collections. Copyright law protects original works of authorship, including literary, artistic, and musical creations. When cultural institutions digitize materials, they must consider who holds the copyright and what rights they have regarding reproduction and distribution (Brown, 2023). The copyright holder is typically the creator of the work, but this can vary depending on contracts or agreements. For example, works created as part of employment may have different ownership rights compared to independently created works (ScoreDetect, 2023). Understanding these rights is crucial for cultural institutions to avoid infringing on copyright laws. Digital content can be

easily copied and shared, which increases the risk of unauthorized use. Institutions must ensure that they have the necessary permissions to digitize and provide access to materials, especially if those materials are still under copyright protection (Zahara & Salim, 2022). Access restrictions are another important consideration when digitizing materials. Many copyright holders impose limitations on how their works can be used, which can affect how cultural institutions provide access to digital collections. Institutions often rely on licensing agreements to obtain the rights to digitize and share content. These licenses can vary widely in terms of their terms and conditions (Pandey & Kumar, 2020). For instance, some licenses may allow institutions to share content freely, while others may require payment or restrict access to certain user groups (Brown, 2023). The increasing reliance on digital licenses rather than outright ownership can complicate the ability of institutions to build and maintain permanent digital collections. As noted in a policy paper by the Communia Association, the shift towards licensing has made it more difficult for institutions to retain and provide access to new works (Communia, 2024). This situation can lead to challenges in preserving digital materials, as institutions may be forced to repurchase access or face restrictions on how they can share content. In addition to legal issues, there are ethical considerations surrounding copyright and intellectual property. Cultural institutions have a responsibility to respect the rights of creators while also ensuring public access to cultural heritage. This balance can be difficult to achieve, especially when dealing with materials that may have multiple rights holders or when the original creators are no longer available (Pandey & Kumar, 2020). For example, when digitizing historical documents or artworks, institutions must consider the potential impact on the rights of descendants or other stakeholders. Ethical guidelines can help institutions navigate these complexities by providing a framework for decision-making that respects both copyright and public access (Brown, 2023).

2.5.7 Standardisation and interoperability

Lack of standardized formats, metadata schemas, and preservation practices can hinder long-term access and exchange of digital archives across institutions (Pandey & Kumar, 2020). Without consistent standards, digital archives may become siloed and difficult to share or integrate with other collections. Promoting interoperability and adopting common standards can help to mitigate these challenges and enhance access to digital archives. When cultural institutions use standardized formats for their digital materials, it becomes easier to share and

access these resources across different platforms and systems. In the context of digital archives, interoperability is crucial for enabling cross-institutional access to collections. However, achieving interoperability can be challenging due to the lack of consistent standards and practices across institutions. For example, a study conducted by Seadle (2010) highlights that while many institutions recognize the importance of interoperability, the current level of integration and online access to holdings is often inadequate. This discrepancy can lead to inefficiencies and missed opportunities for collaboration among institutions, ultimately hindering public access to cultural heritage.

2.5.8 Rapid technological advancements

The ever-evolving digital landscape necessitates continuous adaptation of preservation strategies and investment in new tools and solutions (Zahara & Salim, 2022). As new technologies emerge, cultural institutions must be prepared to assess their potential impact on digital preservation and adjust their practices accordingly. Keeping up with the pace of technological change can be challenging, but it is essential for ensuring the long-term viability of digital archives. Rapid technological advancements present significant challenges for cultural institutions. Digital formats and systems can become obsolete quickly, requiring institutions to migrate data to newer formats or platforms regularly (Zahara & Salim, 2022). For instance, a study by Besser and Trant (2023) highlights that the constant development of new digital tools and platforms can make it difficult for institutions to maintain effective preservation practices. Institutions must not only stay informed about these advancements but also be willing to invest in new technologies that enhance their preservation capabilities. As technology evolves, so too must the skills of the staff managing digital archives. Continuous professional development is crucial for ensuring that personnel are equipped to handle new technologies and methodologies (Baucom, 2019). Institutions should prioritize training programs that focus on emerging technologies and best practices in digital preservation. For example, workshops and online courses can help staff stay current with the latest trends and tools in the field (Abdelhak et al., 2017). By investing in staff training, institutions can enhance their capacity to adapt to technological changes and improve their overall preservation efforts.

2.6 Frameworks for enhancing the preservation of digital archives of archives in cultural institutions

Cultural institutions, including libraries, archives, and museums, face significant challenges in preserving digital archives due to rapid technological changes and the ephemeral nature of digital content (Zahara & Salim, 2022). To address these challenges, various frameworks have been developed to guide institutions in their digital preservation efforts. These frameworks provide a structured approach to managing digital archives and ensuring their long-term accessibility.

2.6.1 Open Archival Information System (OAIS) reference model

The OAIS model provides a comprehensive framework for the long-term preservation and management of digital information. It defines the roles, responsibilities, and functional entities required for an archive to preserve and manage digital materials over time. The OAIS model has been widely adopted by cultural institutions and is considered a best practice for digital preservation (Gartner & Lavoie, 2013). The OAIS reference model was first approved as an ISO standard (ISO 14721) in 2002 and has since been updated to a second edition published in 2012 (ISO 14721:2012). Although initially developed by the Consultative Committee for Space Data Systems (CCSDS), the OAIS model has gained widespread acceptance in the library, archive, and museum communities (Lavoie, 2014). The model provides a common set of concepts and definitions that facilitate discussion across sectors and professional groups, enabling the specification of archives and digital preservation systems (Digital Preservation Coalition, 2021). The OAIS reference model has had a significant impact on the digital preservation community. It has consolidated understanding of the fundamental requirements for securing the long-term persistence of digital materials, serving as a point of familiarity in an uncertain landscape (Lavoie, 2014). The model has also influenced the development of numerous architectures, standards, and protocols related to system design, metadata requirements, and certification (Lavoie, 2014). Many digital preservation initiatives, such as the CEDARS, PANDORA, and NEDLIB projects, have either adopted the OAIS model as the conceptual framework behind their efforts or have been informed by its conclusions (Lavoie, 2000). Additionally, the OAIS model has been used as the basis for repository self-assessment and certification programs, such as the Trusted Digital Repositories initiative jointly sponsored by OCLC and RLG (Lavoie, 2014).

2.6.2 Digital Preservation Coalition (DPC) Handbook

The Digital Preservation Coalition (DPC) has developed a comprehensive handbook that provides guidance on various aspects of digital preservation (Digital Preservation Coalition, 2021). This handbook serves as an essential resource for cultural institutions looking to enhance their digital preservation capabilities. It covers a wide range of topics, including policy and strategy development, risk assessment, metadata management, and storage and infrastructure. Additionally, the DPC Handbook includes case studies and examples from institutions that have successfully implemented digital preservation strategies, making it a practical guide for practitioners in the field. The DPC Handbook is designed to be a key knowledge base for digital preservation. It was first compiled in 2001 by Neil Beagrie and Maggie Jones and has been updated to reflect the latest developments in the field (Digital Preservation Coalition, 2021). The most recent edition includes contributions from over 45 practitioners and experts, ensuring that the content is relevant and comprehensive. The handbook is peer-reviewed and freely accessible, making it a valuable resource for anyone involved in the creation and management of digital materials. By providing a common framework for understanding digital preservation challenges and solutions, the handbook fosters collaboration and knowledge sharing within the field (UNESCO, 2021).

2.6.3 National Digital Stewardship Alliance (NDSA) Levels of Digital Preservation

The National Digital Stewardship Alliance (NDSA) has developed a framework called the Levels of Digital Preservation, which provides a tiered approach to digital preservation (NDSA, 2023). This framework has become a widely adopted tool for cultural institutions seeking to assess and enhance their digital preservation capabilities. The NDSA Levels of Digital Preservation consist of five levels, each with increasing levels of complexity and sophistication (NDSA, 2023). These levels are organized across five functional areas: storage and geographic location, file fixity and data integrity, information security, metadata, and file formats (Phillips et al., 2013). By assessing their current practices against the NDSA levels, institutions can identify areas for improvement and develop a roadmap for enhancing their digital preservation efforts. At Level 1, institutions focus on protecting their data by ensuring that multiple copies of digital materials are stored in different locations (NDSA, 2023). This level emphasizes the importance

of having a basic backup strategy in place to safeguard against data loss due to hardware failures or natural disasters (Phillips et al., 2013). Level 2 involves gaining a deeper understanding of the digital materials being preserved. This includes establishing fixity checks to verify the integrity of files, implementing access controls to protect against unauthorized modifications, and creating basic descriptive metadata to facilitate discovery and access (NDSA, 2023). By knowing their data, institutions can better manage and preserve their digital collections over time. As institutions progress to Level 3, they begin to actively monitor their digital materials. This includes regularly checking file fixity, maintaining logs of all actions taken on digital objects, and ensuring that metadata is kept up-to-date (NDSA, 2023). Monitoring data helps institutions identify potential issues early and take corrective action to maintain the long-term integrity and accessibility of their digital collections. Level 4 focuses on the ability to repair data when issues are identified. This involves having the capacity to perform file format migrations, ensuring that metadata can be updated to reflect changes in file formats or storage locations, and maintaining the ability to restore data from backups if necessary (NDSA, 2023). By being able to repair data, institutions can mitigate the impact of technological obsolescence and ensure the ongoing usability of their digital materials. The highest level of the NDSA framework, Level 5, emphasizes the importance of sustaining data over the long term. This includes having a comprehensive digital preservation policy in place, engaging in regular audits of digital preservation practices, and participating in community-based initiatives to share knowledge and best practices (NDSA, 2023). By sustaining data, institutions can ensure that their digital preservation efforts remain effective and relevant in the face of ongoing technological change. The NDSA Levels of Digital Preservation have had a significant impact on the cultural heritage community. They have been widely adopted by institutions of all sizes, from small community archives to large research libraries, as a benchmark for assessing digital preservation readiness (UNESCO, 2021). The levels have also been used to guide the development of digital preservation policies and strategies, helping institutions prioritize their efforts and allocate resources effectively. Moreover, the NDSA Levels have been incorporated into other digital preservation frameworks and standards, such as the Digital Preservation Coalition's Handbook and the Library of Congress's Recommended Formats Statement (Digital Preservation Coalition, 2021; Library of Congress, 2023). This widespread adoption demonstrates the value of the NDSA Levels in providing a clear and accessible framework for digital preservation.

2.6.4 ISO 16363: Audit and Certification of Trustworthy Digital Repositories

The International Organization for Standardization (ISO) has developed a standard called ISO 16363: Audit and Certification of Trustworthy Digital Repositories (ISO, 2012). ISO 16363 defines a recommended practice for assessing the trustworthiness of digital repositories. It is applicable to a wide range of digital repositories and can be used as a basis for certification (ISO, 2012). The standard was developed by the Consultative Committee for Space Data Systems (CCSDS) and published by ISO in 2012 as ISO 16363:2012. ISO 16363 is designed to provide a comprehensive framework for evaluating the trustworthiness of digital repositories.

2.6.5 Preservation Metadata: Implementation Strategies (PREMIS) Data Dictionary

Preservation metadata is essential for ensuring the long-term accessibility and usability of digital archives. The PREMIS Data Dictionary provides a standard for recording metadata related to the preservation of digital objects (PREMIS, 2015). It defines a core set of metadata elements that institutions can use to document the creation, management, and preservation of digital materials (PREMIS, 2015). The Data Dictionary is built on a data model that consists of five key entities: Intellectual Entities, Objects, Events, Rights, and Agents (Gartner & Lavoie, 2013; PREMIS, 2015). Each of these entities plays a crucial role in preserving digital information and ensuring its long-term usability. Intellectual entities represent the conceptual aspects of the digital object, such as the work or collection it belongs to (Gartner & Lavoie, 2013; PREMIS, 2015). Understanding the intellectual context is vital for managing rights and access. Objects encompass the actual digital files and their associated metadata (Gartner & Lavoie, 2013; PREMIS, 2015). It includes information about the format, size, and technical characteristics of the digital object. Events capture the actions taken on the digital object, such as its creation, modification, and migration (Gartner & Lavoie, 2013; PREMIS, 2015). Documenting these events is essential for maintaining a complete history of the digital object's lifecycle. Rights address the rights associated with the digital object, including copyright information and access restrictions (Gartner & Lavoie, 2013; PREMIS, 2015). Properly managing rights is crucial for legal compliance and ethical use. Agents refer to the individuals or organizations involved in the creation, management, and preservation of the digital object (Gartner & Lavoie, 2013; PREMIS, 2015). This information helps establish accountability and responsibility for the digital materials

(Gartner & Lavoie, 2013). Preservation metadata serves multiple purposes in the context of digital preservation. It provides a record of activities performed on digital materials, allowing institutions to make informed decisions about future preservation actions (Digital Preservation Coalition, 2021). Metadata also supports the discovery and retrieval of digital objects, ensuring that users can access the information they need.

2.7 Research gap

The literature review revealed several research gaps. While existing literature discusses various frameworks for digital preservation, such as the OAIS reference model and the PREMIS Data Dictionary, there is a lack of context-specific theoretical frameworks that address the unique cultural, historical, and operational contexts of the Tooro Kingdom. The absence of such frameworks limits the understanding of how digital preservation practices can be effectively tailored to local needs and resources. The theoretical discourse around digital preservation often emphasizes technological and managerial aspects, with insufficient attention paid to the cultural heritage perspectives specific to regions like the Tooro Kingdom. This gap suggests a need for theories that integrate cultural significance, community involvement, and traditional knowledge systems into digital preservation practices. The literature -reviews also highlighted a lack of empirical studies focusing on the digital preservation initiatives within the Tooro Kingdom. Most existing studies concentrate on broader contexts or different geographical areas, leaving a gap in understanding the specific practices, challenges, and successes of digital preservation in this region. Current research methodologies in digital preservation studies often rely on secondary data or case studies from well-resourced institutions as well. There is a methodological gap in employing qualitative and quantitative approaches to gather primary data from the Tooro Kingdom's archives, which would provide a more comprehensive understanding of the local digital preservation landscape. Furthermore, while various frameworks exist, there is a gap in comparative studies that evaluate the effectiveness of different digital preservation strategies in similar cultural contexts. Research that compares the Tooro Kingdom's practices with those of other regions could yield valuable insights and best practices. Addressing these gaps was essential for understanding and enhancing digital preservation initiatives in the Tooro Kingdom.

2.8 Chapter summary

This chapter discussed what other studies have said about the theoretical framework and key concepts of the study. It also provided the research gap. The next chapter presents the methodology of the study.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter describes the techniques and procedures that will be used to conduct the study (Patel & Patel, 2019). It discusses the area of study, research approach, research design, study population, sampling and sample size, data collection methods, data quality control, data analysis and ethical considerations.

3.2 Area of study

The study area was Tooro Kingdom Administrative Headquarters at Mucwa, Fort Portal and Mountains of the Moon University, Fort Portal, Kabarole District, Western Uganda. These were selected as the areas of study because of the steps it has taken to safeguard its archives such as signing a Memorandum of Understanding with Mountains of the Moon University for their temporary custody (Derek, 2015). The study looked at the way the archives of the Tooro Kingdom are digitally preserved.

3.3 Research approach

This shows the procedure to be followed to gather and analyse data (Mohajan, 2017). A qualitative research approach was used. This facilitated the comprehensive understanding of the issue based on the perceptions of the study population (Creswell & Clark, 2017). Qualitative research is characterized by its focus on understanding phenomena from the perspectives of the participants involved (Creswell & Creswell, 2018). This research approach was used to gather rich, detailed data about the digital preservation initiatives and their impact on accessing archives. This was helpful because digital preservation is not merely a technical process; it involves cultural, social, and institutional factors that influence how archives are maintained and accessed. The specific objectives of the study aimed to uncover various aspects of digital preservation, such as identifying which archives are digitally preserved and analyzing the initiatives in place. Utilizing a qualitative research approach allowed participants to express their thoughts and experiences freely.

3.4 Research design

A research design is a strategy for answering research questions in the most cost-effective way (Patel & Patel, 2019). The study used a case study research design which specifically focused on the Tooro Kingdom Archives. A case study research design is a method used to explore a specific subject in great detail (Creswell & Clark, 2017). This can be a person, group, organization, or event (Creswell & Clark, 2017). The goal of a case study is to understand the subject in its real-life context. This approach is especially useful when researchers want to look at complex issues that cannot be easily measured or explained with numbers. Digital preservation involves many technical and cultural factors. A case study allowed for a detailed exploration of these complexities, giving insights that might be missed in other studies. Focusing on the Tooro Kingdom also helped in looking at the specific challenges and successes of digital preservation in this unique cultural setting. Understanding this context was important for creating effective strategies. Further, the study aimed to find out not only what is happening with digital preservation but also the challenges involved and how things could be improved. A case study was great for exploratory research because it revealed underlying issues and guided future actions. Lastly, the findings from the case study resulted in the development of a framework to improve digital preservation initiatives. This framework was based on the specific experiences and challenges identified in the Tooro Kingdom, making it more relevant and useful for similar situations.

3.5 Study population

A study population is the population being considered for the study (Casteel & Bridier, 2021). The study population for this research consisted of 20 participants from both Tooro Kingdom and Mountains of the Moon University. This diverse group included:

- Librarians: 4 from Mountains of the Moon University and 2 from Tooro Kingdom.
- Records Officers: 3 from Tooro Kingdom.
- Records Staff: 2 from Mountains of the Moon University.
- Head of Archives: 1 from Tooro Kingdom.
- Head of Museum: 1 from Tooro Kingdom.
- Research Support Staff: 3 from Tooro Kingdom.
- Administrators: 2 from Tooro Kingdom.

- Head of Treasury: 1 from Tooro Kingdom.
- Head of Information: 1 from Tooro Kingdom.

This population was carefully selected to include individuals who are directly involved in or have knowledge about digital preservation and archival practices. The inclusion of staff from Mountains of the Moon University was particularly important because the archives of Tooro Kingdom are housed there, making the university a key player in the digital preservation efforts.

3.6 Sample determination, sample size and sampling procedures

According to Patel and Patel (2019), a sample is a subset of the study population. A sufficient sample size is required to ensure fair representation. The sample size for this study was the entire study population of 20 participants. This means that every individual who met the criteria for inclusion was selected to participate. Using the entire study population as the sample size is justified. By including all relevant participants, the study gathered comprehensive data that reflected the full range of experiences and opinions regarding digital preservation initiatives. The total number of participants was also manageable, making it feasible to include everyone without overwhelming the research process. The sampling strategy employed in this study was a purposive sampling method. This means that participants were intentionally selected based on specific criteria related to their knowledge and involvement in digital preservation (Creswell & Creswell, 2018). This strategy was chosen because it allows for the selection of individuals who have relevant experience and insights. Participants were chosen based on their roles in either Tooro Kingdom or Mountains of the Moon University, ensuring that the data collected would be rich and informative

3.7 Data collection methods

Data collection methods are the ways through which data is collected (Creswell & Clark, 2017). The study used structured interviews to collect primary qualitative data and document review to collect secondary qualitative data.

3.7.1 Structured interviews

Structured interviews involve asking the same predetermined questions to all participants (Sileyew, 2019). A structured interview is a method of data collection where the interviewer asks

a set list of predetermined questions in a specific order (Creswell & Clark, 2017). This approach ensures that every participant receives the same questions, which helps in comparing their responses easily. Since all participants answer the same questions in the same order, it reduces variability and bias in the data collection process (Sileyew, 2019). This standardization makes it easier to analyze the responses and identify patterns. Structured interviews are also often quicker to conduct and analyse (Sileyew, 2019). The fixed format allows researchers to collect data systematically, which is especially useful when dealing with a larger group of participants. The questions are additionally designed to be clear and direct, which helps participants understand what is being asked (Sileyew, 2019). This clarity can lead to more accurate responses. In this study, structured interviews were conducted with the participants, who included librarians, records officers, and administrators from both Tooro Kingdom and Mountains of the Moon University. The questions focused on their experiences and opinions regarding digital preservation initiatives. By using structured interviews, the researcher was able to gather specific information about the current practices, challenges faced, and potential improvements in digital preservation.An interview guide was used to guide this process (Refer to appendix 3).

3.7.2 Document review

Document review involves analyzing existing documents related to the subject of study (Patel & Patel, 2019). This can include reports, policies, and archival materials that provide insights into the practices and history of digital preservation initiatives. Reviewing documents allows researchers to gather background information and context that might not be captured in interviews (Sileyew, 2019). It helps in understanding the historical and operational aspects of digital preservation. Document review can help verify the information obtained from interviews (Sileyew, 2019). By cross-referencing what participants say with documented evidence, researchers can ensure the accuracy of their findings. Analyzing documents can reveal gaps in the current practices or highlight areas that need further exploration during interviews. The researcher reviewed relevant documents from Tooro Kingdom and Mountains of the Moon University. This included strategic plans and meeting minutes' digital preservation, previous reports on archival practices, and any existing frameworks. The insights gained from these documents complemented the information obtained from structured interviews, providing a more

rounded view of the digital preservation initiatives. A document review checklist was used to guide this process (Refer to appendix 4).

3.8 Data quality control

The data quality control process in this study involved several key steps to ensure the accuracy, completeness, validity, and reliability of the collected data (Patel & Patel, 2019). The study employed structured interviews and document review to gather information about digital preservation initiatives at the Tooro Kingdom.

3.8.1 Validity

Validity is when a data collection instrument measures what it truly intends to measure. To establish the validity of the structured interviews and document review process, the study employed content validity and triangulation. The interview questions were designed based on existing literature on digital preservation and reviewed by two subject matter experts. Their feedback helped refine question wording, ensuring that the questions were clear, relevant, and aligned with the study objectives. To enhance the credibility of findings, the study used methodological triangulation by cross-referencing data from structured interviews with information obtained from official documents from Tooro Kingdom and Mountains of the Moon University. This approach ensured that key themes were supported by multiple sources and helped identify inconsistencies or gaps in the data.

3.8.2 Reliability

Reliability is when the data collection instruments guarantee that if the same steps are taken to conduct the same study, the same results can be achieved. To ensure reliability, an audit trail was left behind. A systematic approach was shared on how the study was conducted, including the interview guide and document review checklist used.

3.9 Data analysis procedure

Data analysis involves making sense of the collected data to address the research problem (Sileyew, 2019). Thematic analysis was used to analyze the data collected from structured interviews and document reviews. Thematic analysis is a method that helps identify, analyze, and

report patterns or themes within qualitative data (Creswell & Creswell, 2018). The analysis was conducted manually, following a series of steps to ensure thorough examination and understanding of the data. The first phase involved reading through the interview transcripts and relevant documents multiple times. This step helped in getting familiar with the content and gaining a general understanding of the information provided by the participants. After getting familiar with the data, important pieces of information were identified and initial codes created. These codes were short phrases or labels that represented key ideas or concepts found in the data. This step allowed in organizing the data into manageable sections. The initial codes were then grouped into broader themes. Patterns and connections between the codes were looked for to identify major themes that represented the overall findings of the study. This step involved discussing the themes among the research team to ensure that they accurately reflected the data. Once the initial themes were identified, they were reviewed and refined. This was by checking if the themes accurately represented the data and if they were distinct from each other. This step involved revisiting the data to ensure that the themes were supported by sufficient evidence. After refining the themes, each theme was defined and named clearly. Descriptions for each theme were created to explain what it represented and how it related to the research objectives. This helped clarify the findings for anyone reading the study. The findings were then written, presenting the identified themes along with supporting quotes and examples from the data.

3.10 Ethical considerations

Adhering to ethical considerations is recommended for researchers (Sileyew, 2019). Several important ethical considerations were followed to ensure that the research was carried out responsibly and respectfully. These considerations helped protect the rights and well-being of the participants involved in the study.

a. Informed Consent

Before participating in the study, all participants were provided with clear information about the research purpose, procedures, and their role in the study. They were asked to sign a consent form, which indicated that they understood the study and agreed to participate voluntarily. This process ensured that participants made informed decisions about their involvement.

b. Confidentiality

Steps were taken to protect the confidentiality of the participants. Personal information, such as names and specific job titles, was kept private and not shared in the study's findings. Instead, participants were assigned codes or pseudonyms to maintain their anonymity. This helped create a safe environment for participants to share their thoughts and experiences without fear of being identified.

c. Right to Withdraw

Participants were informed that they had the right to withdraw from the study at any time without any negative consequences. This means that if they felt uncomfortable or changed their minds about participating, they could choose to leave the study without any pressure or obligation. This consideration respected the autonomy of the participants.

d. Respect for Participants

All participants were treated with respect and dignity. Their opinions and experiences were listened to and valued. Care was taken to avoid any language or behaviour that could be perceived as disrespectful or harmful.

e. Ethical Approval

Before starting the research, ethical approval was obtained from the relevant review board or committee. This approval ensured that the research met ethical standards and guidelines, providing an additional layer of oversight to protect participants.

f. Accurate Reporting

A commitment was made to report the findings honestly and accurately. The results were ensured to reflect the participants' views and experiences without exaggeration or misrepresentation. This commitment to honesty helped maintain the integrity of the research.

3.11 Chapter summary

This chapter presented the steps that were followed in conducting the study. It first described the study area and then explained how the research was conducted, including the study population and ethical considerations followed. The next chapter presents the findings of the study.

CHAPTER FOUR
PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the study findings. It contains a section on responses, demographic information and findings.

4.2 Responses

20 participants participated in the study. These were from both Tooro Kingdom and Mountains of the Moons University. Participants included 4 librarians (Mountain of the Moons University), 2 librarians (Tooro Kingdom), 3 records officers (Tooro Kingdom), 2 records staff (Mountain of the Moons University), 1 head of archives (Tooro Kingdom), 1 head of museum (Tooro Kingdom), 3 research support staff (Tooro Kingdom), 2 administrators (Tooro Kingdom), 1 head of treasury (Tooro Kingdom) and 1 head of information (Tooro Kingdom)

4.3 Demographic information

Demographic information on age, gender, highest education level and level of work experience was obtained. This was to understand who the participants were. The findings are presented below:

4.3.1 Age bracket

Participants were asked to tick the age bracket in which they belonged. The findings are presented in table 4.1 below.

Table 4.1: Age bracket

Age group (years)	**Frequency**
20-29	6
30-39	11
40-49	1
50 and above	2
Total	**20**

Source: Primary data (2024)

The majority of the participants were in the 30-39 age group, followed by the younger 20-29 group. The strong representation of younger and middle-aged individuals suggests that the study benefited from fresh perspectives.

4.3.2 Gender

Participants were asked to tick their gender. Their responses are presented in table 4.2 below.

Table 4.2: Gender

Category	**Frequency**
Male	8
Female	12
Total	**20**

Source: Primary data (2024)

Most of the participants were female (12) compared to males (8). However, this had no effect on the study.

4.3.3 Highest education level

The participants were asked to tick their highest education level. The findings are presented in table 4.3 below:

Table 4.3: Highest education level

Education level	**Frequency**
Diploma	2
Bachelor's	10
Masters	7
PhD	1
Total	**20**

Source: Primary data (2024)

Most participants had a Bachelor's degree (10), followed by a Master's degree (7), Diploma (2) and a PhD (1). The educational distribution among participants suggested a well-educated sample. This high level of education was beneficial for the study, as it indicated that participants had strong understanding of the questions being discussed. Furthermore, the mix of educational backgrounds ensured a diversity of perspectives. This diversity enriched the discussions and findings of the study, as participants may approach the issues from different angles based on their educational experiences.

4.3.4 Level of work experience

Participants were asked to tick their level of work experience. Their responses are shown in table 4.4 below.

Table 4.4: Level of work experience

Years	**Frequency**
0-3	1
3-6	5
6-9	8
9 and above	6
Total	**20**

Source: Primary data (2024)

Most participants (8) were had 6-9 years of work experience, followed by 6 with 9 and above years, 5 with 3-6 years and 1 with 0-3 years. The presence of individuals with varying levels of experience ensured that multiple viewpoints are represented.

4.4 Findings

4.4.1Archives digitally preserved at the Tooro Kingdom

The first objective of the study was to find out which archives are digitally preserved at the Tooro Kingdom. The findings are presented in four themes (types of digitally preserved archives; policies, management and future plans).

Types of digitally preserved archives

Participants mentioned that the Kingdom has digitized various historical documents, providing a valuable record of its past. The digital preservation of audio recordings was also highlighted. Specifically, a participant shared that:

> *"...Audio recordings have captured important events and narratives that contribute to the Kingdom's cultural heritage."*

The findings also revealed that the Kingdom has digitized records related to its economic activities, such as salt production in Katwe, tea plantations, and the utilization of Kibale forest resources. The Kingdom has also digitized records of agreements between its governors and the central government, as well as agreements between the Kingdom and other entities. Lastly, it was mentioned that the Kingdom has digitized records related to diseases and vaccinations, highlighting its efforts to preserve public health information. From the findings, it was discovered that the Kingdom had an extensive collection of archives that needed to undergo digital preservation. A participant specified that:

> *"The Tooro Kingdom Archives has 630 boxes with 2000 files."*

From the nature of archives held, it is expected that these fall under historical archives, audio recordings, economic archives, government agreements and health archives.

Policies

When asked about specific policies guiding the selection of materials for digital preservation, responses varied. Many participants from Tooro Kingdom expressed uncertainty, stating that no policy is currently in place. However, at Mountains of the Moon University, participants shared that they followed the university policy. Existing procedures for managing and administering archives included:

> *"...robust digital preservation strategies, regular backups, and disaster recovery plans to safeguard against data loss or corruption."*

Given that Tooro Kingdom's archives were managed by Mountains of the Moon University; it was no surprise that they were more familiar with the polices for digital archives management in place.

Management

The responsibility for managing and overseeing the digital preservation process within the Tooro Kingdom was assigned to Mountains of the Moon University. A participant stated that:

> *"The process is managed by MMU staff."*

This highlighted the collaboration between the Kingdom and Mountains of the Moon University.

Future plans

The document review revealed that the Tooro Kingdom has ambitious plans for the future. According to the Kingdom's strategic plan for 2017, there are plans to build Uganda's first digital museum. This museum aims to showcase royal regalia and artifacts used over 200 years ago, contributing to the Kingdom's tourism development. The document review also indicates that the archives are accessible for researchers at the Centre for African Development Studies at Mountains of the Moon University, promoting academic engagement with the Kingdom's rich history.

4.4.2 Digital preservation initiatives for archives at the Tooro Kingdom

The second objective of the study was to analyse the digital preservation initiatives for archives at the Tooro Kingdom. This section integrates findings from interviews with stakeholders and document reviews, highlighting key themes such as technology use, accessibility, organizational practices, and the impact of these initiatives.

Technologies

Participants were asked about the specific technologies and tools employed for digital preservation within the Tooro Kingdom. The responses indicated a reliance on various systems, including: storage systems, electronic catalogues and physical storage facilities and hardware. A participant pointed out that:

> *"Electronic catalogues facilitate the organization and retrieval of archived materials…"*

Another participant noted that:

> *"We use a dedicated computer connected to a Drobo machine whose purpose is to connect our resources on the Local Area Network."*

These assertions affirmed that technology was integrated in managing Tooro Kingdom's digital archives.

Approaches for accessibility

To ensure the long-term accessibility and integrity of digital archives, several approaches were also employed. Participants emphasized the importance of data security and adoption of environmental controls to protect against unauthorized access and data loss. Format migration and duplication of copies was another aspect mentioned. A participant specifically shared that:

> *"We create duplicate copies for users to ensure that data is not lost and continuously update digital files to latest formats."*

This showed that caution was taken to ensure that the digital archives did not become obsolete or lost.

Organization of digital archives

Participants agreed that there were clear policies in place to guide how archives can be accessed. Archives were further organized by subjects and origins, making it easier for users to find relevant materials. A participant also shared that catalogues are are accessible online, allowing researchers and the public to engage with the archives. However, access was regulated. According to one participant:

> *"…accessing the digital archives requires an introduction letter from the Prime Minister and the Vice Chancellor of Mountains of the Moon University."*

The above authorization was required to ensure that access is controlled and that only authorized users can use the records.

Other digital preservation practices

The existing digital preservation practices included collaborative projects such as partnerships with institutions like Mountains of the Moon University to enhance preservation efforts. Information was also backed up on special electronic catalogues kept in secure locations, ensuring that data is not lost. One participant highlighted that:

"Preservation practices are done by MMU Library…"

This promoted collaboration while achieving the goal of effective digital archives preservation.

Impact of digital preservation initiatives

Participants were lastly asked about the impact of digital preservation initiatives on access to the Tooro Kingdom Archives. It was revealed that digital preservation has improved access to historical documents, enabling researchers to engage with the Kingdom's heritage more effectively. One participant remarked:

"It has enabled longevity of the historical documents…"

This showed the importance of digital preservation initiatives. However, challenges such as "tech phobia and unstable power supply" were also noted, which can hinder access for some users.

4.4.3 Challenges affecting the digital preservation of archives at the Tooro Kingdom

The third objective of the study was to investigate the challenges affecting the digital preservation of archives at the Tooro Kingdom. The investigation into the challenges affecting digital preservation initiatives at the Tooro Kingdom highlights several barriers that hinder effective management and accessibility of digital archives. These challenges were identified through interviews with stakeholders and a review of relevant documents, revealing key themes such as technological limitations, funding issues, and organizational constraints. They are presented below.

Technological limitations

One of the primary barriers to accessing digital archives at the Tooro Kingdom is limited technological infrastructure. A participant expressed concerns about the current state of technology, mentioning:

"Unstable power, lack of ICT skills, and lack of special computers for researchers."

Another participant noted:

"Digital archives are not exactly secured by the officials or the buildings in the Tooro Kingdom headquarters."

This indicated that physical security was also a concern. These technological limitations not only affect the preservation process but also the ability of researchers and the public to access the archives effectively.

Funding and sustainability issues

Funding is a critical challenge for the digital preservation efforts at the Tooro Kingdom. Participants highlighted:

> *"Maintaining and expanding digital preservation efforts requires consistent funding…"*
>
> *"…limited space, and project sponsorship may also faze"*

The above assertions pointed out that without financial support, the digital preservation of Tooro Kingdom's archives would be affected. The lack of a dedicated budget for necessary equipment was also mentioned. A participant shared that:

> *"We lack a budget to purchase necessary equipment."*

The lack of a budget to purchase necessary equipment can slow down and affect the progress of digital preservation efforts for archives at the Tooro Kingdom.

Organizational constraints

The organizational structure and management of digital archives present additional challenges. One of the major challenges was the fact that the Kingdom's archives were at Mountains of the Moon University and not at the Kingdom. A participant emphasized that:

> *"We need to own the archives and also house them within the premises of the Kingdom headquarters."*

This would ensure that that there is a dedicated team committed to ensure that the efforts on digital preservation are a success. Even at Mountains of the Moon University, participants expressed dissatisfaction with how the Kingdom's archives were handled. They expressed the need to separate the archives from the library and recruiting archivists to manage the resources effectively. A participant shared that:

> *"There should be a budget, recruit archivists, and a well-built structure meeting archival standards."*

These organizational constraints hinder the effective management and preservation of digital archives, as clear ownership and dedicated resources are essential for success.

Anticipated future challenges

In the review of meeting minutes for a meeting that was held in May 2023 with stakeholders from Tooro Kingdom and Mountain of the Moon University, concerned on future threats such as loss of important information due to technology obsolescence, poor preservation methods and

the pressing need for trained personnel to manage digital archives were mentioned. Despite these challenges, potential opportunities for enhancing digital preservation efforts were identified. These included: improving technological infrastructure such as desktops to enhance access, and designing and implementing user-friendly interfaces and search functionalities.

CHAPTER FIVE
DISCUSSION OF FINDINGS

5.1 Archives digitally preserved at the Tooro Kingdom

The findings highlight the types of archives that have been digitized, such as historical documents, audio recordings, and economic records. This comprehensive overview enhances the understanding of how cultural institutions can effectively manage and preserve diverse types of records in a digital format. It underscores the importance of adapting preservation strategies to the specific needs of various archival materials, particularly in the context of cultural heritage. The uncertainty expressed by participants regarding specific policies for digital preservation indicates a critical gap in governance. This finding suggests that cultural institutions, including the Tooro Kingdom, need to establish clear policies and guidelines for selecting materials for digital preservation. Such policies would ensure that preservation efforts are systematic and aligned with best practices, thereby enhancing the sustainability of digital archives. The collaboration between the Tooro Kingdom and Mountains of the Moon University exemplifies the importance of partnerships in managing digital archives. This finding implies that cultural institutions can benefit from sharing resources and expertise, leading to more effective preservation strategies. It highlights the potential for collaborative networks among cultural institutions to enhance digital preservation efforts. The ambitious plans for building Uganda's first digital museum indicate a forward-thinking approach to cultural heritage management. This finding suggests that the Tooro Kingdom is not only focused on preserving its past but is also actively engaging in initiatives that promote education and tourism. This aligns with broader trends in cultural heritage management, where institutions seek to enhance public engagement and accessibility.

The literature review highlights the vulnerability of born-digital materials and the need for cultural institutions to preserve them due to their susceptibility to obsolescence (Flanagan, 2022; Zahara & Salim, 2022). This aligns with the findings that the Tooro Kingdom has digitized various historical documents and audio recordings, showcasing its commitment to preserving its cultural heritage. The Records Continuum Model (RCM) discussed in the literature review emphasizes that recordkeeping is a continuous process involving creation, capture, organization,

and access (Frings-Hessami, 2021). This concept is reflected in the findings, where the Tooro Kingdom's archives encompass diverse types of records, including historical, economic, and health-related documents, indicating an integrated approach to managing its digital archives. The literature review stresses the importance of collaboration between archivists and records managers to enhance information management strategies (Lucidea, n.d.). This is echoed in the findings, which reveal that the management of the Tooro Kingdom's archives is a collaborative effort with Mountains of the Moon University, indicating a practical application of collaborative principles in digital preservation.

However, there were also some contradictions. The literature review suggests that effective digital preservation requires clear guidelines and policies for record creation and management (Frings-Hessami & McKemmish, 2021). However, the findings indicate a lack of specific policies guiding the selection of materials for digital preservation at the Tooro Kingdom, with many participants expressing uncertainty about existing policies. This discrepancy highlights a gap between theoretical frameworks and practical implementation. The literature review discusses the challenges of preserving born-digital materials, emphasizing their ephemeral nature and the urgency of preservation (Frings-Hessami, 2021). In contrast, the findings from the Tooro Kingdom reveal a significant focus on digitizing historical documents and audio recordings, which may not fully address the complexities associated with born-digital materials. This suggests a potential oversight in the Kingdom's digital preservation strategy. While the literature review outlines the importance of adopting best practices for digital preservation, the findings indicate that the Tooro Kingdom lacks a robust policy framework and clear guidelines for managing its archives. Although there are ambitious plans for the future, such as building Uganda's first digital museum, the current practices may not adequately support these goals, revealing a contradiction between aspirations and existing realities.

The findings provide a practical application of the RCM within the context of the Tooro Kingdom. By illustrating how the model can guide the management of digital archives, the study contributes to the theoretical discourse on recordkeeping practices. It demonstrates the relevance of RCM in addressing contemporary challenges in digital preservation and highlights its potential to enhance the accessibility and sustainability of cultural heritage records. The

distinction made between born-digital materials and digitized physical archives contributes to the understanding of the complexities involved in digital preservation. The findings emphasize the need for tailored strategies for different types of records, which adds depth to the existing literature on digital preservation practices in cultural institutions (Flanagan, 2022; Zahara & Salim, 2022). The study opens avenues for future research by identifying gaps in current practices, such as the need for robust policies and the challenges of managing ephemeral digital content. Researchers can build on these findings to explore effective strategies for digital preservation, particularly in similar cultural contexts.

5.2 Digital preservation initiatives for archives at the Tooro Kingdom

The findings highlight the lack of specific policies guiding the selection and management of digital archives at the Tooro Kingdom. The study reveals the collaboration between the Tooro Kingdom and Mountains of the Moon University in managing the digital archives. This collaboration is crucial for leveraging expertise and resources, but it also highlights the need for clear roles and responsibilities to ensure effective management of the archives. The findings emphasize the Kingdom's goal of engaging the community and promoting awareness of its cultural heritage through digital archives. This focus on accessibility aligns with the Records Continuum Model's emphasis on making records available to various stakeholders throughout their lifecycle. The study indicates that the Tooro Kingdom has a vast collection of physical archives that need to be digitized. This suggests that the Kingdom should develop a comprehensive digitization strategy to prioritize materials based on their significance, condition, and research value.

Both the literature review and findings highlight the importance of using technology for managing digital archives. The literature review emphasizes the need for secure and reliable storage infrastructure, such as redundant storage solutions and cloud storage, to protect against data loss and ensure long-term accessibility (Digital Preservation Coalition, 2021; Hurley, 2024). Similarly, the findings indicate that the Tooro Kingdom relies on various technologies, including storage systems, electronic catalogues, and physical storage facilities, to manage its digital archives. As one participant noted, "Electronic catalogues facilitate the organization and retrieval of archived materials." Another similarity is the emphasis on accessibility. The literature review

stresses the importance of making digital archives available to various stakeholders, which aligns with the Tooro Kingdom's goal of engaging the community and promoting awareness of its cultural heritage through digital archives. The findings also suggest that the Tooro Kingdom employs approaches to ensure the long-term accessibility of its digital archives, although specific details are not provided. The RCM emphasizes that recordkeeping is not a linear process but a continuum where activities such as creation, capture, organization, and access occur simultaneously (Frings-Hessami, 2021). This theoretical perspective is mirrored in the findings, which reveal that the Tooro Kingdom has digitized various types of archives, including historical documents, audio recordings, and records related to economic activities and public health. The findings indicate that these records are not only created but also organized and made accessible, aligning with the RCM's focus on the continuous nature of recordkeeping. The literature review discusses the necessity of clear policies for digital preservation, including selection criteria and metadata management (Pandey & Kumar, 2020). However, the findings highlight a gap in this area, as many participants from the Tooro Kingdom expressed uncertainty regarding specific policies guiding their digital preservation efforts. While Mountains of the Moon University has established robust digital preservation strategies, the lack of a dedicated policy for the Tooro Kingdom suggests a potential area for improvement. This contradiction points to the need for the Kingdom to develop its own policies that align with the RCM's recommendations for effective recordkeeping and preservation. Both the theoretical review and findings emphasize the importance of making records accessible to various stakeholders. The RCM encourages the pluralization of records, which aligns with the Tooro Kingdom's goal of engaging the community and promoting awareness of its cultural heritage through digital archives. The findings indicate that the archives are accessible for researchers at the Centre for African Development Studies, supporting the RCM's focus on accessibility throughout the records' lifecycle. This connection reinforces the idea that effective digital preservation not only safeguards records but also enhances their usability for future generations.

The study applies the Records Continuum Model to the context of the Tooro Kingdom, demonstrating its relevance in analyzing digital preservation initiatives in cultural institutions. This contributes to the growing body of research that explores the practical applications of the RCM in various settings. The study provides valuable insights into the digital preservation

practices of the Tooro Kingdom, which is a cultural institution in Uganda. This contributes to the limited research on digital preservation initiatives in African cultural institutions, which is an understudied area compared to other regions. The findings identify challenges faced by the Tooro Kingdom in managing its digital archives, such as the lack of dedicated policies and the need for further digitization. This information can inform the development of strategies and best practices for other cultural institutions facing similar challenges. The study highlights the Tooro Kingdom's focus on engaging the community and promoting awareness of its cultural heritage through digital archives. This contributes to the growing recognition of the importance of community engagement in the preservation and dissemination of cultural heritage.

5.3 Challenges affecting the digital preservation of archives at the Tooro Kingdom

The findings highlight technological limitations, such as unstable power and inadequate ICT skills, which resonate with the literature's emphasis on technological obsolescence as a major barrier to digital preservation (Zahara & Salim, 2022). Both sources point to the necessity of robust technological infrastructure for effective preservation and access to digital archives. The findings indicate that funding is a critical challenge for the Tooro Kingdom's digital preservation efforts, echoing the literature's assertion that inadequate funding limits the ability of cultural institutions to acquire necessary resources (Pandey & Kumar, 2020). Both emphasize that without consistent financial support, the sustainability of digital preservation initiatives is at risk. The findings reveal organizational challenges, particularly regarding the management of archives at Mountains of the Moon University instead of within the Kingdom itself. This aligns with the literature's discussion on the importance of clear ownership and dedicated resources for successful digital preservation (Baucom, 2019). Both sources underscore the need for a structured approach to managing digital archives. While the RCM emphasizes the importance of continuous recordkeeping and collaboration between archivists and records managers, the findings suggest that the current organizational structure at the Tooro Kingdom hampers effective management. The lack of dedicated archivists and clear policies contradicts the RCM's ideal of integrated and collaborative recordkeeping practices (Frings-Hessami, 2021). The findings reveal ambitious future plans for the Tooro Kingdom, such as building Uganda's first digital museum, which suggests a forward-thinking approach. However, the immediate challenges related to funding, technology, and organizational constraints may impede these

plans. This contradiction highlights the tension between long-term aspirations and the pressing need to address foundational issues in digital preservation. The literature emphasizes the need for specialized knowledge and skills in digital preservation, yet the findings indicate that there is currently a lack of trained personnel at the Tooro Kingdom. This gap in expertise contradicts the literature's assertion that effective digital preservation requires skilled staff capable of managing complex digital environments (Baucom, 2019).

The findings underscore the critical need for investment in technological infrastructure to support digital preservation efforts. The identified technological limitations, such as unstable power and inadequate ICT skills, point to the necessity for cultural institutions to prioritize infrastructure development. This insight can inform policymakers and stakeholders about the importance of allocating resources to enhance technological capabilities in cultural institutions. The findings reveal that funding is a major barrier to effective digital preservation at the Tooro Kingdom. This highlights the broader issue of financial sustainability in cultural heritage institutions, suggesting that securing consistent funding should be a priority. The implications extend to other cultural institutions facing similar challenges, advocating for the development of funding strategies and partnerships to support digital preservation initiatives. The uncertainty regarding policies guiding the selection of materials for digital preservation indicates a gap in governance within the Tooro Kingdom. This finding emphasizes the importance of establishing clear policies and guidelines for digital preservation, which can serve as a model for other institutions. The development of standardized procedures can enhance the effectiveness of digital preservation efforts and ensure that valuable cultural heritage is adequately protected. The findings reveal organizational constraints related to the management of archives, particularly the need for dedicated archivists and clear ownership of the archives. This highlights the importance of establishing a robust organizational structure that supports effective management of digital archives. The findings can inform best practices for other cultural institutions seeking to improve their archival management.

The findings expand the existing literature on digital preservation by providing a detailed examination of the specific challenges faced by the Tooro Kingdom. This adds to the body of knowledge on the barriers to effective digital preservation in cultural institutions, particularly in

developing regions, and highlights the unique context of the Tooro Kingdom. The identified challenges and implications can serve as a framework for future research in digital preservation. Scholars can build upon these findings to explore solutions to the barriers faced by cultural institutions, investigate the effectiveness of different preservation strategies, and examine the role of technology in enhancing access to cultural heritage. The findings offer valuable insights for policymakers and cultural heritage professionals, suggesting the need for targeted interventions to address the identified challenges. By emphasizing the importance of funding, infrastructure, and policy development, the study contributes to the discourse on effective digital preservation practices.

5.4 Framework to enhance the digital preservation initiatives of archives at the Tooro Kingdom

The following framework combines elements from the OAIS reference model, the NDSA Levels of Digital Preservation, the PREMIS Data Dictionary, and the records continuum model. This integrated approach addresses the current challenges and gaps identified in the digital preservation efforts of archives of the Tooro Kingdom.

Assessment and Planning

- Conduct a Needs Assessment**:** Evaluate the current state of digital preservation at Tooro Kingdom. Identify existing digital materials, assess their condition, and determine the specific needs for preservation.
- Develop Policies and Guidelines**:** Create clear policies that outline the selection criteria for digital materials, management practices, and roles within the preservation team. This will help clarify responsibilities and improve collaboration between Tooro Kingdom and Mountains of the Moon University.

Incorporate the OAIS Model

Utilize the OAIS model's functional entities to structure the digital preservation process. This includes:

- Ingest: Establish processes for capturing and preparing digital materials for preservation.
- Archival Storage: Ensure secure and reliable storage solutions for digital archives.

- Data Management: Maintain accurate metadata and documentation for all digital objects.
- Access: Develop user-friendly access systems for stakeholders to retrieve and use digital materials.
- Preservation Planning: Regularly review and update preservation strategies to adapt to technological changes.

Adopt NDSA Levels of Digital Preservation

Assess Current Practices Using NDSA Levels: Evaluate the Kingdom's digital preservation efforts against the NDSA Levels of Digital Preservation. This will help identify strengths and areas for improvement:

- Level 1: Ensure multiple copies of digital materials are stored in different locations.
- Level 2: Implement file fixity checks and basic metadata management.
- Level 3: Monitor digital materials regularly to maintain integrity.
- Level 4: Develop capabilities for repairing and migrating data as needed.
- Level 5: Create a comprehensive digital preservation policy and engage in community initiatives.

Utilize PREMIS Data Dictionary

Use the PREMIS Data Dictionary to document essential metadata for digital objects. This includes:

- Intellectual Entities: Describe the conceptual context of digital materials.
- Objects: Record technical details about the digital files.
- Events: Document actions taken on digital objects, such as creation and modifications.
- Rights: Manage copyright and access rights associated with the materials.
- Agents: Identify individuals or organizations responsible for the digital objects.

Integrate the Records Continuum Model

Use the records continuum model to view digital materials as part of a continuous lifecycle. This includes:

- Create: Ensure that records are created with preservation in mind.
- Organize: Maintain organized and accessible digital archives.

- Pluralize: Make digital materials available to diverse audiences.
- Realize: Utilize digital archives for educational and cultural purposes, enhancing community engagement.

Continuous Improvement and Training

- Regular Training and Capacity Building: Provide ongoing training for staff involved in digital preservation to keep them updated on best practices and new technologies.
- Evaluate and Adapt: Regularly assess the effectiveness of the digital preservation framework and make necessary adjustments based on feedback and technological advancements.

By implementing this integrated framework, the Tooro Kingdom can enhance its digital preservation efforts, ensuring that its cultural heritage is safeguarded for future generations while addressing current challenges and gaps in the system. This approach will not only improve the management of digital archives but also foster collaboration and community engagement.

5.5 Chapter summary

This chapter presented and discussed the findings of the study. It described who the study participants were from the demographic information provided, presented and interpreted the findings, and then discussed the findings relating them to the literature reviewed and the theoretical framework. It also proposed a framework to enhance digital preservation efforts for archives at Tooro Kingdom.

CHAPTER SIX
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The aim of this study was to evaluate digital preservation initiatives and their impact on accessing archives in cultural institutions using Tooro Kingdom as a case study. The study intended to find out which archives are digitally preserved at the Tooro Kingdom; analyse the digital preservation initiatives for archives at the Tooro Kingdom; investigate the challenges affecting the digital preservation of archives at the Tooro Kingdom; and develop a framework to enhance digital preservation initiatives for archives at the Tooro Kingdom. This section contains the summary of the findings, conclusion, recommendations and areas for further research.

6.2 Summary of findings

6.2.1 Archives digitally preserved at the Tooro Kingdom

Tooro Kingdom has made significant strides in digitizing various types of archives, including historical documents, audio recordings, economic records, government agreements, and public health information. This digitization effort is crucial for preserving the Kingdom's cultural heritage and ensuring that valuable historical narratives are accessible for future generations. However, the findings also reveal a lack of specific policies guiding the selection of materials for digital preservation, with many participants expressing uncertainty about existing frameworks. The management of digital preservation is currently a collaborative effort between the Tooro Kingdom and Mountains of the Moon University, where university staff oversee the process. This partnership highlights the importance of collaboration in effectively managing digital archives. Despite the progress made, challenges remain, particularly regarding technological limitations, funding issues, and organizational constraints. These barriers hinder the effective management and accessibility of digital archives, underscoring the need for improved infrastructure and dedicated resources.

6.2.2 Digital preservation initiatives for archives at the Tooro Kingdom

The Kingdom has successfully digitized various types of archives, including historical documents, audio recordings, economic records, government agreements, and public health

information. This diverse range of preserved materials underscores the Kingdom's commitment to safeguarding its cultural heritage and making it accessible for future generations. However, the findings also highlight critical gaps in the current digital preservation framework, particularly regarding the absence of specific policies guiding the selection and management of digital archives. While Mountains of the Moon University provides some oversight and follows established university policies, the lack of tailored policies for the Tooro Kingdom suggests a need for further development in this area. Establishing clear guidelines for digital preservation would enhance the Kingdom's ability to prioritize materials, ensure proper metadata management, and facilitate long-term accessibility. The collaboration between the Tooro Kingdom and Mountains of the Moon University is a positive aspect of the findings, as it brings together resources and expertise for effective archive management. However, the study indicates that more defined roles and responsibilities could further strengthen this partnership and improve the overall management of digital preservation efforts.

6.2.3 Challenges affecting digital preservation initiatives for archives at the Tooro Kingdom

The findings reveal a lack of specific policies guiding the selection of materials for digital preservation, with many participants expressing uncertainty about existing frameworks. The management of digital preservation is currently a collaborative effort between the Tooro Kingdom and Mountains of the Moon University, where university staff oversee the process. This partnership highlights the importance of collaboration in effectively managing digital archives. Despite the progress made, challenges remain, particularly regarding technological limitations, funding issues, and organizational constraints. These barriers hinder the effective management and accessibility of digital archives, underscoring the need for improved infrastructure and dedicated resources.

6.2.4 Framework to enhance digital preservation initiatives for archives at the Tooro Kingdom

The proposed framework for digital preservation at Tooro Kingdom represents a strategic and comprehensive approach to safeguarding the Kingdom's rich cultural heritage. By integrating established models such as the OAIS reference model, the NDSA Levels of Digital Preservation,

the PREMIS Data Dictionary, and the records continuum model, this framework addresses the current challenges faced in managing digital archives while promoting best practices in preservation. Implementing this framework will enable Tooro Kingdom to systematically assess and enhance its digital preservation capabilities, ensuring that valuable historical documents, audio recordings, and other significant materials remain accessible for future generations. The emphasis on collaboration between Tooro Kingdom and Mountains of the Moon University will strengthen resource sharing and expertise, fostering a more effective preservation environment. Furthermore, the framework's focus on continuous improvement and staff training will ensure that the Kingdom adapts to evolving technologies and practices in the field of digital preservation. By establishing clear policies and guidelines, Tooro Kingdom can prioritize its preservation efforts, effectively manage metadata, and engage the community in meaningful ways.

6.3 Conclusion

6.3.1 Archives digitally preserved at the Tooro Kingdom

While the digitization of various archives signifies a commitment to preserving cultural heritage, the lack of clear policies, funding constraints, and technological limitations pose significant obstacles. The collaborative management approach with Mountains of the Moon University is a positive step, but further efforts are needed to establish robust policies and secure adequate funding for sustainable digital preservation initiatives. The Kingdom's future plans for a digital museum reflect a forward-thinking vision that can enhance public access to its rich cultural heritage, provided that the identified challenges are addressed effectively.

6.3.2 Digital preservation initiatives for archives at the Tooro Kingdom

While the Tooro Kingdom has made commendable strides in digitizing its archives, the findings underscore the importance of developing specific policies and enhancing collaboration for effective digital preservation. By addressing these gaps, the Kingdom can ensure the long-term preservation and accessibility of its cultural heritage, ultimately contributing to the broader field of digital preservation in cultural institutions.

6.3.3 Challenges affecting digital preservation initiatives for archives at the Tooro Kingdom

While the digitization of various archives signifies a commitment to preserving cultural heritage, the lack of clear policies, funding constraints, and technological limitations pose significant obstacles. The collaborative management approach with Mountains of the Moon University is a positive step, but further efforts are needed to establish robust policies and secure adequate funding for sustainable digital preservation initiatives.

6.3.4 Framework to enhance digital preservation initiatives for archives at the Tooro Kingdom

The proposed framework not only aims to protect and preserve the Kingdom's archives but also serves as a catalyst for cultural engagement and education, enriching the lives of current and future generations. Through dedicated efforts in digital preservation, Tooro Kingdom can ensure that its history and heritage are preserved, celebrated, and shared with the world.

6.4 Recommendations

Based on the findings and discussion, the following recommendations are proposed to enhance digital preservation efforts at the Tooro Kingdom:

i. Tooro Kingdom should prioritize the development of clear policies and guidelines for digital preservation. This includes establishing criteria for selecting materials for digitization, implementing standardized metadata schemas, and outlining procedures for managing and preserving digital archives. Adopting best practices from initiatives like the UNESCO Memory of the World Programme and the International Council on Archives can help inform the development of these policies.

ii. Tooro Kingdom should explore various funding sources, such as government grants, private sponsorships, and international development programs, to ensure that resources are available for maintaining and expanding digital preservation initiatives.

iii. Tooro Kingdom should consider establishing a dedicated management structure for its archives. This may involve housing the archives within the Kingdom's premises and recruiting trained archivists to oversee their management. Separating the archives from

the library at Mountains of the Moon University and creating a well-built structure meeting archival standards can help streamline the management process.

iv. Tooro Kingdom should invest in capacity building programs for its staff. This may include providing training in digital preservation techniques, format identification, metadata management, and risk assessment. Collaborating with institutions like the International Council on Archives can help access resources and expertise for these capacity building initiatives.

v. Tooro Kingdom should develop clear policies specifically for managing its digital archives. These policies should establish guidelines for prioritizing materials for digitization based on their historical significance, condition, and research value; specify open and widely adopted formats, such as PDF/A for documents and TIFF for images, to ensure long-term accessibility and reduce the risk of obsolescence and define standards for capturing and managing metadata to enhance the usability and context of digital archives.

6.5 Areas for further research

The following areas are proposed for further research:

i. An investigation into potential funding sources for digital preservation initiatives to ensure sustainability of preservation efforts of archives for cultural institutions in Uganda.

ii. Capacity building and service delivery in archival institutions in Uganda.

iii. A comparison of on-site and off-site digital preservation initiatives for public institutions in Uganda.

6.6 Limitations and de-limitations of the study

Limitations refer to factors that may affect the results or findings of the study and are often beyond the researcher's control (Creswell & Creswell, 2018). This study involved a relatively small sample size of 20 participants. While this allowed for in-depth qualitative analysis, the limited number of participants may not fully represent the broader population involved in digital preservation at the Tooro Kingdom and Mountains of the Moon University. However, focus was put on obtaining quality information so as to produce rich findings that depict the present state of

digital preservation of archives at Tooro Kingdom. Secondly, the qualitative nature of the study introduced a level of subjectivity in data collection and analysis. The interpretation of participants' responses and the identification of themes were influenced by the researcher's perspectives and biases. This subjectivity could affect the reliability of the findings. The researcher however strived to be impartial and limited bias, reporting and only discussing what was reported. Lastly, while document review was an important part of the data collection process, access to archival documents or reports was restricted. The process was bureaucratic and, in the end few documents were reviewed. Despite this, the documents accessed had some pertinent information that informed the study.

6.7 Chapter summary

This chapter presented a summary of the findings, conclusions, recommendations, areas for further research, and study limitations and de-limitations. It concludes the research report.

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APPENDICES

INTERVIEW SCHEDULE

A. LETTER TO PARTICIPANTS

Dear Participant,

I am Sam Obunaka, a student pursuing a Masters in Library and Information Studies at Uganda Christian University. I am conducting a study titled: Digital Preservation of Tooro Kingdom Archives. The objectives of the study are: i) to find out which archives are digitally preserved at the Tooro Kingdom; ii) to analyse the digital preservation initiatives for archives at the Tooro Kingdom; iii) to investigate the challenges affecting digital preservation initiatives of archives at the Tooro Kingdom; and iv) to develop a framework to enhance the access to digital archives at the Tooro Kingdom.

I humbly request you to participate in this study by providing relevant data related to the objectives above. As a way of maintaining confidentiality, I will uphold all key information that can be used to identify you. Additionally, do note that the interviews will be recorded to guide me in writing down the findings. If for any reason you feel the need to withdraw from participating, you are free to do that any time as you wish because participation in this study is voluntary. Kindly let me know when you are available for the interview so that I can update the time on my schedule. The interview will take 25-40 minutes of your time.

I await to hear from you.

Sam Obunaka

0780247565

CONSENT TO PARTICIPATE IN THE INTERVIEWS

1. I hereby confirm that I have been informed by the researcher, Sam Obunaka, about the nature and conduct of this study.
2. I have the opportunity to ask any questions related to this study.
3. I have received, read, and understood the participant letter of information about the study.
4. I understand that all the information the researcher gathers is confidential and will not prejudice me in any way.
5. I voluntarily agree to take part in this research.

Please tick the box below to indicate your consent.

- ☐ I have read the consent form and herby agree to participate in this study.

SECTION C: BIO-DATA QUESTIONS

Age Bracket (Please tick what is applicable):

- ☐ 20-29
- ☐ 30-39
- ☐ 40-49
- ☐ 50 and above

Gender (Please tick what is applicable):

- ☐ Male
- ☐ Female

Highest Level of Education (Please tick what is applicable):

- ☐ Diploma
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ PhD

Years of Work Experience:

- ☐ 0-3 years

- 3-6 years
- 6-9 years
- 9 years and above

Position at Tooro Kingdom/Mountains of the Moon University (Please specify) …….

Section D: Archives digitally preserved at the Tooro Kingdom

i. To your knowledge, what types of archival materials within the Tooro Kingdom are currently preserved in digital formats? (e.g., historical documents, photographs, audio recordings, etc.)
ii. Is there a specific policy or strategy guiding the selection of materials for digital preservation? If so, could you elaborate on its key principles?
iii. Who is responsible for managing and overseeing the digital preservation process within the Kingdom?

Section E: Digital preservation initiatives for archives at the Tooro Kingdom

i. What specific technologies and tools are used for digital preservation within the Tooro Kingdom? (e.g., storage systems, software, metadata management tools, etc.)
ii. What approaches are employed to ensure the long-term accessibility and integrity of digital archives? (e.g., format migration, emulation, data security measures, etc.)
iii. How are digital archives organized and made accessible to stakeholders within and outside the Kingdom?
iv. Describe the existing digital preservation practices at the Tooro Kingdom.
v. How are the digital archives at the Tooro Kingdom currently accessed?
vi. Please share if there are any access restrictions on the digital archives and the rationale.
vii. In your experience, has digital preservation impacted the access to Tooro Kingdom Archives? (Please share how, if so.)

Section F: Challenges affecting digital preservation initiatives on access to Tooro Kingdom Archives

i. What are the main barriers faced in accessing digital archives at the Tooro Kingdom?

ii. What are the anticipated future challenges and opportunities for digital preservation in the Kingdom?

iii. Is there anything else you would like to share regarding the digital preservation efforts and access to archives at the Tooro Kingdom?

DOCUMENT REVIEW CHECKLIST

Information source	Nature	Content to look for
Digital preservation guides	**Internal**	**Tooro Kingdom Archives, digital preservation strategies, impact on access.**
Annual report	**Internal**	**Tooro Kingdom Archives, digital preservation strategies, challenges faced, impact on access.**
Strategic plan	**Internal**	**Tooro Kingdom Archives, digital preservation strategies, challenges faced, impact on access**
Digital preservation guides	**External**	**Archives of cultural institutions, digital preservation strategies, challenges faced, impact on access**

REC APPROVAL

UGANDA CHRISTIAN UNIVERSITY

A Centre of Excellence in the Heart of Africa

1st August, 2024

OBUNAKA SAM
Uganda Christian University
+256 780247565
Email: samobunaka322@gmail.com

UG-REC-026 APPROVAL NOTICE

To: Obunaka Sam, Principal Investigator

Re: UCU-REC Application titled: *Evaluation of Digital Preservation Initiatives and Their Impact on Accessing Archives in Cultural Institutions: The Case of Tooro Kingdom*

Application Number: UCUREC-2024-966

Version: 4.1

Type: [ ] **INITIAL REVIEW**
[ ] Protocol Amendment
[ ] Letter of Amendment (LOA)
[ ] Continuing Review
[ ] Material Transfer Agreement
[ ] Other, Specify:

I am pleased to inform you that the **UG-REC-026;** UCUREC approved the above referenced application.

Approval of the research is for the period from 1st August, 2024, to1st August, 2025
This research is considered minimal risk category.
As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and additions to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes. The REC application number assigned to the research should be cited in any correspondence.
3. Reports of unanticipated problems involving risks to participants or other must be submitted to the REC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for REC review.

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0 1 AUG 2025
RESEARCH ETHICS COMMITTEE

4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Regulations require review of an approved study not less than once per 12-month period. **Therefore, a continuing review application must be submitted to the RECeight weeks prior to the above expiration date of 1st August, 2025 in order to continue the study beyond the approved period.** Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. Your research details have been shared with the Executive secretary of Uganda National Council for Science and Technology (UNCST) and you are not required to get clearance since you are a Master's Degree research. Refer to UNCST Research registration and clearance Policy and guidelines (July 2016) in Uganda section 6(e).

The following is the list of all documents approved in this application by **UG-REC _026:**

	Document Title	Language	Version	Version Date
1.	Protocol	English	1.0	2024-07-13
2.	Informed Consent Form	English	1.0	2024-07-13
3.	Interview Guide	English	1.0	2024-07-13
4.	Questionnaire	English	1.0	2024-07-13

Signed and Stamped

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Prof. Peter Waiswa.
UCUREC Chairperson,
pwaiswa@musph.ac.ug

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01 AUG 2025
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