

Digitisation Process of Text-Based Materials: A Comparative Study of the Digitisation Process of Text-Based Materials at the National Library of Wales, UK, and the Nigeria Governors' Forum Special Library

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Abstract

The aim of this research was to investigate the digitisation process of text-based materials by conducting a comparative analysis of the National Library of Wales (NLW), United Kingdom and the Nigeria Governors' Forum (NGF) Special Library, and with a keen examination of their respective best practices. The study focused on the National Library of Wales, United Kingdom, and the Nigeria Governors' Forum Special Library. There were five objectives in this research which were to identify the similarities and differences in the digitisation processes of text-based materials of the NLW and the NGF special library; to identify best practices and potential areas for improvement in the digitisation policies and strategies of both libraries; examine the strengths and weaknesses of digitisation processes at the NLW and the NGF special library; evaluate critically the impact of digitisation in the NLW and the NGF special library; and to inform future decision making by developing recommendations for digitisation processes of text-based materials in libraries.

Data was collected and analysed by using observation, questionnaires, and document analysis.

The findings of the research showed that both libraries have established processes for digitising text-based materials, and there are similarities and differences in the digitisation processes used in both libraries. Recommendations were outlined.

Declaration and Statements

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed Naomi O. Ubogu (candidate)

Date 31-09-2023

STATEMENT 1

This work is the result of my own investigations, except where otherwise stated. Where *correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged by in text citation giving explicit references. A bibliography is appended.

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STATEMENT 2

I hereby give consent for my work, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

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Abbreviations

ALCTS	Association for Library Collections and Technical Services, Preservation and Reformatting Section
AV	Audio Visual
NGF	Nigeria Governors' Forum
NLW	National Library of Wales
TIFF	Tagged Image File Format
LTO	Linear Tape-Open
OCR	Optical Character Recognition
OPAC	Online Public Access Catalogue

Glossary of Terms

Term	Definition
Best Practices	Procedures and guidelines that are widely accepted because experience and research has demonstrated that they are optimal and efficient means to produce a desired result.
Born-Digital	A descriptor for information that is created in digital form, as opposed to digitised from analogue sources.
Copyright	A statutory right that grants creators (authors) certain exclusive rights in their creations for a legally established duration of time.
Digitisation	The process of converting an analogue document (paper, microform, film, analogue audio, or audiovisual tapes) to digital format for the purpose of preservation or access.
Digitisation Policy	Digitisation policy set out principles that guide digitisation process.
Digitisation Workflow	This is a sequence of processes and activities through which the digitisation project passes from initiation to completion.
Digital Preservation	The managed activities necessary for ensuring the long-term retention and usability of digital objects.
Dublin Core	A simple set of metadata elements used as a common meeting ground between richer, more granular metadata

	standards from diverse groups. Allows for generalizability and the support of cross-collection discovery.
Metadata	Structured information about an object, a collection of objects, or a constituent part of an object such as an individual content file.
Preservation	The processes and operations in ensuring the technical and intellectual survival of digital objects through time.
Text-Based Materials	Text-based refers to materials with static or fixed text and images, such as textbooks and supplemental text materials. Both print and digital materials can be text-based.

Chapter 1: Introduction

1.1 Background

The digitisation of text-based materials has revolutionized how libraries access and preserve valuable information and cultural heritage. Through digitisation, text-based materials are transformed into digital formats, making them more accessible to a wider audience and ensuring long-term preservation. This comparative study focuses on the digitisation processes employed at two distinct institutions: the National Library of Wales (NLW), UK, and the Nigeria Governors' Forum (NGF) Special Library. By examining and comparing the digitisation processes of these institutions, this study aims to shed light on the methodologies, challenges, and outcomes achieved in digitising text-based materials. Selecting the NLW and the NGF library for this study lies in the digitisation experiences of both libraries, the different socio-cultural backgrounds, the different institution types, the opportunity to acquire knowledge on the digitisation of text-based materials, and the opportunity for knowledge sharing and transfer. Both libraries have recognized the potential benefits of digitisation for expanding access to their collections and safeguarding their cultural heritage.

1.2 Institutional Background

Understanding the institutional background of both libraries is crucial to comprehending the factors that influence their digitisation processes of text-based materials.

1.2.1 National Library of Wales

The National Library of Wales (NLW), located in Aberystwyth, was established by Royal Charter in 1907 with the core mission to collect, preserve, and give access to all kinds and forms of recorded knowledge, especially relating to Wales and the Welsh and other Celtic

peoples, for the benefit of the public, including those engaged in research and learning (National Library of Wales, Strategic Plan 2021–2026). The library houses over 40,000 manuscripts, making it the world's largest and most important collection of Welsh and Welsh-language manuscripts. It is both a vast repository of knowledge and a hub of activity, providing the people of Wales with a deep insight into their past, an understanding of the present, and inspiration to shape their future (National Library of Wales, Collection Development Policy 2022). The library is well-known worldwide for its creative use of digital technologies to improve content access. As compared to physical text-based materials, a significant increase in their digital collections is available, with 7 million digitised objects now available through their newly built catalogue. With a rich collection of text-based resources spanning decades, the library has made significant efforts to provide access to its holdings through digitisation. The NLW digitisation section currently has 21 staff working across a variety of projects. 5 are fixed-term positions currently working on externally funded projects. 1 Section Head, 1 Programme Manager/Unit Head, 1 Head of Photography Unit, 1 Head of Audio Visual Unit, 3 Line Managers (Metadata and Imaging Specialists), 6 Imaging Technicians, 7 Audio Visual Technicians, and 1 Text Encoding/Metadata Specialist. Of these, the equivalent of 4 people works on the digitisation of text-based collections, and the rest are involved in the digitisation of special collections, film, video, and audio collections.

1.2.2 Nigeria Governors' Forum Library

Modelled after the American National Governors Association (NGA), the Nigeria Governors' Forum (NGF) was founded in 1999 following a multiparty conference of all elected governors in Nigeria held in Abuja between April 26 and 29, 1999. The NGF is a coalition of elected governors of the thirty-six states of Nigeria, with a mission to provide a platform for collaboration among governors, irrespective of their party affiliation, to share experiences,

promote cooperation, and serve as a mechanism for conflict resolution at both the national and sub-national level. Since its establishment, the Forum has become a major player in Nigeria's governance and development process.

The NGF special library is the custodian of the Nigeria Governors' Forum's knowledge base materials. The library commenced in August 2018 as an information hub that collects, stores, preserves, and disseminates knowledge resources in print and digital formats for library patrons seeking information and knowledge on the NGF's core thematic areas. Located in a world-class, serene environment, the primary function of the NGF special library is the collection and preservation of public policies, laws, and literature of sub-national value. The library commenced the digitisation of text-based materials in 2019. The library has rare and valuable collection of digitised text-based materials relevant to governance, policymaking, and development; these documents can easily be accessed through the library's Online Public Access Catalogue (OPAC) and the digital repository. The digitisation process at the NGF special library includes collection-specific approaches such as selection criteria, digitisation techniques, and metadata generation. The library's digitisation activities have provided access to its collections for policymakers, researchers, and the public, promoting informed decision-making. The library is a reference for Nigerian states governments to establish libraries in their respective states. The Library Manager oversees the digitisation project at the NGF library with assistance from the staff of the library and the ICT department.

1.3 Research Focus

The comparative study of the digitisation processes of text-based materials in libraries provides an opportunity to explore and gain understanding from their respective approaches. By analyzing these two institutions, the researcher can examine the methodologies, challenges faced, and outcomes achieved in digitising text-based materials in both libraries. Critical to this

study is to acquire an in-depth understanding of the digitisation process of text-based materials, identify best practices, provide recommendations that will enhance digitisation processes in similar libraries globally, and develop collaborative partnerships between libraries operating in different cultural, social, and economic contexts. These contexts encompass a variety of cultural practices, including customs, values, and social and economic dynamics that affect how libraries work.

1.4 Research Questions

This comparative study aims to address the following specific research questions:

1. What are the similarities and differences in the digitisation process of text-based materials at the NLW and the NGF special library?
2. What are the two libraries' policies and strategies regarding digitising text-based materials?
3. What are the strengths and weaknesses of the digitisation processes used by the two libraries?
4. What impact has digitisation had on the accessibility, discoverability, and use of library materials in each library?
5. What recommendations can be provided to libraries in similar contexts to guide their decisions on the digitisation processes of text-based materials?

1.5 Aim

This study aims to compare the digitisation processes used by the NLW and the NGF and to identify best practices for digitising text-based materials in both libraries.

1.6 Research Objectives

The research aims to achieve its aims through the following objectives:

1. Identify the similarities and differences in the digitisation processes of text-based materials from the NLW and the NGF special library.
2. Identify best practices and potential areas for improvement in the digitisation policies and strategies of the two libraries.
3. Examine the strengths and weaknesses of digitisation processes at the NLW and the NGF special library. Understanding these strengths and weaknesses can help libraries develop strategies to improve their digitisation processes.
4. Critically evaluate digitisation's impact on the NLW and the NGF special library.
5. Inform future decision-making by developing recommendations for the digitisation processes of text-based materials in libraries.

1.7 Significance of the study

This study holds significant importance for advancing digitisation practices in libraries and the broader field of information management. Comparing the digitisation processes at both libraries, valuable insights can be gained regarding effective strategies, methodologies, and technologies employed in digitisation projects. These insights can contribute to the development of best practices that can be adopted by libraries globally.

1.8 Scope and Limitations

The scope of this comparative study is focused specifically on the digitisation of text-based materials at the NLW, and the NGF Special Library. The constraint lies in the accessibility of data and information for analytical purposes. This study utilises literature, official documents,

observations, and questionnaires for data collection. The scope and depth of available information may vary, and certain aspects of the digitisation process may not be fully captured. Nevertheless, efforts will be made to gather comprehensive and reliable data to ensure the validity and credibility of the findings. Recognising the ever-changing nature of technology and the digital environment is crucial. The study's outcomes and suggestions can be impacted by the technology and infrastructure accessible during the research.

1.9 Dissertation Structure

The study is organized into five chapters. Chapter one is the introduction, which gives the research background, purpose, aims, and objectives. Chapter two is the literature review, which covers digitisation of text-based material, workflow, digitisation best practices, and challenges. Chapter three is the methodology focused on the research design, data collection, and analysis. Chapter four is the results, which present the analysis of the qualitative data, interpretation of the findings as they relate to the research objectives, and comparison of the results between both libraries. Chapter five is the discussion, which integrates the findings with existing literature and examines similarities, differences, and patterns in the digitisation processes in both libraries. Chapter six is the conclusion, which summarises the findings, implications, and recommendations.

1.10 Chapter Summary

This introductory chapter examined the purpose of the research by giving a brief background on the digitisation of text-based materials, its importance in safeguarding cultural heritage, and enhancing accessibility at the NLW and the NGF library. The backgrounds of both libraries were examined to ascertain their implementation of digitisation processes for text-based materials using appropriate digitisation guidelines. Choosing these institutions enabled the researcher to gain practical knowledge and approaches on digitisation workflows for text-based

materials and learn best practices from both libraries that will guide future digitisation projects.

The research focus, questions, objectives, significance of the study, scope, and limitations have also been outlined and discussed in this chapter.

Chapter 2: Literature Review

2.1 Introduction

The digitisation of text-based materials has significantly transformed the conservation, availability, and distribution of cultural heritage and knowledge. This chapter presents relevant secondary research findings pertaining to the research topic. This literature review compares the digitisation process of text-based materials in libraries, specifically analysing the National Library of Wales in the UK and the Nigeria Governors' Forum Special Library.

2.2 Method of Literature Review

This literature review analyses text digitisation using paper and web-based research. Printed books, e-books, articles, online journals, and web publications were identified and analysed using a systematic approach. Google search was used to find current research on library text digitisation. Primo, Aberystwyth University Library OPAC, Proquest LISA, NLW website, NGF website and library OPAC, and Google Scholar were searched using keywords to find relevant materials. The research includes varied papers that thoroughly review and cite the topic.

2.3 Keywords for Search

The chart in figure 2.1 depicts the keywords utilised in the search for resources pertaining to the research topic.



Figure 2.1: Map of Keywords for search

2.4 Digitisation

According to Terras (2011) digitisation:

“may seem a recent phenomenon in memory institutes, but the current state of affairs where libraries, archives, museums, galleries, and even private collections are expected to make available their holdings in digital form follows a period of experimentation with and appropriation of available digital technologies which dates back almost forty years.”

Digitisation is taking place on a global scale. According to Holley (2004), large and small organisations worldwide from many different sectors (museums, archives, libraries, art galleries, government and commercial) have been creating or converting resources into digital form for many users. Digitisation is a form of copying that converts information stored in analog form into digital formats (Lischer-Katz, 2022). According to Lee (2001, p. 3), digitisation refers to converting analogue signals or codes into digital ones. Also, Hughes (2004, p.4) defined digitisation as transforming analogue content into binary code, comprising of 1s and 0s, to facilitate computer readability, while Hampson (2001) identified digitisation as critical for effortlessly integrating printed and electronic resources.

2.4.1 Why Libraries Digitise

It is important to consider the reason libraries digitise their collections. Youngs (2001, p. 8) stated that libraries digitise their collection for prestige, access, analysis, research, preservation, policies, and technologies. According to Lopatin (2006) since the early 1990s libraries have been embarking on digitisation projects to provide access to, and to preserve unique materials in their collections. Similarly, Pandey et. al (2014), Tuna et.al. (2013), Kipaan (2012) asserted that libraries digitise their collections for preservation and to provide easy access to information.

2.4.2 Benefits of Digitisation in Libraries

According to Anderson and Maxwell (2004, p. 1), digitisation offers advantages beyond enhanced accessibility. Wood-Fisher (2012, p. 34) noted that digitisation offers benefits such as improved accessibility for users and preservation of archival materials. Jones and Tudur (2018) stated that digitisation enhances the accessibility of the NLW collections for viewing and re-use. Tietie (2021) noted that digitising library resources has facilitated convenient access and retrieval of documents at the NGF library and has allowed library users to access digitised documents through the library's Online Public Access Catalogue (OPAC) and digital repository.

Digitisation provides benefits such as preserving fragile and deteriorating materials, including manuscripts, rare books, and documents. This is achieved by creating digital surrogates in secure environments, reducing physical handling, and ensuring long-term cultural heritage access. Also, digitisation enhances accessibility to textual materials, facilitate worldwide access and engagement, diminishing geographical constraints and promote knowledge sharing.

2.4.3 Disadvantages of Digitisation

According to Devi and Murthy (2005) staff expertise and additional resources are often the greatest costs in digitisation. Petrescu (2008) identified three drawbacks of digitisation: large storage space required for certain document types, particularly images; high current cost of digitisation; and the potential for digital copies produced by current technologies to be less precise than the original. While Dhule (2018) outlined seven challenges of digitisation in libraries: funding, changing software and hardware, updating software and hardware, legal aspects, technical expertise, technophobia, and technological obsolescence.

2.4.4 Standards, Guidelines and Best Practices for Digitisation

Libraries used established digitisation guides and standards. Guidelines are important for maintaining standards and consistency in many fields (Federal Agencies Guidelines Initiatives 2023). Xie and Matusiak (2016) noted that guidelines and standards ensure the creation of high-quality sustainable digital objects that supports currents and intended use and are interoperable and consistent across collections and institutions. Similarly, Hughes (2004, p. 199), stated that best practices in digitising cultural heritage materials are like their analogue counterparts, as they are established procedures that offer a safety net for practitioners throughout the digitisation process. The Northeast Document Conservation Center emphasizes the need for institutions to develop technical guidelines that align with their specific needs and project goals in the ever-evolving digitisation landscape.

The US Federal Agencies Guidelines Initiatives (FADGI) Technical Guidelines for Digitising Cultural Heritage, developed by the Still Image working group, offer best practices for digitising still image materials, while the Netherlands' Metamorfoze guideline preserves paper heritage through guidelines for two-dimensional materials.

The International Federation of Library Associations and Institutions (IFLA) and the National Information Standard Organisation (NISO) have both recommended guidelines for creating sustainable and adaptable digital collections. The IFLA's guidelines aim to help professionals and non-professionals create re-useable and valuable digital collections, while the NISO's framework provides a framework for local practices.

ALCTS (2013) recommends minimum digitisation capture for libraries to produce sustainable content without re-digitisation. The National Archives and Records Administration (NARA) Technical Guidelines for Digitising Archival Materials for Electronic Access outline

methods for creating digital surrogates for access and reproduction, but not for replacing original records.

2.5 Review of Selected Digitisation Initiatives in Nigeria and the United Kingdom

Since the advent of digitisation in the 20th century, libraries in the UK and Nigeria have undertaken digitisation projects to conserve their collections and enhance access to text-based materials.

Table 2.1: Selected works on digitisation initiatives in Nigeria and the United Kingdom

Digitisation in Nigeria	Digitisation in UK
<p>According to the director general of NITDA – Kashifu Inuwa, the Federal Government of Nigeria has provided training about the use of ICT to 1376 civil employees who belonged from 48 Nigerian agencies, departments, and ministries from November 2020 to December 2021 (BusinessDay, 2022).</p>	<p>The British Library is at the forefront of digitisation in the last 20 years. Being recognized as the guardians of National treasures, British Library is recognized as the global leader and expert in dealing with fragile and rare material (Library).</p>
<p>The Obafemi Awolowo University library in Nigeria has two ongoing projects for digitisation. One is the digitisation of the collection of some Nigerian newspapers and the other one is the digitisation of the abstracts to doctoral programmes and masters’ programmes dissertations and thesis (Jagboro et al., 2012).</p>	<p>The UK also considered different forms of digital systems management, including underpinning interventions as a “shared library management system” to identify the potential significance for user experience and service delivery (Library).</p>
<p>According to Huridocs (n.d.), the government of Nigeria has taken an initiative of the Nigeria Court Digitisation Project, which digitise the court proceedings. At present 817 court cases have been digitised successfully.</p>	<p>In 2014, William Sieghart commenced the “single-digital presence” in England by explaining that “how in a digital age, the public libraries space can be the most exciting place for readers and give the public access to an unprecedented range of digital</p>

	content” (Connolly, Fredrickson, Millar, & White, 2019).
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2.6 Review of some Selected Studies on Digitisation

No specific research has been conducted comparing the digitisation process of text-based materials in libraries operating in the United Kingdom and Nigeria. However, there have been studies on digitisation in general. The research findings of (Kelly, 2014; Snow, 2013; Wood-Fisher, 2012; Wood-Fisher et al., 2011; Chopra, 2011; Fabunmi et al., 2009) provided a foundation for current research findings pertaining to digitisation processes in libraries, providing insights into best practices, challenges, and trends. Results of these studies dictated that the professional literature related to the evaluation of digital libraries shows a growing interest in refining users' experience and justifying the formulation of digital collections to different stakeholders. While (Okocha, 2022; De La Porte, 2019; Mommoh & Abubakar, 2019; Nneji, 2018; Pandey & Kumar, 2018; Udem et al., 2015; Iwhiwhu & Eyekpegaha, 2009; Lopatin, 2006) highlighted the gaps and challenges in various aspects of digitisation processes in libraries, they offer valuable insights into areas that require attention and improvement in the digitisation of text-based materials. Different challenges were observed in these studies such as improper funding, lack of national-level policy for digital preservation and absence of technical infrastructure etc. These challenges were mostly encountered while digitising and preserving cultural heritage resources. This paper recommends that adequate funding be provided to overcome the challenge of digitisation and meet up with recent advancements in technology.

Nneji (2018) and Baro et al (2013) investigated the digitisation activities in university libraries in Nigeria and their findings revealed that only a few university libraries in Nigeria have adopted digitisation of their information resources. In their studies, Lade and Saka (2019); Baro

et al. (2013) and Fatoki (2007) listed theses, dissertations, newspapers, magazines, seminar and conference papers, inaugural lectures, technical reports, newsletters, manuscripts, ceremonial addresses, directories, official gazettes, annual budgets and reports, circulars, journal articles and historical documents as the most frequently digitised materials.

Hughes (2004, p. viii) discusses the digitisation of text-based materials in chapter ten of her book. The chapter covers managing the digitisation process, handling, metadata, and technical issues. Anderson and Maxwell (2004, p.vi) documented the digitisation process, including material selection, preservation, standards, metadata, workflow, funding, policy, and challenges. The book chapter has highlighted the protection of copyright implication as a significant challenge in the digital settings that must be extended and strengthened. In addition, during digitisation in libraries, the sensitive content must be taken good care of particularly the culturally sensitive materials, and it is also very important to respect these sensitivities. Another critical factors for implementation of digitisation of libraries include selection of appropriate methods, work organisation, training, quality control, metadata, standards and formats, application of technology, and finding the sources of funding for the digital collections.

According to their work, it has been observed that digitisation has refined with time to a great extent. The importance of digitisation policy has been explained that it is crucial to formulate effective digitisation policies before digitising. The book also emphasises the importance of addressing all aspects of digitisation to foster its adoption in a country, facilitate discussions on obstacles related to digitisation, and encourage digital collaboration across institutions. Xie and Matusiak's (2016) third chapter discuss converting cultural heritage materials from analogue to digital format. This paper explores the motives and methods behind digitisation projects in libraries, archives, and museums. It summarises the steps involved in converting analogue resources to digital format. This chapter has focused on the best practices for the digitisation of libraries. The authors have provided international perspectives on the success and growth of

digital libraries and their crucial factors such as evaluation, retrieval, preservation, sustainability, interface design, metadata, digitisation, and collection.

2.7 Digitisation of Text-Based Materials

Digitisation is crucial for the preservation and accessibility of textual materials in libraries. Textual digitisation involves converting text-based materials such as books, manuscripts, newspapers, and journals into digital formats. The primary goal is to preserve the text's original format and structure. The process of digitising text-based materials is a complex one that involves multiple steps. The first step is to identify materials for digitisation, which can be difficult due to the requirement for a thorough understanding of the collection and its contents.

The Northeast Document Conservation Center (NEDCC) outlined four basic steps in digitising paper-based collections: capture, image processing, delivery, and quality control. Xie and Matusiak (2016) outlined six basic digitisation steps: project planning, image capture, digital processing, metadata creation, ingesting digitised objects and digital preservation.

Text-based materials can be digitised using optical character recognition (OCR) techniques, scanning, and photography. The choice of digitisation method depends on the material's characteristics and the required output level. According to Weaver (2020), the methods of digitisation in libraries depend upon several factors such as user needs, software requirements, the original materials' quality, and the library resources. Saia (2023) highlighted the importance of required output levels in the process of digitisation. According to Kitsios et al. (2021), the integration of technology should promote the extent to which the user of modern technology believes that he or she will achieve the required output level.

Blanke et al. (2012) proposed that optical character recognition (OCR) software is essential for digitising text-based resources, including documents, periodicals, and books, by converting

paper-based analogue sources into machine-readable formats. This may involve creating a digital repository or offering online access to the materials.

2.7.1 Importance of Digitising Text-based Materials

Libraries are digitising materials to enhance accessibility and preservation. Digitisation is an important method for preserving and granting access to textual materials. The proliferation of digital technologies and the internet has facilitated large-scale digitisation projects by institutions worldwide, enabling wider dissemination of knowledge and promoting global collaborations in research and education (Fabunmi et al., 2009; Sun & Yuan, 2012). Digitising text-based materials provides advantages such as improved accessibility, collaboration, discoverability, preservation, and research opportunities. Digitisation enables remote access and targeted search of digitised texts, thereby removing physical obstacles and facilitating novel opportunities for research and learning.

Digitising textual content is crucial for libraries and cultural organisations (Routhier Perry, 2014). The NLW and the NGF special library recognise the importance of digitising their collections for remote research, access, and long-term preservation.

2.7.2 Managing and Handling the Digitisation of Text-Based Materials

Textual materials are the central components of library collections and the primary target of digitisation initiatives (Arms, 2001; Patra & Sahoo, 2022). Digitising text-based materials necessitates considerable expertise and tools. Adherence to digitisation material handling policies is crucial to ensure the careful handling of textual materials (Arms, 2012). Certain text materials may require additional handling during digitisation due to their delicate condition, while others may require proper cleaning prior to digitisation to achieve optimal digitisation quality. Digitising voluminous textual materials requires careful consideration. Certain

materials may necessitate specialised scanning equipment for optimal outcomes. Chapman (2003) recommended microfilming fragile material before scanning it.

According to Hughes (2004, p. 257), analysing the state of the original materials and the intended results of digitisation can guide the digitisation methods employed.

2.8 Digitisation Equipment

Digitisation of text-based materials requires appropriate equipment such as scanners, computers, cameras, and OCR software for efficient digitisation (Hanna, 2022). For the digitisation of documents and photographs the best equipment is a flatbed scanner, however, for the digitisation of books, a book scanner is the most appropriate equipment (LibGuides, 2023).

2.9. Digitisation Workflow

Steps must be taken to ensure the success of any digitisation project and having a workflow to guide the digitisation process is important. Bandi et. al. (2015); Bülow et al. (2011, pp. 10 -13); Anderson & Maxwell (2004, p.101) and Georgieva (2019) provided recommendations highlighting the important steps involved in digitisation workflow from selection of documents, scanning, image capture, editing, analysing, preparing dataset, ensuring OCR, preservation, and access. These recommendations must be considered for making the digitisation workflow effective.

2.10 Selecting Materials for digitisation

The process of digitisation in libraries involves the selection of materials for digitisation. Library-Automation (2017) notes that selection of appropriate material for digitisation is one of the significant challenges faced during the planning and implementation of digitisation projects. Hartman et al. (2005) asserted that choosing and evaluating resources for digitisation is a challenging aspect of managing digital resources, as stated by Lopatin (2006). Allison

(2014) further emphasised that this process requires considering multiple factors. Vogt-O'Connor (2000), and Sitts (2000) stated that selection requires informed judgement and criteria. While Ayris (1998) suggests a decision-making matrix grouped around assessment, gains, standards, and administrative issues to help with selection process.

2.10.1 Selection Process

The effective selection of text-based materials for digitisation requires careful consideration and several checklists and criteria have been identified to guide this process. Youngs (2001) outlined key elements for a selection checklist, including intellectual justification, demand, relevance to funders and institution, copyright, relationship to other projects, image capture feasibility, metadata, originals condition, and sensitive content. While Ooghe and Moreels (2009) listed institutional frameworks, value of the material, physical criteria, unicity and digital multiplicity, metadata, and financial framework as criteria for selecting materials for digitisation. The National Library of Scotland also identified criteria based on material types and motivation that influence material selection. And the IFLA/UNESCO (1999) survey on digitisation and preservation found that historical/cultural value and an increase in access were the criteria that guided which materials were selected for digitisation.

2.10.2 Stakeholder Involvement

Involving stakeholders in the digitisation process is paramount. Youngs (2001, p.9) stated that the selection process must involve those with detailed and expert subject knowledge of the collection.

2.10.3 Selection Policy

Implementation of a good selection policy should not be taken for granted. Anderson & Maxwell (2004, p. 3) noted that digitisation policy is a good way to formalize selection criteria and cover issues arising during any digitisation project.

2.11 Metadata

Metadata is data about data. Brown (2013, p.155) challenges the conventional definition of metadata as "data about data" as unhelpful. He noted that metadata is the information needed to discover, manage, and use content by humans and machines.

Digitisation projects depend on metadata and Dublin core is the basic standard for describing digital or physical items; it has 15 core metadata elements for cross-domain resource description. According to Higgins (2006) metadata underpins digital curation; not implementing metadata may make a digital resource unusable, unrecoverable, or unidentified. Ye (2023) stated that metadata must explicitly explain and gather data features to aid data retrieval. Hayes (2017) explained that metadata comes from multiple intellectual traditions and reflects the objectives of the communities who use it. Hughes (2004, p.196), noted that metadata should include the digital object's creators, structure, and format. she added that excellent metadata development is essential to creating long-term digital materials.

2.11.1 Types of Metadata

Miller (2022, p.13) classified metadata into three types: descriptive, administrative, and structural; administrative metadata is further subdivided into technical and preservation metadata, rights metadata, and use metadata. Higgins (2006) classified metadata standards into five categories: descriptive, administrative, technical, usage and preservation.

2.12 Copyright

Copyright issues must be considered when embarking on digitisation projects in libraries. In the United Kingdom, the copyright legislation is "The Copyright, Designs and Patents Act, 1988". While in Nigeria, the primary law for the protection of copyright is "Copyright Act Cap C28 LFN 2004, amended 2003". Copyright protection law in the UK and Nigeria are almost similar as they give right to the creators of artistic, musical, dramatic, and literary works to

protect and control the way their artwork or material can be used. Copyright laws help in the process of digitisation particularly for those works related to cultural heritage, and history; copyright laws give legal access to libraries to digitise these works (UNESCO, 2003).

The UK Data Service advised against digitising non-original sources without considering copyright. Hughes (2004, p. 57) emphasised that knowing the copyright status of all items at the start of a project, planning for copyright and other legal difficulties, and cooperating with the institution's legal counsel is crucial. She noted that copyright metadata must be generated as part of project administration for every digital object and all copyright and legal choices must be extensively documented. Additionally, Witten et al. (2010: p. 35) stated that building a digital library requires careful attention to copyright, understanding of ownership rights, and need for permission to convert non-public domain materials.

2.13 Funding

Digitisation efforts require significant resources to succeed. In the United Kingdom, the funding of digitisation is internal however the mass digitisation has been funded externally. Digitisation of libraries in the UK are funded by “TWA Digitisation Grant.” This fund provides grants up to £5000 for UK museums, special collections libraries and archives for the digitisation of their materials (Digital-meets-culture, 2017).

In Nigeria, the government of Nigeria funds digitisation in government agencies, as indicated by BusinessDay (2022), N152 billion has been spent on the process of digitisation in the year 2021. Digitisation initiatives may be funded differently depending on the library's size, but an accurate cost estimate is crucial. Lee (2001, p. 94) advised against starting a digitising project without a budget. While Lopatin (2006) noted that digitisation projects are costly, scanning, quality checking, and metadata creation require hardware, software, and qualified employees. (Eden, 2001; Chepesiuk, 2001), posited that digitisation project cost should be funded by

sourcing for a grant, while Popova et al. (2020) and Anderson & Maxwell (2004, p.125) stated that digitisation projects will succeed if there is fund.

2.14 Preservation and Access

Long-term management of digital content requires preservation. Purcell (2019, p. 52) posited that digital preservation involves managing digital content to ensure continued access. Anderson & Maxwell (2004, p. 155) suggested using standard file formats, migrating, and refreshing files regularly, using an archival repository or other reliable offsite storage, choosing appropriate storage media, and ensuring adequate funding and organisational support for digital preservation. According to Kalusopa (2018), digital preservation involves a set of management activities that are implemented to ensure sustained access to digital materials for the desired duration. Also, Astle and Muir (2002) emphasised that the digital process requires applying standards and protocols to ensure sustainable digitisation, long-term preservation, and retrieval.

2.15 Chapter Summary

This chapter has provided a detailed review of the studied variables from the existing and past literature. The literature has been reviewed with the help of searching the content by using relevant keywords. The chapter has provided the in-depth review of the concept of digitisation and why libraries digitise and reviewed the benefits. The disadvantages of digitisation, standards, guidelines, and best practices of digitisation were also discussed. Moreover, the chapter has reviewed selected digitisation initiatives in the United Kingdom and Nigeria and reviewed selected studies on digitisation. In addition, the selection of the materials for digitisation has been discussed. This chapter also reviewed metadata, its types, copyright laws, funding sources, preservation, and access to text-based material in libraries from the literature in detail.

Chapter 3: Methodology

3.1 Introduction

This chapter describes the research methodology adopted in conducting this comparative study. It outlines the details of the research design to be adopted to meet the research objectives, data collection techniques, sampling method, data analysis procedures, ethical considerations and the justification for the method adopted in the study. Limitations encountered during the research process are also stated before presenting the conclusion of the chapter.

3.2 Research Design

The research design is based on a comparative case study aiming to gather rich and contextual data about the similarities and differences in the digitisation processes at the NLW and the NGF library. Using the comparative approach allowed for an in-depth exploration of the subject matter, considering each institution's complexities, distinctions, and unique characteristics. According to Azarian (2011), researchers use the comparative approach to establish a certain new order of things and/or reinforce the old ones. A comparative analysis approach is well-suited to examine the digitisation process of text-based materials at both libraries due to its ability to provide a comprehensive understanding, identify best practices, broaden perspectives, enhance validity, and offer opportunities for improvement in both libraries.

Document analysis complemented the questionnaire and observational data, providing additional context and supporting evidence for the findings.

3.2.1 Comparative Analysis

Comparative analysis focused on workflow, processes, technologies, and equipment used to undertake digitisation. The comparative analysis was done by gathering data, organizing data, identifying key themes and analysing the data from both libraries separately to identify similarities, differences, best practices and interpreting the data to note key findings and draw

conclusions that provided areas for improvement for both libraries, which contributes to the overall research aim of the study and assists to achieve objectives 1, 2 and 3 of this study.

3.2.2 Qualitative Content Analysis

This method involves analyzing textual data to identify themes, patterns, and trends in the data. To identify patterns and interpret the findings, qualitative content analysis was used to fulfill objective 1,2 and 3 and to analyze documents such as digitisation policies, project reports, transcripts, and other types of textual data collected during the research to identify the digitisation workflow in the NLW and the NGF. A comprehensive analysis of these documents provided valuable information about the libraries' strategies, methodologies, and standards; and enabled an assessment of the outcomes and impact of the digitisation initiatives.

3.2.3 Tools and Materials

Tools and materials such as a digital camera and note-taking were utilised to document all aspects of the digitisation process of text-based materials and to ensure all relevant information and data were captured during the research. Note-taking materials for observations, document management software for organizing and analysing documents are used as tools for data collection. The tools and materials were selected based on their appropriateness as they are dependable and valid which assists the researcher to have compatibility with the research objectives and data collection.

3.3 Data Collection Methods

A qualitative method was used to collect comprehensive data from both libraries to fulfill objective 1, 2 and 3 of this study. According to Denscombe (2021, p.328) qualitative data comes from various sources and takes many forms, such as answers to open-ended questions, transcripts from interviews, written reports, diaries, scripts, and minutes of meetings. Using a

qualitative method for this research was valid to enable the researcher to get in-depth knowledge of the digitisation workflow of text-based materials in both libraries.

Questionnaires were used as a major instrument for data collection, observation and document analysis were used as additional methods of data collection. Semi-structured interview (Appendix A) was designed for data collection, but the researcher did not conduct the interview as the other method of data collection were sufficient to get data that fulfilled the five research objectives.

3.3.1 Population and Sampling

The population for this research were the professionals involved in digitising text-based materials in both libraries. The reason for selecting both libraries is because of the digitisation projects they have done over the years. This choice of the NLW and the NGF library was purposeful, and this was aided by personal curiosity of the researcher who being a Nigerian and studying in Wales tends to examine the differences in digitisation process of both libraries. According to Goodrick (2014), purposeful sampling is non-probability sampling where the researcher chooses units or participants based on predetermined characteristics. The sample in this research represent staff involved in the digitisation process of text-based materials. At the NLW, the head of the digitisation department and three other staff were selected and four staff of the NGF library were selected for data sampling based on the researcher's knowledge of the NGF library.

3.3.2 Observation

On-site observations were conducted to gain firsthand knowledge of the digitisation processes of text-based materials in both libraries and the findings of the observations were compared to identify the similarities and differences in their digitisation workflow. Patton (2002) as cited in Austin, Z., & Sutton, J. (2014), described observation as a useful tool in both quantitative and

qualitative research: “[it involves] descriptions of activities, behaviours, actions, conversations, interpersonal interactions, organization or community processes or any other aspect of observable human experience”.

The researcher used a period of one day each in the allocated time for collection of data to keenly observe 2-4 library personnel involved in digitisation both libraries. The findings from observation not only efficiently explore the process of digitisation but also supports the findings from other methods utilized in this study. The researcher was able to analyse the digitisation process of text-based materials in both libraries by specifically observing the elements of digitisation workflow, which includes the document selection process, copyright, standards and guideline, equipment, scanning, software, metadata creation, quality control, storage, retrieval, and access. The selection of these aspects is formulated on basis of elements highlighted in questionnaire and through manual searching. Observations were thoroughly documented to capture relevant information regarding the study. The observation method in both libraries involved participants and asking specific questions to understand the digitisation workflow of text-based materials. The observation sheet in Appendix B was used as a guide to ask specific questions that align with the five objectives of the study.

3.3.2.1 Observation Analysis

Qualitative data analysis techniques were applied to analyze the observational data. This involved categorising and coding the observed behaviors, actions, and practices related to the digitisation process. These codes were generated on basis of prevalent aspects of digitisation in both libraries. The analysis identified patterns, similarities, and differences in the workflows, technologies, equipment, metadata, best practices, strengths and weaknesses and challenges encountered in both libraries. The aspects of analysis in this regard, are aligned with the objectives of the study. The study analysed observational data to understand the practical

aspects of the digitisation processes and their impact on the accessibility and preservation of text-based materials in both libraries.

3.3.3 Questionnaire

A qualitative questionnaire (Appendix C) comprising 15 open-ended questions relating to the five objectives of the study was designed using Microsoft forms (a part of Office365 that helps create forms, surveys, and questionnaires). The link to the questionnaire for both libraries was sent via email to participants. Using this method to design and distribute the questionnaire facilitated data collection for analysis and enabled the researcher to easily reach the participants, get feedback and analyses the findings. Tella (2015) noted that when designing a questionnaire, it is essential to keep certain factors in mind such as to meet the objectives of the study, determine the data type, question(s), and response(s) for capturing important variables and design a user-friendly questionnaire. According to Rivano & Hagstrom (2017), a qualitative questionnaire is a fruitful method for information studies, and it generates a wealth of research-worthy data. Questionnaires, as a method of data collection, support the five objectives of the study.

Open-ended questions (these are questions that cannot be answered with static response) on digitisation workflow, document selection, technologies, impact, preservation, challenges, and recommendations were asked to allow the respondents to elaborate and give detailed descriptive answers based on their experiences in the digitisation process of text-based materials. Closed-ended questions (they are questions that are designed with options to choose a response) could also be used to get answers to specific questions in research, but they were not used because they were not the best option for this study.

3.3.3.1 Questionnaire Analysis

Thematic analysis was used to analyse the open-ended responses from the questionnaire. It involves organising the participants' responses to analyse and identify key patterns, codes and themes that enabled the data to be categorized. Castleberry & Nolen (2018) defined thematic analysis as a method of “identifying, analyzing, and reporting patterns (themes) within data”.

3.3.4 Document Selection and Review

This study used a systematic approach to select relevant documents for analysis. Documents were selected based on these criteria; they follow a period of last five years, must be in English and have extensive information related to the digitisation process in the respective libraries.

According to Munn et. al, (2018) the systematic approach “*follows a structured research process that requires rigorous methods to ensure that the results are both reliable and meaningful to end users*”. The details of documents collected from both libraries are presented in Appendix D and E.

3.3.4.1 Document Analysis

The documents collected during the research, were analysed using qualitative content analysis. This involves examining the documents for relevant themes, concepts, and key information related to the research questions. Documents were analysed based on themes such as similarities and differences in the digitisation workflow of text-based materials, strengths and weaknesses faced by both libraries. The analysis helped to identify commonalities, discrepancies, and best practices documented in the materials. It will help to identify strategies, decision-making processes, and formalise approaches employed by both libraries in their digitisation initiatives.

3.4 Data Analysis

A combination of two data analysis methods were used in this research to provide a comprehensive understanding of the digitisation process of text-based materials in the two libraries.

3.5 Justification for the chosen Research Methods

The chosen research methods align with the research question, objectives, and philosophy of this comparative study. The mixed-methods approach allows for a comprehensive exploration of the digitisation processes, combining in-depth comparative analysis and qualitative content analysis for a more holistic understanding of the research. Observations and the use of questionnaires provided rich contextual information, capturing the experiences, perspectives, and challenges faced in both libraries. Document analysis complemented these insights by examining formal documents related to digitisation strategies and outcomes.

3.6 Ethical Considerations

Ethical considerations prioritise the protection of participants' rights and confidentiality, fostering a respectful and ethical research environment. This research followed the guidelines laid out in the Ethics Policy for Research of the Department of Information Studies, Aberystwyth University. Ethical consideration was given high priority throughout the research process. Informed consent (Appendix F) was obtained from participants involved in the observations and in issuing out questionnaires. Participants were provided with information about the research purpose, procedures, potential risks, and their rights to participate or withdraw. Confidentiality and anonymity were ensured by assigning pseudonyms or identifiers to participants.

3.7 Limitations

There are several limitations to consider in this comparative study. The researcher's close connection with the NGF library is a major limitation which might affect the findings of this study. However, methodological limitations were faced by the researcher in both libraries. These limitations include:

3.7.1 Generalisability

The findings of this study may be specific to the two libraries and may not be directly applicable to other libraries with different contexts, resources, or infrastructures. Therefore, caution should be exercised when generalizing the findings beyond the scope of this study.

3.7.2 Sample Size

The study involved a limited number of participants at both libraries. While efforts were made to ensure diversity and representativeness in the selection of participants, the sample size restricts the extent of insights gained from the observations and administered questionnaire.

3.7.3 Availability of Data

The availability and accessibility of certain data, such as internal reports or user feedback, may vary between the two libraries. The study was dependent on the availability of relevant documents and the willingness of participants to provide access to such data.

3.7.4 Subjective and Biases

Measures were taken to minimize bias, such as using multiple codes and employing an iterative process of data analysis to enhance reliability.

3.7.5 Time Constraints

The research process was constrained by time limitations, affecting the depth and breadth of data collection and analysis. Efforts were made to maximize the use of available time and resources while ensuring the rigor and validity of the study.

3.7.6 Language and Cultural Factors

The study was conducted in English, which may limit the inclusion of perspectives from non-English speakers or those with limited English proficiency especially at the NLW that uses Welsh as its primary language in the workplace. The NGF uses English as its primary language in the workplace. Additionally, cultural factors may influence the interpretation and understanding of certain concepts related to digitisation processes.

3.7.7 External Factors

The digitisation processes in both libraries may be influenced by external factors, such as changes in funding, policies, or technological advancements, which may impact the findings and conclusions of the study.

3.8 Chapter Summary

This chapter has discussed the research design, data collection method and data analysis. Qualitative approaches using observation, questionnaire and document analysis were used for data collection and were analysed to derive meaningful findings and conclusions. The ethical considerations and limitations of the study were noted.

Chapter 4: Results

4.1 Introduction

This chapter of the dissertation deals with the analysis of collected data. Following the method of observation, questionnaire, and document analysis, three different analyses have been done. By keenly considering the objectives of the study, different types of analysis have been selected. This chapter discuss all these analyses in detail.

4.2 Analysis of Data Collected by Observation

The codes for observation analysis have been selected on basis of process of digitisation prevalent in both libraries and have been observed to comparatively study the digitisation process of text-based materials. On basis of analysis, similar and different patterns related to codes have been identified in both libraries (illustrated in Table 4.1).

4.2.1 Digitisation workflow

The first code, digitisation workflow is formulated based on objective 1. It has been observed that the digitisation workflows in both libraries includes standardized and organized steps. In both libraries, when a new document is assigned for digitisation to respective library they select the appropriate text-based material, check copyright status, scan the document, and formulate metadata, ensure quality control, and upload digitised documents to their digital repository for access. Based on observation, similarities in digitisation workflow in both libraries were identified. However, the difference is that the NLW has a specialized committee established for selection process which is not followed by the NGF library.

4.2.2 Funding

The second code, funding is formulated through observation data collection that aligns with objective 3 of the study. Based on collected data, a different pattern of funding is identified in both libraries as the NGF library is funded internally. While the NLW embark on digitisation

on large scale thus it incorporates external funding for projects like Welsh Journal Online and Welsh Newspaper Online.

4.2.3 Document Selection Process

The third code is related to objective 1 and 2 which deals with the document selection process. On basis of observation, similar patterns have been identified in NGF library and NLW. Both libraries prioritize documents before digitisation by efficiently utilising library sources. In the NGF library, internal documents which are regularly used by staff and patrons are given priority. Likewise, the digitised document in the NLW mostly follows users' demand. However, due to significant dependence of the NLW on external funding the digitisation is bound to fulfil the requirement of funding bodies. Accordingly, besides all similar patterns the document selection process in both libraries is different due to external funding.

4.2.4 Copyright

The fourth code is in relevance with objective 1, 2 of this study which deals with copyright. Based on observation it has been examined that in this aspect both libraries exhibit different patterns. Most of the digitised documents in the NGF library are internal and do not need copyright permission. Unlike the NGF, the NLW must follow a strict copyright clearance based on UK law. Accordingly, NLW can only digitise material which is 100 years old and have cleared copyrights. In the case of Welsh journals, they get permission from right holders. The difference is due to incorporation of digitisation of many external documents by the NLW as they tend to publish digital content more freely.

4.2.5 Equipment and Software

The usage of equipment and software is the fifth code of this study that has been aligned with objective 1 of the study. Based on observations, different patterns have been identified in the equipment used in both libraries for digitisation. See Appendix G and Appendix H. The pattern

of software usage is also different as the NGF library uses Dspace which is an open-source software, while the NLW uses LIMB, Capture One Pro Software, and WOMBAT software which are developed in-house to carry on process of digitisation. Accordingly, entirely different patterns have been identified in both libraries related to usage of equipment and software.

4.2.6 Standards, Guidelines and Quality Control Measures

The other identified codes are standards, guidelines and quality control measures which align with objective 1 of the study. Related to standards and guidelines, a similar pattern is identified in both libraries as NGF follows global guideline and principles for digitisation which includes guidelines provided by the International Federation of Library Associations Institutions (IFLA), and the America Library Association US (FADGI). Likewise, NLW use FADGI and Metamorfoze as a guide. Related to the code of quality control measures, both libraries follow similar patterns as they ensure error-free documents, accuracy of metadata, and completion of converted document.

4.2.7 Digitisation of Text-Based Materials in 2023

The other identified code is related to digitisation of text-based materials in 2023 which is aligned with objective 1 and 4 of the study. As per observation, different patterns have been identified in both libraries as the NGF concentrate on text-based materials such as the governor's meeting documents, inaugural speeches, addresses, reports, Federal Account Allocation Committee and National Economic Council documents. As compared, the digitised text-based material by NLW in 2023 comprises King Arthur printed books, Civil War Tracts, 10 new volumes of selection of early printed books, 18th-19th century biographies, and the Cambrian News newspaper.

4.2.8 Metadata

Metadata is the other identified code aligned to objective 1 of the study and different patterns have been identified related to metadata in both libraries. In the NGF, metadata is created using the Dublin Core metadata standards to justify its accuracy and the library also uses a metadata entry sheet (see Appendix I) for metadata entry into their digital repository. While in the NLW, descriptive metadata is created by the relevant curatorial team and descriptive records need to be finalized before digitisation. Also, technical, and administrative metadata are either created automatically or semi-automatically via LIMB processing tool or via custom made workflow tools before documents are stored in FEDORA which is the digital repository of the NLW.

Table 4.1: Results of Observation-based Analysis

Code	Similar/Different Patterns in NGF Library and NLW
Digitisation Workflow at the NGF and NLW	Similar Pattern of workflow at NLW and NGF
Funding sources at the NGF and NLW	Different Pattern of funding at NGF and NLW
Document Selection process at the NGF and NLW	Similar Pattern of document selection at NGF and NLE
Copyright Permissions at the NGF and NLW	Different Pattern of copyright at NGF and NLW
Equipment and software at NGF and NLW	Different Pattern of equipment and software at NGF and NLW
Standards and guidelines at NGF and NLW	Similar Pattern of standards and guidelines at NGF and NLW
Quality control measures at the NGF and NLW	Similar Pattern of quality control measures at NGF and NLW
Digitisation of text-based materials in 2023 at the NGF and NLW	Different Pattern of digitisation at NGF and NLW

Metadata process at the NGF and NLW	Different Pattern of metadata at NGF and NLW
Storage, retrieval, and access at the NGF and NLW	Similar Pattern of storage and retrieval at NGF and NLW.

4.2.9 Storage, Retrieval and Access

The last code is storage, retrieval and access which aligned with objective 1, 4 and 5 of the study. There are some similar patterns related to this code in both libraries as NGF library and NLW tends to provide easy access to their digital repository. However, the different pattern is that access and retrieval of digital documents is quite easy in NGF library as compared to NLW. Moreover, both libraries have limited access opportunities as patrons can have access to limited number of documents.

4.3 Questionnaire – Thematic Analysis

Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data (Braun & Clarke, 2006). The data collection in the questionnaire was based on the objectives of the study. Thus, as per objectives of the study questions have been asked to participants. A total of 5 responses were received from participants for the shared questionnaire, 4 from the NGF library and 1 from the NLW. The mind-map of identified themes based on the five objectives of the study is illustrated in Figure 4.1.

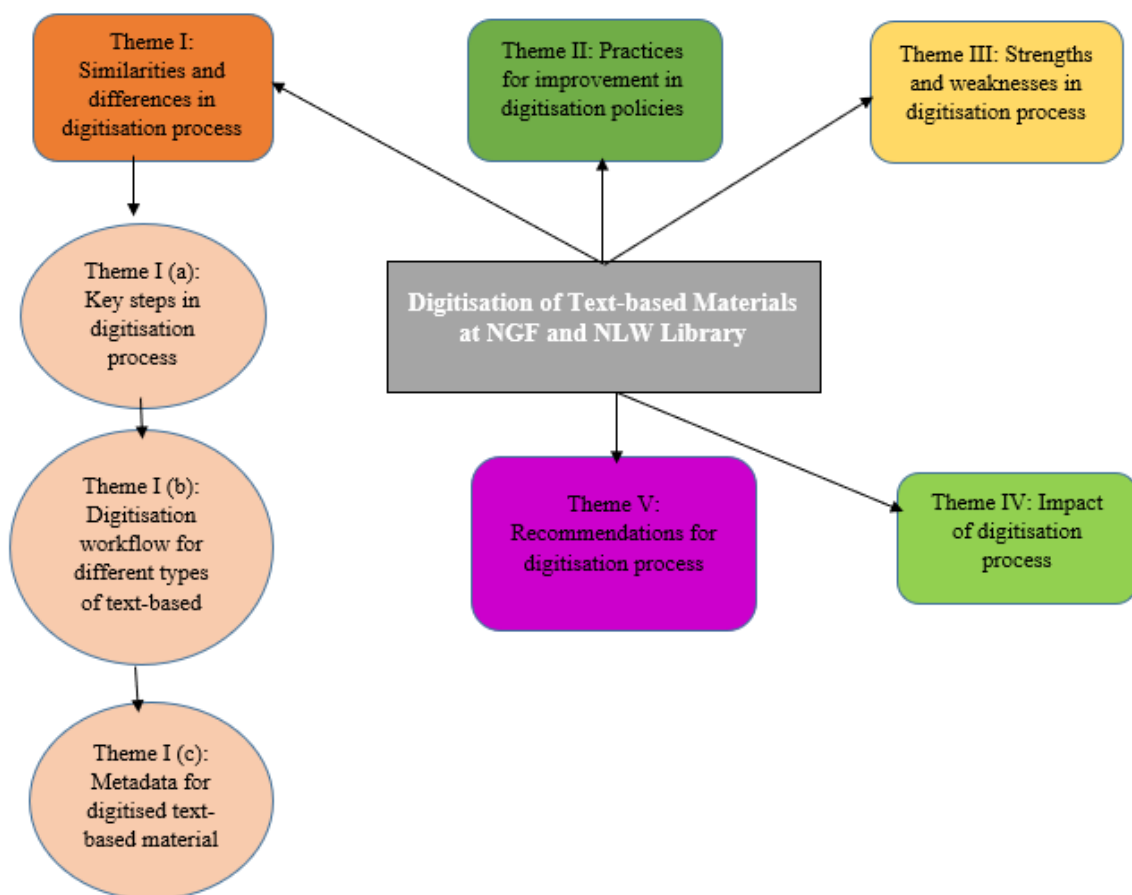


Figure 4.1: Mind-map of Thematic Analysis

4.3.1 Objective 1: Similarities and differences in digitisation process

Objective 1 compared the similarities and differences in digitisation process of text-based material in NLW and NGF special library. To achieve the first objective the following themes were addressed, which are key steps in the digitisation process: digitisation workflow for different text-based materials, handling of fragile material and metadata for digitised text-based material. These subthemes are discussed below:

The digitisation of text-based material in the NGF library follows the conversion of physical form of documents into digital form which enable their electronic accessibility and searchability. It involves step-by-step process to enhance the conversion of text-based material by utilizing the right manpower which is efficient library personnel and equipment.

A similar process of digitisation is followed in the NLW which also includes several significant stages of conversion of text-based material into digital form.

Subsequently, from responses of participants of both libraries it can be identified that the NGF and NLW follows a similar pattern of digitisation.

4.3.1.1 Theme I (a) Key steps in digitisation process

The key steps in digitisation process in the NGF are extensive as illustrated in figure 4.2.

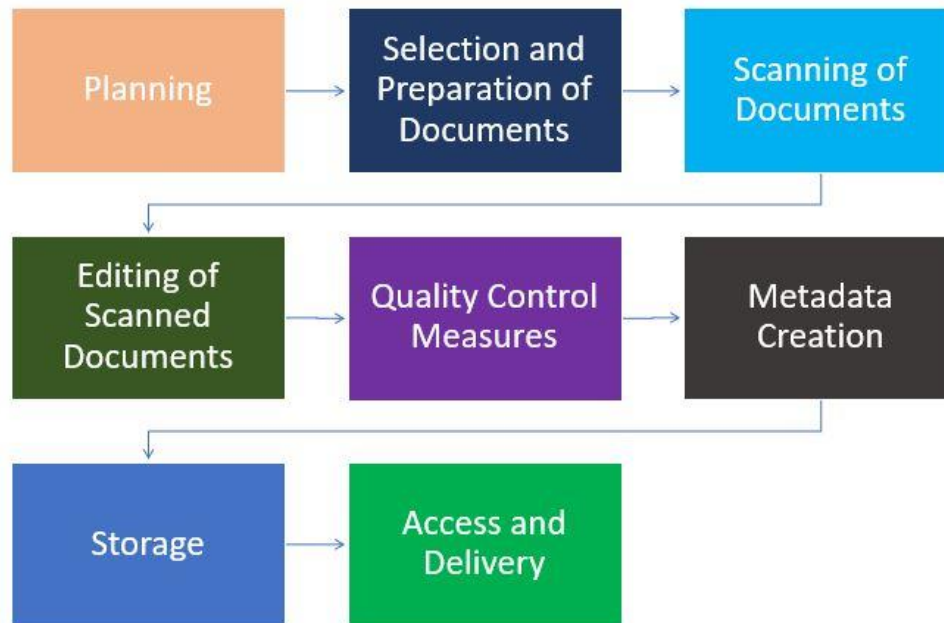


Figure 4.2: Key steps in digitisation process in the NGF Library

These key steps identify the scope of digitisation process, select the text-based material based on its relevance, scan the material using high-resolution scanners, ensure the accuracy and completion of text, formulate metadata, and store the digitised material in digital repository of the NGF where it is made accessible to patrons through NGF e-library. All these key steps are significant in digitisation process in libraries as they enhance the electronic database of the respective library. Participant 3 highlighted it as:

“During selection, materials were chosen for digitisation based on their significance, value, such as books, documents. Prior to digitisation, the selected materials were prepared, Scanning, or capturing digital images or data from the physical materials

took place, afterwards Metadata creation, Quality control, Storage, and preservation, and finally Access and dissemination.”

However, these key steps are different in the NLW as the response gotten from participant indicates the steps of digitisation at the NLW as shown in Figure 4.3

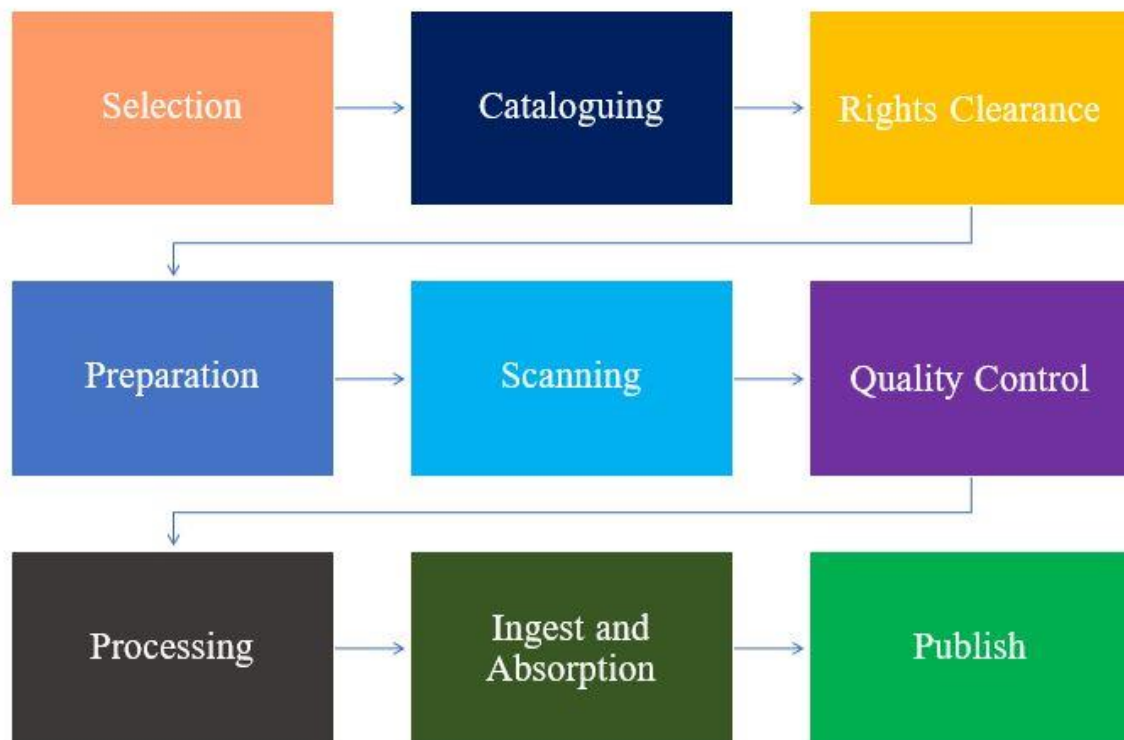


Figure 4.3: Key steps in digitisation process in the NLW

The scanning and quality control of text-based material in the NLW is similar to the NGF. However, the key step of processing is followed in which decision related to page labels and structure is followed. In the end, the record of catalogue is labelled with appropriate statements and link is provided to view digital version of document.

4.3.1.2 Theme I (b): Digitisation workflow for different types of text-based material

In the NGF, the workflow of text-based material depends on their format and specific requirements. For instance, digitisation of bound books needs specialized scanners. For digitisation of loose books, they were scanned by utilization of sheet-feed scanners. Handwritten material is digitised by manual encoding and fragile material is scanned by utilizing non-contact scanning techniques. Large text-based materials are digitised using scanners like CZUR-ET. Participant 2 elaborates it as:

“The digitisation workflow involves many processes with a slight difference depending on the type of material being digitised. Digitisation of hardcopy (physical) materials is performed by Optical Character Recognition (OCR) to convert the scanned images into searchable text. For the digitisation of softcopy (electronic) materials, the workflow involves selecting the right materials for digital, preparing them by converting them to PDF format, process by editing them for quality assurance, creating metadata, and finally publishing them in a digital repository.”

In the NLW, most of the items are scanned using i2s Copibook however the fragile documents are captured in V-shaped book so that their spine can be saved while scanning. Journals and newspapers also follow different workflows such as individual cataloguing. The response gotten from the NLW states:

“Newspapers and Journals follow different workflows to account for the different structural elements they contain. For example, a journal volume may contain articles which are individually catalogued, and newspapers may only have a catalogue record at the title level, but contain more complex structural elements such as issues, columns, articles, and content zones.”

Examining the responses to the questionnaire, it can be ascertained that the workflow digitisation process in the NGF is extensive when compared to the NLW. NGF uses different categories of scanners for different types of documents while in the NLW most documents are scanned by using i2s Copibook.

4.3.1.3 Theme I (c): Metadata for digitised text-based material

One of the participants in the NGF library indicated that metadata for digitised text-based material was generated manually by librarians using a metadata worksheet. They extracted technical metadata for decoding and to retrieve digitised files. Metadata is also created for digitised text-based material by utilizing Dublin Core metadata standard.

This process is different in NLW as the participant from this library states that:

“Descriptive metadata is created by the relevant curatorial team. All descriptive records need to be finalised before the digitisation process can take place.”

From the analysis of responses, it is indicated that the metadata for digitised text-based material is different in NGF and NLW.

Table 4.2: Comparative Analysis of Theme I.

Similarities and differences in digitisation process in NGF Library and NLW		
Similarities	Differences	Conclusion
NLW and NGF both follows organized and efficient steps of Digitisation.	The metadata process is different as NGF conduct metadata by cataloguing while in NLW descriptive metadata is conducted by curatorial team.	The Digitisation process of NGF and NLW is similar however the difference is in their formulation of metadata.
NLW and NGF has effective Digitisation workflows for materials related to text-base.	NGF and NLW follows different equipment and scanners for different types of text-based material as in NGF, CZUR-ET is used while in NLW, i2s Copibook is used.	NGF and NLW follows efficient Digitisation workflows for Digitisation of text-based material, however the equipment and software for text base material is different in both libraries.
NLW and NGF has similar quality control of text.	The copyright permission is different in both libraries as NGF is more dependent on its internal sources while NLW has external sources.	The quality control measures in NGF and NLW are similar however, copyrighting permission is different in both libraries.

4.3.2 Objective 11: Practices for improvement in digitisation policies

This theme is based on objective 2 of this study and questions related to employment of digitisation best practices, specific criteria for selecting document and practices to ensure long-term preservation of documents has been asked from participants of both libraries that are discussed as follows.

The NGF library has implemented significant practices to improve its digitisation process which includes enhancing the goal of digitisation, prioritising material based on its significance and relevance, implementation of quality control, employment of user-friendly platforms, and continuous improvement on basis of evaluation and feedback. The selection criteria of documents are based on their significance, accessibility, and their subject matter. Besides this, NGF library continuously adopt long-term practices to ensure the improvement in its digitisation policies. One of the participants highlighted that the strategic plan of digitisation process in NGF's library aligned with the core values and goals of the organisation. Participant 3 indicates that NGF library follows a specific criterion for digitisation process which is based on the permission of the copyright holders. Besides, for long terms preservation, the participant highlights:

“NGF Library establish secure storage systems for digital materials. Regular backups and robust storage infrastructure are essential for preserving digital assets.”

In the NLW, to follow best practices in the digitisation process, rights should be cleared for digitisation, items are digitised entirely, and consistency is ensured. The specific criteria for selection of material to digitise follows an up-to-date descriptive record and rights to publish material online. For long term preservation, NLW uses the FEDORA based repository and Linear Tape-Open (LTO) based digital archive storage media to preserve files.

On basis of responses, it is evident that the digitisation process is alike and both libraries follow similar criteria for selection of documents. However, the long-terms preservation plan is followed differently by both libraries.

Table 4.3: Comparative Analysis of Theme II.

Practices for improvement in digitisation policies in NGF Library and NLW		
Similarities	Differences	Conclusion
NGF and NLW employs significant practices to improve digitisation	NGF has long-term preservation plan to improve digitisation process	Although, NGF and NLW employs efficient practices to improve Digitisation however their plan differs in terms of time-framework.
NGF and NLW has similar criteria for selection of documents for digitisation	NGF and NLW use different scanners for Digitisation of documents	The criteria for selection of documents are same of NGF and NLW however they use different scanners to convert documents.
NGF and NLW has similar quality control related to accuracy of documents	There is no difference in quality control of both libraries	Within the aspect of quality control, NGF and NLW follows similar degree of quality control

4.3.3 Objective III: Strengths and weaknesses in digitisation process

This theme is formulated on basis of objective 3 in which questions related to strengths and weaknesses in digitisation process, better digitisation practices in library as compared to other libraries and the areas in digitisation process which further needs improvement has been asked. The evaluation on basis of responses is discussed below.

The strength of the digitisation practices in the NGF is the clear goals of the process along with comprehensive selection of material, rigorous quality measures, standardization of metadata and efficient preservation practices. In addition, good organisational structure, sufficient financial support, and expanded reach and accessibility also strengthen the digitisation process in this library. However, this process has some weaknesses as well which include challenges like handling of fragile material, copyright restrictions, and quality control issues. In addition, the weakness of process includes issues related to tedious practice of material selection, time consuming and capital incentive and limited access. Highlighting the weaknesses, participant 2 states:

“Better security, internal resistance to change, improper documentation resulting in delays in sorting and delay in the approval and release of funds for procurement of items for the digitisation.”

Furthermore, as compared to other libraries, NGF has excelled in its digitisation process because of enhanced accessibility, better preservation, facilitated collaboration and knowledge sharing. In addition, it has recorded an increase in users. One of the participant highlights that:

“The digitisation processes of text-based materials at the NGF Library have excelled in comparison to other libraries in the preservation of vital and rare resources of the Nigeria Governors' Forum, accessibility and discoverability of the NGF library

resources, the library ensures that quality control measures are in place and NGF library has excelled in the implementation of metadata standards as well.”

The areas which need further improvement are robust quality control measures, enhancing metadata standards, employing efficient preservation format and increased accessibility. NLW also has strengths related to digitisation process as it has 15 years of experience related to digitisation of variety of multiple texts. A robust infrastructure is also the strength of NLW to preserve documents. Related to weakness of digitisation process, the NLW participant states:

“Maintaining the different types of workflows and providing suitable access to users is our main challenge. Although we have digitised many thousands of monographs from some of our key collections, there is no way to browse this content. We are currently waiting for an upgrade of our underlying repository.”

Furthermore, the digitisation process excelled at NLW library due to its extensive central funding while other libraries rely on external funding. The area which need more improvement are the accessibility to documents.

Based on responses, it can be stated that the strengths and weaknesses of the NGF library and the NLW are alike, and they have similar areas which need further improvement like quality control and enhanced accessibility. However, the practices in which they excel in their digitisation are different in the NGF and the NLW.

Table 4 4: Comparative Analysis of Theme III

Strengths and weaknesses in digitisation process in NGF Library and NLW		
Similarities	Differences	Conclusion
NGF and NLW has significant strength in comprehensive selection of material	NGF employs more practices to excel their Digitisation as compared to NLW	NGF and NLW incorporates significant practices to excel their digitisation however NGF employs more efficient practices
NGF and NLW has significant strength related to standardization of metadata	NGF and NLW has no difference related to standardization of metadata	The standardization of metadata is strength of both libraries
NGF and NLW both have weaknesses in quality control measures	There is no difference as both libraries have limitations of quality control measures	The limitation in quality control measures is weakness of both libraries.

4.3.4 Objective IV: Impact of digitisation process

This theme is formulated on basis of objective 4 of the study and the analysis on basis of responses is discussed below:

The impact of digitisation process in the NGF library has significant effect on several areas which includes its influence on wider access to material, preservation of fragile material, easy retrieval of documents by patrons. Besides this, it has ensured the provision of valuable material users. In perspective of other participant, the significant impact enhances the use of

technology in learning and provide quick access to extensive amount of content. In this regard, participant 3 states that:

“Digitisation of text-based materials has provided faster retrieval of stored information and has reformed the NGF traditional library to a modern library.”

Related to insight from previous experiences the participants states that they have learned planning and prioritization, importance of collaboration, efficient use of technology and equipment and they have learned importance of continuous improvement process. One of participant highlights that they have learned efficient handling of fragile material, to ensure the standards of digitisation and following the standards of metadata. In view of participant 3, the aspects learned from past experiences are:

“Learning how to use global standards and guides in digitising text- based materials, gaining skills in digitisation preservation and increased accessibility and increased visibility and users.”

In the NLW the digitisation process has significant impact related to wider audience as stated by the response from the NLW participant:

“Our text-based collections are available to wider audience and offer more options for modern researchers.”

Additionally, historic texts digitised using Optical Character Recognition (OCRs) are easier to search for and can be utilised for a wider range of research activities.

Based on lessons learned from past experiences, the NLW respondent highlights that the need to develop sustainable workflows has been learnt. Besides, the participant also stated that:

“Niche functionality can be compromised for a more sustainable workflow.”

Based on responses, it has been evaluated that both libraries have similar impact of digitisation process. However, the participants have learned different lessons from past experiences of digitisation.

Table 4.5: Comparative Analysis of Theme IV

Impact of digitisation process in NGF Library and NLW		
Similarities	Differences	Conclusion
Digitisation at NGF and NLW provides wider access to material	NGF has remarkably learn from past experiences as compared to NLW	Digitisation for both libraries is efficient but NGF has formulate their strategies based on past experiences
Digitisation at NGF and NLW helps both libraries to preserve their fragile material	There is no other difference	Both libraries efficiently preserve their fragile material
Digitisation at NGF and NLW enhance the retrieval of material by users	There is no other difference	Both libraries provide easy access to readers and enhance retrieval of material

4.3.5 Objective V: Recommendations for digitisation process

This theme has been devised as per objective 5 of the study in which question related to suggestions for improvement of digitisation of text-based material has been asked from participants of both libraries. The analysis as per responses is discussed below.

In NGF, it is recommended that the respective library needs to be clear with its objectives and goals of digitisation, invest in high quality equipment, and enhance quality based on evaluations and feedback. In addition, it is suggested that the accurate creation of metadata should be focused along with ensuring the safety of converted files and preservation of original data. One participant recommends that frequent assessment of process should be carried on for further improvement, libraries should ensure that they have adequate finances, manpower, equipment, and technology that will ensure successful project completion and collaboration and partnership with other libraries should be considered for further improvement of digitisation process. One of the participant states it as:

“Libraries should have a digitisation policy to guide their digitisation processes, and libraries should follow global digitisation standards and ensure they have a workflow.”

The first recommendation stated by the NLW participants is to:

“Build simple robust workflows for digitising, OCR’ing and preserving text-based collections.”

Other recommendations given by the NLW are ensuring consistency of specifications across their collections to facilitate cross-collection searching, enable researchers to access the full text of the digitised content, be prepared to compromise on niche functionality for better access, clear rights before digitisation begins. The participant further suggested to:

“Ensure that descriptive records are accurate and up to date, and over specify storage and network infrastructure to ensure reliance and scalability.”

From the above-mentioned analysis, it can be formulated that the participant in both libraries has similar suggestions for future improvement.

Table 4.6: Comparative Analysis of Theme V

Recommendations for digitisation process in NGF Library and NLW		
Similarities	Differences	Conclusion
NGF and NLW both needs to clear their objectives	No different suggestion is recommended.	There is need to clear objectives related with digitisation in both libraries.
NGF and NLW both focus on robust workflow	No different suggestion is recommended.	Robust workflow is weak in both libraries which is needed to enhance.
NGF and NLW both needs to enhance their access to digitised material	No different suggestion is recommended.	Access to digitised material should be focused on both libraries.

4.4 Document Analysis

Document analysis helped the researcher in evaluating and interpreting electronic and physical documents. In this study the researcher has conducted the document analysis of the documents which has been collected from the NGF special library and the NLW. The following section provides in detail document analysis of the documents collected from both libraries.

4.4.1 Documents from the NLW

From the National Library of Wales United Kingdom, the researcher has collected five documents. See Appendix D for the details of collected documents.

4.4.1.1 Digitisation – a priority at the NLW

This section aims to achieve the first objective of the study which is to identify the process of digitisation at NLW. The findings obtained from the analysed documents from the NLW revealed that the library is effectively digitising its text-based materials and making them accessible for both viewing and re-using purposes.

For centuries, libraries have served as cultural hubs, and with the increasing digital transformation, the use of the internet and technology, and the rise of literacy, there has been a need for the libraries to become digitised and innovative (Gul & Bano, 2019). The NLW is now providing services regarding digitisation and professional conversation to organisations and people, particularly in Wales as well as across the United Kingdom (NLW, 2023). In the present era, the role of libraries in promoting literacy has become crucial more than ever as the internet and technology has made information accessible much more; therefore, in the digital age, the process of digitisation is needed to develop, interpret, and manage information (Inamdar, 2021).

At the NLW the digitisation process is prioritised by using copyright right status, providing significance and value to digitisation, and fulfilling users demands. The library has potential for partnership, and it conserve and preserve the needs of digitisation and follows a proper strategic alignment. NLW priortise digitisation of text-based materials for several reasons such as security and preservation of the original documents. Moreover, the rising demand of readers towards contemporary and digital materials have also forced NLW to digitise. Thus, with the help of the digitisation of text-based material, the collections of the libraries have become more accessible, both for reuse and viewing purposes (Atanda et al., 2021; Chakraborty & Jana, 2021).

4.4.1.2 Digitisation's impact in the NLW – Content digitised by the NLW

This section aims to achieve the fourth objective of this study which is to evaluate the impact of digitisation. So far, the National Library of Wales UK has digitised a great amount of content as shown in table 4.7 below.

Table 4.7: Content digitised by the NLW

Content Type	Materials digitised (in numbers)
audio-visual material	one thousand hours
print materials	more than 2,000,000 pages
newspaper pages	more than 1,000,000
Journals	more than 1.3 million
archival items	more than 1,000,000
Photographs	more than 2 million and fifty thousand,
Manuscripts	more than 75,000
graphic items	more than 1,50,000

The process of digitisation at NLW is shown in figure 4.4 below. The observed workflow in the NLW is also the same but with LIMB replacing WOMBAT as the processing tool which was not reflected in figure 4.4. The library has developed a comprehensive and complex workflow for the management of digitisation of text-based materials. It follows a benchmarking exercise which ensures text-based materials are being digitised using standardised techniques and methods.

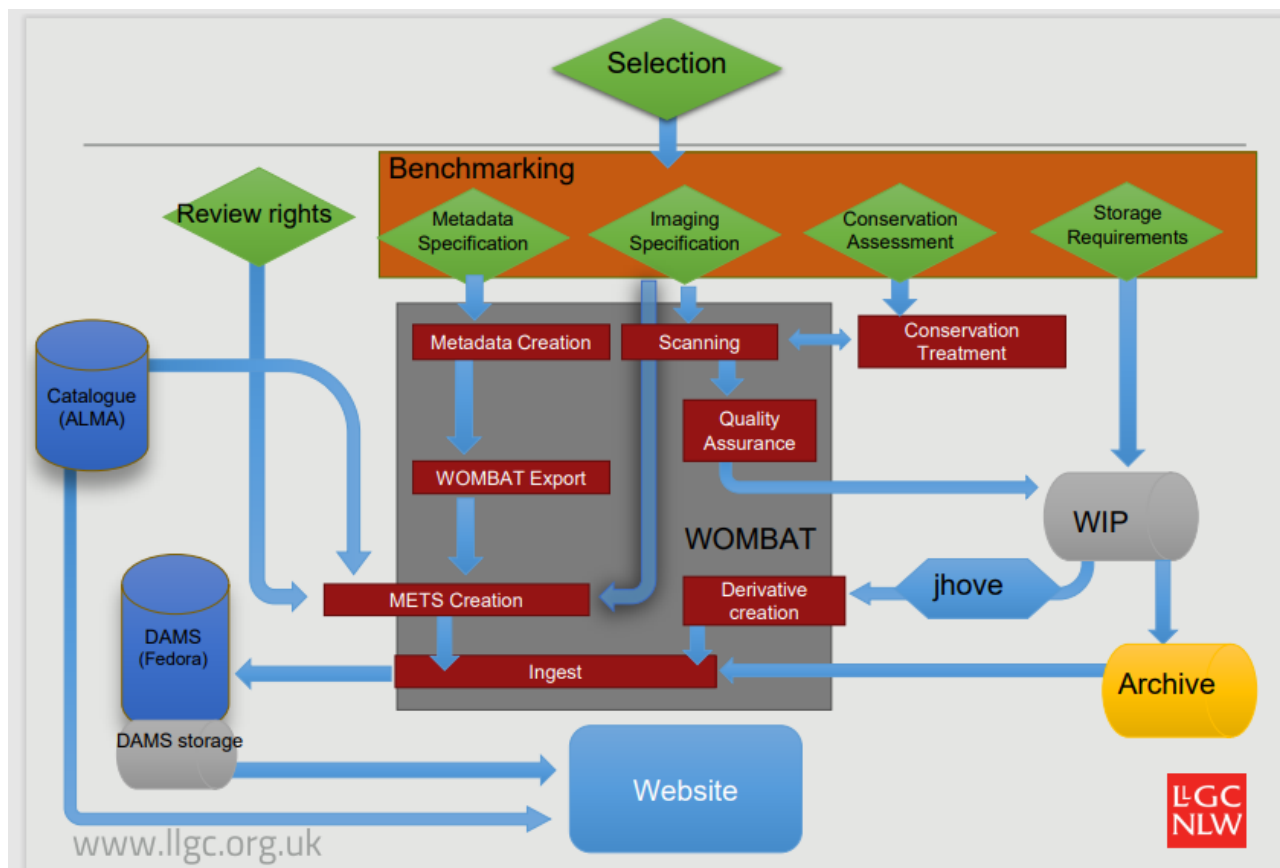


Figure 4.4: Digitisation process in the NLW

Source: *Digitisation at the National Library of Wales by Scott Waby (March, 2022)*

4.5.2 Documents from NGF Library

From the NGF library, documents have been collected and the details of these documents are presented in Appendix I.

4.5.2.1 Digitisation's impact in the NGF - NGF Digital Repository

From the collected and analysed documents, it has been revealed that NGF library is effectively implementing digitisation process for the digitisation of its text-based materials. The first document shows that NGF has its digital repository which is comprehensive. At the NGF a proper workflow of digitisation is being followed as listed in document 2 which is digitisation workflow.

NGF library is culturally responsible and heavily invested into digitisation and other resources in order to maintain the optimal performance which interests its efficiency, the library continuously collect feedback from its stakeholder and patrons in order to improve the user experiences and the processes of digitisation, also periodic maintenance and backups are performed to ensures the reliability of the system and integrity of the data (NGF, 2023c). The first document (guide on how to access digitised text-based materials in the NGF digital repository) provides a complete guide on how to access the digital repository of the NGF library. The digital repository is easily accessible, and documents can easily be retrieved by typing in the query such as the date, subject author, and title of the document. See figure 4.5 below:

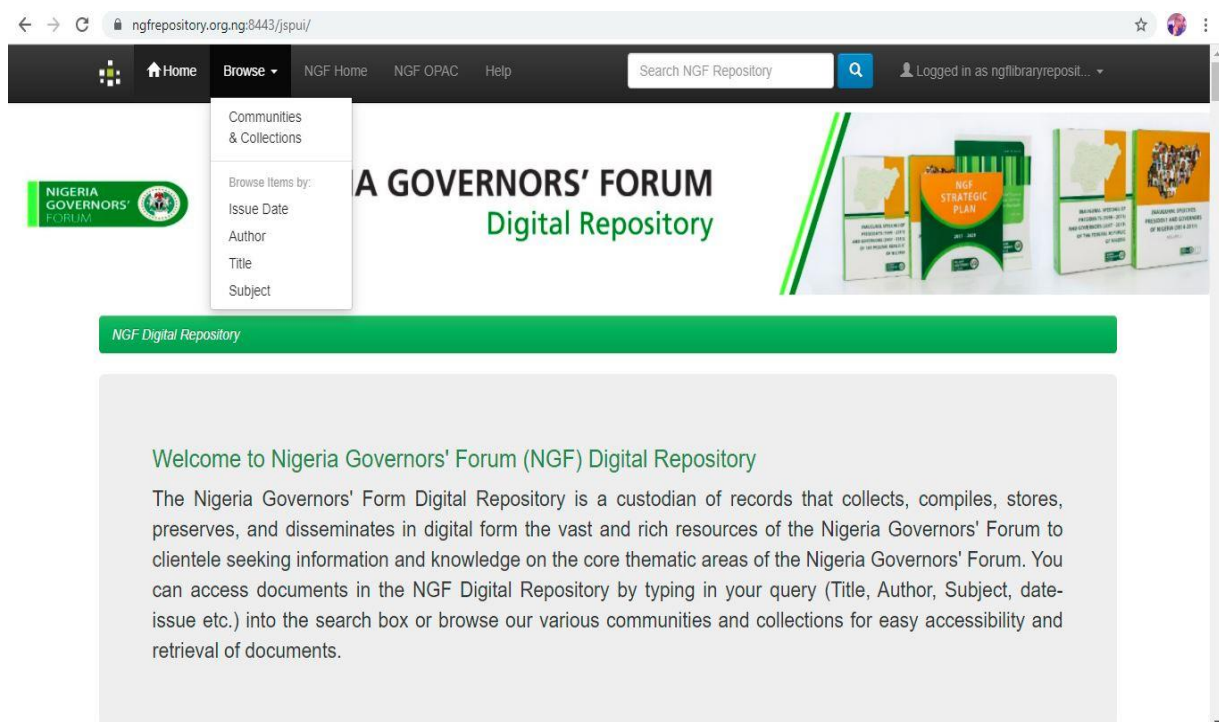


Figure 4.5: NGF Library Digital Repository

Source: (NGF, 2023b)

4.5.2.2 Evaluation of digitisation in the NGF special library – Digitisation workflow

The documents reflect the workflow observed at the NGF library as illustrated in figure 4.2.

4.5.2.3 Knowledge Management Strategy – a strength of NGF library's Digitisation

The NGF library has implemented an effective knowledge management strategy which simultaneously build the digital repository and the e-library. To ensure metadata accuracy and credibility, any publication catalogued in the NGF e-library is immediately digitised and uploaded to the digital repository.

4.5.2.4 Best practices of Digitisation at NGF Library Policies and Procedures

The NGF library is a custodian of records which disseminates, preserves, stores, compiles and gathers the rich and vast resources of the NGF in a digital form thus the clients who are seeking knowledge and information about the NGF can easily have access (NGF, 2023a). The NGF library is a "One Stop Information Hub" which was created for the purpose of study and research, for supporting NGF's mission, and protecting and preserving the resources of the NGF for the library patrons. The library policy includes digitisation which clearly states that documents of the NGF library must be digitised for easy accessibility and preservation. Documents to be digitised must follow a selection process and external documents to be digitised must be free of any copyright restrictions. The digitisation process of the library materials must conform with global standards and guidelines (IFLA) for digitising library materials.

4.6 Summary of the Chapter

This chapter has discussed the analysis drawn from the data gathered in the form of observations, questionnaire, and documents. The chapter discusses thematic analysis based on the data collected by conducting interviews of the participants of the study. A total of five themes have been identified in accordance with the research objectives. For the observation-

based data collection, the chapter has discussed the content analysis in detail. The content analysis, based on the observations, the researcher has identified codes including digitisation workflow, funding sources, the selection process of the documents, copyright, utilisation of software and equipment, standards and guidelines, quality control measures, digitisation of text-based material in 2023, process of metadata add storage retrieval and access. Based on these codes the researcher has identified similarities and differences in the patterns in both libraries. Lastly, the chapter details the document analysis that has been conducted on the collected document from both libraries and notes down the findings of the study based on the document analysis in relevance to the objectives of the study.

Chapter 5: Discussion

5.1 Introduction

This section of the dissertation deals with the discussion of the achieved results. As the study comprises three different approaches to analysis, this chapter discusses the results achieved from all approaches. In this accordance, the discussion of findings based on thematic analysis and content analysis (observation-based and document-based) has been dealt with in this chapter.

5.2 Discussion of Thematic Analysis

Objective 1 of the study tends to identify the similarities and differences in the digitisation process of text-based material in the NGF library and NLW. Similar questions were asked of participants to comparatively study the digitisation process in both libraries. Based on thematic analysis, identical themes and sub-themes have been generated that are relevant to the objective. The analysis indicates the key factors of the digitisation process are similar in both libraries, which include steps related to planning, selection, scanning, evaluating quality, the creation of metadata, and access. However, a bit difference in key steps is that NLW focuses more on users' requests. In the digitisation workflow for different types of documents, similarities exist between both libraries as both use different tools to handle different kinds of material, like newspapers, books, fragile documents, etc. The process of metadata creation is different in both libraries because NGF follows the Dublin Core Metadata Standard, while at the NLW, descriptive metadata is created by the curatorial team, and technical and administrative metadata is either created automatically or semi-automatically via the LIMB processing tool or custom-made workflow tools. The outcomes of this study are validated by Nneji (2018), who highlights similar key factors of digitisation that the outcomes of this study find in both libraries.

Objective 2 of the study identifies best practices and potential areas for improvement in the digitisation policies and strategies of the two libraries. Based on thematic analysis, similar patterns have been identified in both libraries as both practice prioritising material, quality control, user-friendly equipment, and publishing material online. The findings of Quan Liu (2004) validate the outcomes of this study, as the respective study also highlights selection, quality control, and copyright as efficient practices in the digitisation process of a library.

Objective 3 of the study deals examined the strengths and weaknesses of the digitisation process in both libraries. Based on analysis, it has been found that the strengths and weaknesses of the digitisation process in both libraries are similar. Both libraries can efficiently manage the quality and quantity of data and convert it with accuracy. Within the context of weakness, both libraries face similar challenges, which include the handling of fragile material, following standards, and providing accessibility. The study of Lacuata (2020) validated the outcomes of this study, as the respective study highlighted the strengths and weaknesses of digitisation process. However, the respective study highlighted implementation of guidelines and standards as a major weakness.

Objective 4 of the study critically evaluates digitisation's impact on the NLW and the NGF special library. The analysis has explored that both libraries have similar impacts of the digitisation process, but the learning from past mistakes is different, as highlighted by the participants. Digitisation has significantly impacted both libraries as it enhances their user base and provides easy accessibility to data. Geyer-Schulz et al. (2003) support the findings of this study, as the respective study indicates a significant impact of the digitisation of libraries, particularly in the field of scientific and technical information. Musa and Musa (2012) also highlighted that digitisation has a significant impact on libraries; however, there are numerous challenges that need to be addressed.

Objective 5 of this study is to inform future decision-making by developing recommendations for the digitisation processes of text-based materials in libraries. Participants from both libraries provided similar suggestions to improve the digitisation process. They recommended enhancing the objectives of digitisation, improving quality control, using efficient equipment and software, and ensuring the consistency and accuracy of converted documents. The study of Mohammed (2013) also provides similar recommendations, as highlighted by the present study. It includes the enhancement of funding, the utilisation of efficient equipment, and expert advice related to digitisation.

Subsequently, from the thematic analysis, this study has found that similarities exist in major procedures and policies of digitisation of text-based material in both libraries. The differences exist at minor levels, so apparently the NGF library and the NLW follow a similar approach to digitisation.

5.3 Discussion of Content Analysis (Observation-Based)

This section of discussion follows the content analysis of the collected data by observation. Based on observation, codes have been generated in this study related to the research objectives. The analysis identifies similar and different patterns related to codes in both libraries.

The first identified code is the digitisation workflow, which is based on objective 1 of the study. Based on observation, both libraries have similar patterns of digitisation workflow. Besides the similarity in the overall process of digitisation workflow, a different pattern is also identified in the selection process of both libraries. However, as much similarity exists in other aspects, it can be stated that both libraries have similarities in digitisation workflow. Both libraries have different methods for different workflows. Gueguen and Hanlon (2009) support the results of

this study by highlighting the importance of digitisation workflow and recommending a model for enhancing digitisation.

The second identified code is related to funding sources, which supports objective 3 of the study. Based on analysis, an entirely different pattern of funding has been identified in both libraries, as the NGF library is funded by internal sources while the NLW supports external funding. The study of Pandey and Misra (2014) yields similar results as it brings forth the funding of digitisation in libraries by both internal and external funding.

The third identified code is the document selection process, which aligns with objectives 1 and 2 of the study. Based on the analysis, a similar pattern of document selection is identified in both libraries. However, a slightly different pattern is also identified, which indicates that, due to external funding, NLW is bound to follow the document selection process based on external requests from patrons. As the overall process is much alike, it can be stated that the document selection process is similar in both libraries.

The fourth code deals with the procedure of copyright, followed by the NGF library and NLW. From the analysis, a different pattern of copyright is identified in both libraries. NGF mostly digitises internal documents, so the issue of copyright is limited, while on the contrary, NLW must follow strict copyright policies as per law. The outcomes gained from the NLW are validated by the study of Otubelu and Ume (2015), which states that the issue of copyright is serious and grave in digitisation.

The fifth code identified in this study is related to the use of equipment and software, and in the analysis, an entirely different pattern is identified in both libraries. NGF uses different equipment and software, like the Czur M3000, as compared to NLW, which uses equipment like the Zeuschel OSQ. In addition, both libraries use different software for the digitisation process.

For the guidelines and standards, similar kinds of patterns have been identified in both libraries. Both libraries follow global international guidelines and standards for digitisation, the NLW uses FADGI and Metamorfoze as guides. Likewise, the NGF follows the guidelines provided by the International Federation of Library Associations and Institutions (IFLA), and the American Library Association US (FADGI). The IFLA seeks to improve services around the globe through the representation of the profession and the working of the interests by becoming the global voice of libraries (IFLA, 2023). Several libraries around the world are following these guidelines because they play a crucial role in the promotion of library development and information services throughout the world (Shaheb, 2023).

The observation code has also shown that similar patterns have been observed in terms of quality control measures in both libraries. NLW and the NGF library are quality conscious and implement strict quality control measures to ensure high accuracy of the documents and metadata. According to Nieva et al. (2020), to ensure integrity in digitisation, quality control is an important component.

The next code was related to the digitisation of text-based materials in the year 2023, and it has been observed that different patterns have been followed by both libraries, as the NLW particularly focuses on the Cambrian, civil war tracts, and King Author printed books; however, the major focus of the NGF library is on the digitisation of text materials like governor's meeting documents, inaugural speeches, addresses, reports, the Federal Account Allocation Committee, and National Economic Council documents.

The next code has identified the metadata and both libraries use different tools and techniques for metadata.

The last code was related to storage retrieval and access. Both libraries use different patterns, and it was observed that they provide limited access opportunities as patrons can have access to a limited number of documents.

5.4 Discussion of the Document Analysis

From the document analysis that has been conducted above, it has been interpreted that both libraries in this study are digitising their text-based materials and making them highly accessible and secure. The management, staff, and administration at the National Library of Wales, United Kingdom, has digitised, protected, and conserved cultural and heritage material as well as scholarly and academic knowledge by combining state-of-the-art technology and traditional skills, whether it is a sensitive item, a small collection of fragile documents, several hundred thousand pages, or any large-scale project. The NLW and the NGF library are taking initiatives to embrace participatory movements and technologies that provide opportunities to create and exercise literacy skills and enable a strong sense of engagement with the library collections. The NLW is involved in crowdsourcing projects and Wikimedia projects, the crowdsourcing projects, for instance, the Cardiganshire War's transcription of the tribunal records and the Cynefin, have provided a platform and topic of interest for further discussion in terms of historical information with the help of digital technologies. Similarly, the Wikimedia activities and projects, has stimulated discussion regarding the development of information and research for literacy skills, as well as discussion regarding bias, facts, and truth (Jones & Tudur, 2018). It is critical for libraries to be at the forefront of innovation and technology when providing and improving literacy in its various forms (Martzoukou, 2021).

Therefore, these libraries, being true to their principles of foundation, continuously strive and survive for collection preservation and giving access to knowledge in all forms, and these forms now include graphical works, audio visuals, and born digital in addition to the physical formats. Both libraries are committing to widening access to knowledge and literary skills. Particularly,

NLW supports communities and individuals in their engagement and interpretation of the library collection; thus, it plays a dynamic role in the ongoing evolution of social cohesion and lifelong learning in Wales as a nation in terms of collective identity.

Similarly, the NGF library encourages an environment of learning and knowledge development and improvement through the continuous identification of opportunities that can foster professional development and growth and enhance learning by sharing with others the best insights of the library (NGF, 2023c). From the document analysis, it has been determined that both libraries are continuously working on their processes of digitisation for further improvement and thriving in this line; digitisation is also an essential element of their processes, core management, and overall success.

Chapter 6: Conclusion

6.1 Conclusion of the study

This study is an attempt to analyse the digitisation process of text-based materials in the National Library of Wales, United Kingdom, and the Nigeria Governors' Forum Special Library. For this purpose, the researcher has gathered qualitative data in three forms, which include a questionnaire, the collection of observational data, and documents. Thematic analysis was used for the analysis of qualitative data. To analyse the questionnaire, the researcher conducted thematic analysis based on which themes have been generated. These themes were based on the objectives of the study. In the study, there were a total of five research objectives; therefore, five themes have been developed. In every theme, it was identified that there exists a similar pattern between both libraries. However, a few differences were also identified, but those were on a very minor level, and on a major level, there were similarities between them. It has been interpreted based on thematic analysis that in both libraries, the process of digitisation of the text-based material is similar. The analysis of the observational data has shown that some of the identified codes showed a similar pattern between both libraries, while some showed different patterns. In this regard, the digitisation workflow, selection process of documents, standards and guidelines, measures of quality control assessment, and the processes of storage, retrieval, and access of the documents have shown a similar pattern being followed by both libraries. In contrast to this, there has been a different pattern of funding sources, copyright permissions, utilisation of equipment and software, digitisation of text-based material in the year 2023, and metadata process. The study has also analysed the documents gathered from both sources, and document analysis has been conducted. The document analysis also produced similar results as the above two (questionnaire and observational analysis). Both libraries are taking steps to digitise their text-based materials to preserve, broaden access and provide ease to their users.

6.2 Implications of the study

This study provides a few implications in terms of theory and practice.

6.2.1 Theoretical Implications

This study offers a lot of theoretical implications. The study has extended the body of literature on the digitisation process of the text-based materials library. In the present digital era, digitisation has become increasingly important and crucial because this activity is not just one-time. Libraries are continuously acquiring new materials and fresh knowledge, and some of this knowledge needs to be digitised. In Nigeria, approximately 10% of the total financial budget are allocated to university library (Nebraska-Lincoln, 2020). These practices can be extended to the digitisation exercises. Similarly, as per the vision of the British Library of the year 2020 for preserving and delivering the digital collection into the digital repository in the long run, the library has imposed end-to-end workflows. Accessing the guarantee for future generations is necessary (British Library, 2020).

The study has extended the existing literature on the digitisation process of text-based materials, and it is particularly important in the context of the Nigeria Governors' Forum special library and the National Library of Wales in the United Kingdom and important for all the libraries around the world in terms of digitisation.

6.2.2 Practical Implications

In addition to the theoretical implications, the study offers several practical implications. It enhances awareness and demonstrates the importance of digitising text-based materials at the libraries; therefore, the study has encouraged the library management and administration to digitise their materials as much as possible and provide access to their users through digital platforms. The study would be important for the management of both libraries to examine the current state of digitisation in their libraries and analyse the need for future improvements; it

would also suggest the best practices for digitising text-based materials. The study would improve the knowledge of the stakeholders of the National Library of Wales in the United Kingdom and the Nigeria Governors' Forum special library on digitisation so that they can implement digitisation projects in the best possible manner, it would also encourage other libraries, whether small or large, national or international, to implement these practices in order to reshape and modify their processes of digitisation of text-based materials. By implementing digitisation into the processes, functions, and activities of the libraries, they can maximise their overall effectiveness by integrating the policies and plans of digitisation, which would also open the libraries to users. Digitisation would enhance the access of the library not only to the people in the region where the library is situated but to the digital platform, where anyone from any part of the world can get access to the library material based on some terms and conditions. In addition to this, the study provides several recommendations and implications to the policymakers, the government of the United Kingdom, the authoritative bodies, and other relevant stakeholders of the libraries to develop new policies and modify the existing policies regarding the digitisation of text-based materials in the libraries. These policies must be carefully monitored and implemented so that they would encourage the digitisation of text-based materials in libraries, and most of the stakeholders would benefit from it. Another practical implication of the study is that it suggests digitisation for the safety and preservation of library resources, particularly the endangered ones, and that it would also, in return, foster improvement in the efficiency of the information search mechanism. This study would help the libraries in the implementation and improvement of digitisation because it provides a complete picture of digitisation, its basic concepts, reasons behind it, factors that must be considered before, during, and after the digitisation processes, and the challenges that the library would encounter in the digitisation of its resources.

6.3 Limitations of the study

Even though this study is comprehensive, no research is without limitations, as is the case with the present study. There are a few limitations based on which the researcher has provided recommendations to future researchers.

The first limitation of the study is limited access to the information regarding the process of digitisation in both libraries, the researcher was only able to get limited information regarding the strategies, policies, and processes implemented by these libraries by using questionnaire, observations and analysing documents collected. Another limitation of the study is the time constraints, as the research was cross sectional in nature and data was collected in a limited time which restricted the researcher to get detailed and in-depth information. Since NLW is situated in the UK and NGF is in Nigeria, the contextual and cultural factors of both Nigeria and the United Kingdom is also a limitation particularly during the phase of data collection. Moreover, the study involved qualitative interpretation of data so the findings may be subjective in nature which may impact the generalisability and authenticity of the results obtained.

6.4 Future research

Based on the above limitations, the researcher has suggested that future researchers should eliminate the impact of bias and subjective interpretations of the respondents from the data collection. Future researchers are suggested to collect data at different points in time by adopting a longitudinal method, and lastly, they are suggested to include more libraries or geographical context, this would increase the sample size of the data and the researcher can have access to more information regarding digitisation by including more sources as well as it would also generalise the findings of the study.

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Appendices

These appendices are arranged in the order they appear in the dissertation.

Appendix A: Proposed Interview Questions for Participants



INTERVIEW QUESTIONS FOR PARTICIPANTS

RESEARCH TOPIC: Digitisation Process of Text-Based Materials: A Comparative Study of the Digitisation Process of Text-Based Materials at the National Library of Wales, UK, and the Nigeria Governors' Forum Special Library

Introduction

Thank you for consenting to be interviewed for this research. This interview is intended to get insight into the digitisation process of text-based materials in the NLW and the NGF library. All questions align with the research objectives of this study. I also wish to confirm that you have consented to have this interview recorded.

Identifying similarities and differences in the digitisation processes of text-based materials.

1. How would you describe the overall digitisation process of text-based materials at the National Library of Wales?
2. What are the key steps involved in the digitisation process of text-based materials at the National Library of Wales?
3. What are the differences in the digitisation workflow for different types of text-based materials?
4. What are the specific guidelines for handling fragile or rare materials?
5. How is metadata created for digitised text-based materials?

Identifying best practices and potential areas for improvement in the digitisation policies and strategies.

1. What are the best practices the NLW has implemented in its digitisation policies and strategies?
2. What are the specific criteria used for selecting text-based materials for digitisation?
3. How does the NLW ensure the long-term preservation and accessibility of digitised materials?

Examining the strengths and weaknesses of digitisation processes of text-based materials.

1. What are the strengths of the digitisation processes of text-based materials at the NLW?
2. What are the weaknesses or challenges encountered in the digitisation process of text-based materials at the NLW?
3. In what areas have the digitisation processes of text-based materials at the NLW excelled in comparison to other libraries?
4. What areas of the digitisation processes of text-based materials at the NLW needs improvement?

Evaluating the impact of digitisation.

1. What are the lessons learned or insights gained from previous digitisation projects of text-based materials?
2. What are the impact of digitisation of text-based materials in your library?

Developing recommendations for digitisation processes of text-based materials in libraries.

1. Based on your experiences on the digitisation of text-based materials, what recommendations would you give for improving digitisation processes of text-based materials in libraries?

Appendix B: Observation Sheet

Digitisation workflow of Text-based Materials at the National Library of Wales, UK, and the Nigeria Governors' Forum Library

General Information	
Research Topic	Digitisation of Text-based materials: A Comparative study of the Digitisation Process at the National Library of Wales UK, and the Nigeria Governors' Forum Library.
Observer	Naomi Onoriode Ubogu
Date of Observation	13 June 2023
Library	
No of Staff	
Question	Answer
1	What are the digitisation workflow of text-based materials?
2	How are digitisation projects funded?
3	What are the document selection process?
4	How is copyrights handled?
5	What are the equipment and software used for digitising text-based materials?
6	What standards and guidelines are used in digitising text-based materials?
7	What quality control measures considered?

8	What digitisation of text-based materials has the library has done in 2023?		
9	How is metadata created?		
10	Storage, retrieval, and access		

Appendix C: Questionnaire



QUESTIONNAIRE FOR PARTICIPANTS

RESEARCH TOPIC: Digitisation Process of Text-Based Materials: A Comparative Study of the Digitisation Process of Text-Based Materials at the National Library of Wales, UK, and the Nigeria Governors' Forum Special Library

Section 1

Objective 1:

To identify similarities and differences in the digitisation processes of text-based materials.

1. How would you describe the overall digitisation process of text-based materials at the National Library of Wales?
2. What are the key steps involved in the digitisation process of text-based materials at the National Library of Wales?
3. What are the differences in the digitisation workflow for different types of text-based materials?
4. What are the specific guidelines for handling fragile or rare materials?
5. How is metadata created for digitised text-based materials at the NLW?

Section 2

Objective 2:

To identify best practices and potential areas for improvement in the digitisation policies and strategies.

6. What are the best practices the National Library of Wales has implemented in its digitisation policies and strategies?
7. What are the specific criteria used for selecting text-based materials for digitisation?
8. How does the NLW ensure the long-term preservation and accessibility of digitised materials?

Section 3

Objective 3:

To examine the strengths and weaknesses of digitisation processes of text-based materials.

9. What are the strengths of the digitisation processes of text-based materials at the NLW?
10. What are the weaknesses or challenges encountered in the digitisation process of text-based materials at the NLW?
11. In what areas have the digitisation processes of text-based materials at the NLW excelled in comparison to other libraries?
12. What areas of the digitisation processes of text-based materials at the NLW needs improvement?

Section 4

Objective 4:

To evaluate the impact of digitisation at the NLW.

13. What are the lessons learned or insights gained from previous digitisation projects of text-based materials at the NLW?
14. What are the impact of digitisation of text-based materials at the NLW?

Section 5

Objective 5:

To develop recommendations for digitisation processes of text-based materials in libraries.

15. Based on your experiences on the digitisation of text-based materials, what recommendations would you give for improving digitisation processes of text-based materials in libraries?

Appendix D: Documents from the National Library of Wales, United Kingdom

For analyzing documents from the NLW the documents collected includes;

1. Digitisation at the National Library of Wales.
2. Digitisation service unit scanning newspaper journals and plain text documents on Zeutschel OS 14,000 scanners.
3. Benchmarking documents: journals.
4. Quality assurance guidelines.
5. List of digitisation programme.
6. Sample operational plan.

Appendix E: Documents from Nigeria Governors' Forum library

From the Nigeria Governors' Forum library, the researcher has collected five documents which include;

1. A guide on how to access digitised text-based materials in the NGF digital repository.
2. Digitisation workflow of text-based material at the NGF library.
3. Knowledge management strategy to ensure metadata uniformity of digitised text-based material at the NGF library.
4. Library policies and procedures.
5. Metadata worksheet for Dspace entry for the NGF digital repository.

Appendix F: Consent form for Questionnaire



Research Consent Form

Participation in Questionnaire for Research Purposes

Dear Participant,

I am currently pursuing a Master of Arts in Information and Library Studies at Aberystwyth University, Wales. As part of my course, I am undertaking research on “**Digitisation of Text-Based Materials: A Comparative Study of the Digitisation of Text-Based Materials at the National Library of Wales and the Nigeria Governors’ Forum Library**” under the supervision of Dr Sarah Higgins at the Department of Information Studies. The research seeks to compare and contrast the digitisation processes used by the NLW and the NGF, identify best practices for digitising text-based materials in both libraries and develop recommendations to guide digitisation in libraries.

I would like to invite you to participate in this questionnaire for this research. Your inputs and insights as a staff member involved in the digitisation processes at the NLW are highly valuable to this study and I would be very grateful if you would take the time to complete this questionnaire as it would assist me greatly with this research. The questionnaire consists of fifteen open-ended questions, administered online and may require more than 30 minutes to complete. It will be accessible until Tuesday, July 18, 2023. If you choose to take part in this research, please note the following:

1. Participating in this research poses no known risks.
2. All information collected during this study will be kept strictly confidential.
3. Your responses will be anonymized, and no identifying information will be linked to your questionnaire.

4. The data collected will be used solely for the purpose of this research study to analyze the research data and to report on the research and its findings.

Consent: I have read and understood the information provided above. I voluntarily agree to participate in this research study by completing the questionnaire. I understand that my identity will be kept confidential, and my participation is entirely voluntary.

Participant's Signature: _____

Date: _____

Please note that your completion and submission of the questionnaire will be considered as your consent to participate.

Thank you for your time and contribution to this research study and you may contact the researcher if you have any questions.

Researcher: Naomi Onoriode Ubogu

Phone No: 07831715928

Email: nau3@aber.ac.uk

CLICK ON THE LINK BELOW TO ACCESS THE QUESTIONNAIRE

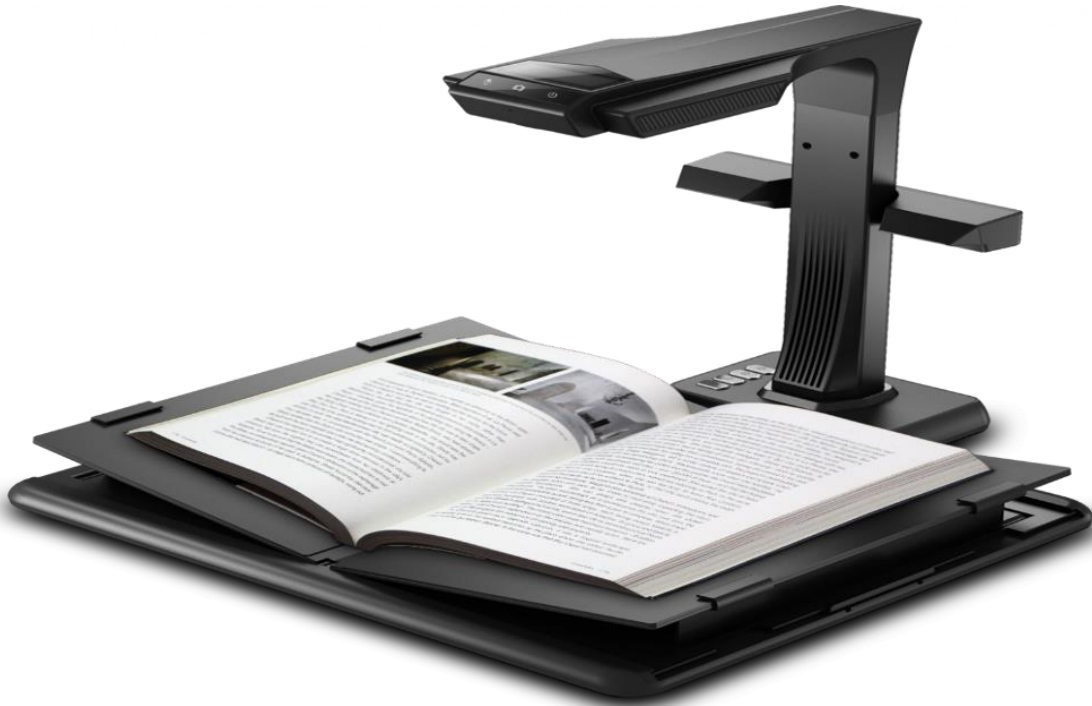
<https://forms.office.com/e/8cB9TUR8Hg>

or

Scan the QR code



**Appendix G: Equipment used for Digitisation of Text-based Materials at the Nigeria
Governors' Forum Library**



CZUR-M3000 Professional Book and Document Scanner



HP ScanJet Professional 3000 Sheet-feed Scanner

Appendix H: Equipment used for Digitisation of Text-based Materials at the National Library of Wales, UK



CopiBook Open System A2



Zeuschel A0 OS 14000



Zeuschel OSQ



ATIZ BookDrive Mk2

Appendix I: Metadata Worksheet for Dspace Entry at the NGF library



METADATA WORKSHEET FOR DSPACE ENTRIES AND SUBMISSION

Authors (+):

Title *:

Other Titles:

Date of Issue *:

Publisher:

Citation:

Series/Report No.:

Identifiers (ISBN, ISSN e.t.c) :

Type (book, article, journal):

Subject Keywords :

Abstract:

Description:

Accessibility :

Content in bitsream :