

**UTILISATION OF LEAN PRINCIPLES TO ENHANCE PROCESSES AND  
WORKFLOWS OF ELECTRONIC RESOURCES AT AN ACADEMIC LIBRARY IN  
SOUTH AFRICA**

by

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## DECLARATION

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**Utilisation of lean principles to enhance processes and workflows of electronic resources at an academic library in South Africa**

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to the appropriate originality detection system which is endorsed by Unisa and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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## **DEDICATION**

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## SUMMARY

Academic libraries, once hailed as the “heart of academia”, are currently competing with their institution’s academic departments and support services for resources and recognition. To stay current and relevant in serving their user community needs in an ever-evolving technological landscape, academic libraries must adopt innovative ways to improve their services for their users. In tandem with technological advances and providing electronic resources that are speedily accessible, academic libraries need to constantly find new ways in serving their users’ information needs.

This dissertation focused on the staff, resources, processes and workflows at Nelson Mandela University Library and Information Services (NMULIS), as well as lean principles as a business improvement initiative. The primary purpose was to explore how lean principles could enhance the processes and workflows of e-resources to ensure seamless access.

The research was conducted as an exploratory qualitative case study within the interpretive paradigm. The target sample consisted of 12 participants selected through purposive sampling; only those librarians responsible for creating and managing access to e-resources at NMULIS were eligible as participants. Empirical primary data were generated by means of four-phase semi-structured interviews and non-participative observation which were triangulated. The finding of the triangulation process highlighted five themes that emerged through reflexive thematic data analysis.

The key findings of this research study confirmed that implementing lean principles to the processes and workflows of e-resources will without a doubt enhance the accessibility to e-resources at NMULIS. Recommendations based on the findings were knowledgeable and skilled staff, effective and efficient systems and tools, as well as processes and workflows that are current and documented were requirements for a successful lean principles implementation streamlining the functions within and across departments. However, pivotal aspects beyond the delimitation of the study that emerged as the qualitative enquiry evolved were aspects of a lean culture that hinges on strong leadership and buy-in from both staff and management.

In conclusion, this study confirms that the library services under the auspices of Nelson Mandela University have the ability to balance its core traditional services in an online

environment in response to new trends, future needs and in alignment with the institutional Vision 2030 Strategic Framework.

**KEYWORDS:**

*Lean principles; lean waste; e-resources; electronic resource management; processes; workflows; users; 21st century ICT skills for librarians; academic libraries; documentation; standardisation.*

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## LIST OF ABBREVIATIONS

BPM	Business Process Management
CDP	Collection Development Policy
DOI	Digital Object Identifier
DVC: RII	Deputy Vice Chancellor: Research, Innovation and Internationalisation
EBSCOhost	Elton B Stephens Company
ERM	Electronic Resource Management
ERMS	Enterprise Resource Management System
ICT	Information and Communication Technologies
IFLA	International Federation of Library Associations and Institutions
ILS	Integrated Library System
IP	Internet Protocol
IS	Information Systems
ITS	Integrated Tertiary System
KB	Knowledge Base
LIS	Library and Information Services
LISDA	Library Services and Digital Applications
LMS	Library Management Systems
LMS	Library Management Systems
LSP	Library Services Platforms
MARC	Machine-Readable Cataloging
NMU	Nelson Mandela University
NMULIS	Nelson Mandela University Library and Information Services
OCLC	Online Computer Library Catalog
OPAC	Online Public Access Catalog

PMID	PubMed Identifier
RTA	Reflexive thematic analysis
SAFIRE	South African Identity Federation
SAML	Security Assertion Markup Language
SAN	Security Area Network
SANLiC	South African National Library and Information Consortium
SEALS	South East Academic Library System
TA	Thematic analysis
TENET	Tertiary Education and Research Network of South Africa
TPS	Toyota Production System
UNISA	University of South Africa
URL	Uniform Resource Locator
WAM	Web Access Management
WWIS	Worldwide Information Services



## CHAPTER ONE

### INTRODUCTION AND BACKGROUND TO THE STUDY

#### 1.1 INTRODUCTION

Electronic resources management (ERM) has a cyclical life-cycle, consisting of repetitive processes and workflows that are becoming increasingly complex due to the ever-changing technological environment, systems and tools (Anderson 2014; Bentil, Li Liew & Chawner 2022; England & Miller 2016; Hosburgh 2014; Sandeep, Gireesh Kumar & Kuwar 2021; Verminski & Blanchat 2017). Processes and workflows are vital components for sustainability, profitability, growth and risk mitigation (England & Miller 2016; Laguna & Marklund 2013) in manufacturing and service-oriented organisations. According to Cain and Haque (2008), a good workflow concerns more than simply efficiency; it facilitates timeous service delivery and directs the team on how to accomplish the goals that have been set. One means of achieving these goals is by implementing business process improvement initiatives or organisational improvement initiatives.

Numerous business process improvement methodologies exist. Examples are total quality management, Six Sigma, lean manufacturing and re-engineering (Salah & Rahim 2019; Zaini & Saad 2019). However, Ahmad, Romle, Rozia, Rodzi, Azemi and Ahmad (2016) caution that it is imperative to choose the correct process improvement method to obtain the outcome of what the improvement is intended to achieve. Business process management (BPM) initiatives and their successful implementation can be found in various scholarly communications (Bevilacqua, Ciarapica & De Sanctis 2016; Caldera, Desha & Dawes 2019; Dyllick & Muff 2015; Williams 2012). Conventionally, there may be different approaches toward public/non-profit sector processes and workflows and those of the private/business sector.

Lean manufacturing is a philosophy of continuous improvement to eliminate waste (non-value-adding components) and satisfy customers (Alefari, Salonitis & Xu 2017). To achieve this, Womack, Jones and Roos (1990) propose five lean principles. In the same vein, Robinson and Yorkstone (2014) identify the five lean principles as specify value, value stream, flow, pull and perfection. Robinson and Yorkstone (2014) also

identify the eight instances of lean waste as waiting, overproduction, excess inventory, defects, transporting, unused creativity, inappropriate processing and excess motion as further core elements of lean principles within an operation. Even though these principles were based on the observations of the authors while studying several manufacturing systems, Covey (1992) advises that organisations should embrace the core principles, because they can serve as a compass by providing constancy of purpose and alignment of organisational goals and actions.

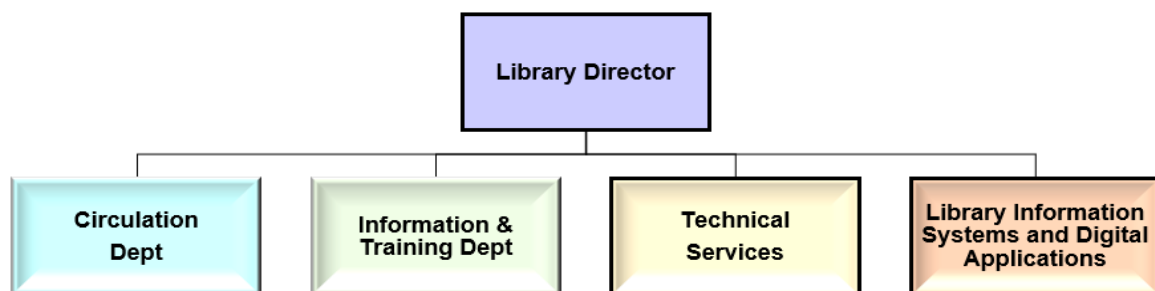
There is much scholarly literature to be found on the successful implementation of lean principles as a business improvement tool, in both the manufacturing and services sectors (Alefari, Salonitis & Xu 2017; Prasad, Dhiyaneswari, Ridzwanul Jamaan, Mythreyan & Sutharsan 2020; Sahoo 2020), as well as in higher education institutions, both internationally and nationally (Allu 2019; Hines & Lethbridge 2008; Malange 2013). The implementation of lean principles in higher education sectors has been entertained because of seeking improvements in response to demands in the marketplace, which is exceeding the expectations of students, faculties and stakeholders, as well as sustainability and financial constraints (Balzer, Francis, Krehbiel & Shea 2016; Bieraugel 2015; Bozzoli 2015; Garofalo 2014; Kress 2008; Novak & Zwiercan 2015). From an academic library perspective, it is noteworthy that the implementation of lean principles showed remarkable success results in countries as diverse as the United States (improvement of patient care through value stream mapping of library information and use), United Kingdom (improving customer services through value stream, Australia (building capacity by realigning staff and resources), Malaysia (to enhance service delivery work-flow and increase staff motivation, behaviour and performance) and Nigeria (re-positioning the 21<sup>st</sup> academic library) (Arumuru 2020; Bremmer 2016; Hanken 2011; Haron 2022; Thomas 2015). In the South African context, however, there is a dearth of such research.

Academic libraries form a fundamental part of the institutions they serve in supporting the learning and teaching, research and community engagement through the provision of information resources (Men & Israel 2017). As with universities, academic libraries are facing complex and overwhelming challenges compounded by technological innovation and budget constraints in delivering streamlined services to their users (Ashiq, Ur Rehman & Mujtaba 2021). It is also evident that academic libraries have

experienced considerable change in the creation of new knowledge, its packaging, use and dissemination, and the service structure in their collection development (Bentil, Li Liew & Chawner 2021), resulting from information and communication technologies (ICTs) as the core driver. Nelson (2016) suggests that lean principles may enable libraries to respond and adapt better to the constantly changing technology demands of users while maximising personnel and resources under static and declining budgets.

### 1.1.1 Contextual setting

The core purpose of the Nelson Mandela University (NMU) Library and Information Services (LIS) is to serve its users with products and services through responsible information stewardship. According to the NMULIS organogram on the SharePoint website (2021), the library is divided into four departments, namely: information and training services, circulation services, technical (bibliographic) services, and library systems and digital applications (see Figure 1.1).



Source: Author's own compilation

**Figure 1.1: NMU directorate organogram**

For purposes of the current study, the researcher applies the term “technical services” rather than “bibliographic services.” Gorman (1998), as cited in Davis (2015), defines technical services as all the tasks carried out in a library that is concerned with the processing of library materials by making them accessible to the users.

Since the adoption of ICTs in their environment, libraries have changed the way they organise, create, disseminate, and access information, (Okonedo-Adegbaye, Amusa & Bakare 2014). Libraries, especially academic libraries, are experiencing fast-paced changes in their collection development and service deliveries. Bentil, Li Liew and

Chawner (2021) concur that the rapid change caused by digital technologies requires complete and functional documentation, which assists in facilitating succession planning and ensuring consistency; in addition, it may reveal tasks that are more important than others that need urgent attention. The landscape of electronic resources (e-resources) is very complex and libraries continue to struggle with developing capabilities and capacity in managing e-resources (England & Miller 2016). The collection development at NMULIS is hybrid; however, the focus of the current research study is delimited to electronic resources only.

At NMU, discoverability and accessibility of e-resources are made possible through processes and workflows, systems and tools. The departments responsible for the creation and management of access to e-resources at NMULIS are: the technical services, library systems and digital applications (LISDA) and the South East Academic Library System (SEALS) consortium. The technical services department is further divided into three sub-departments, namely: acquisitions, cataloguing and classification, and electronic resource management (ERM).

E-resources consist of databases, electronic journals (e-journals), electronic books (e-books), multimedia or any information resource in an electronic format. These e-resources come in various access and purchasing models ranging from individual subscriptions, subject collections, once-off perpetual access, selected titles, pay-per-view, chapters and rental, to name a few. The access models and the organisation's reporting structures determine the processes and workflows of e-resources. As such, the researcher contextualised the roles and responsibilities of the technical and systems librarians responsible for creating and managing e-resources at NMULIS, as well as the systems and tools the library employs to facilitate access. In addition, a brief overview of the various formats and access models of e-resources in the collection development is presented in Chapter Two of this research report.

### **1.1.2 Conceptual framework**

Both a theoretical framework and a conceptual framework are tools for conceptualising research (Ngulube 2020a). Grant and Osanloo (2014:12) define a theoretical framework as “the foundation from which all knowledge is constructed and serves as a structure and support for the study's rationale, problem statement, purpose,

significance and research questions.” The importance of theoretical and conceptual frameworks is that they drive the literature review of what researchers propose and suggest through comparison and critical evaluation, thereby drawing findings between the various concepts (Maluleka 2017).

The fundamental difference between a theoretical framework and a conceptual framework is that a theoretical framework is based on a single theory underpinning a study, while a conceptual framework consists of concepts or constructs of various theories and extant literature (Ngulube 2020a). The current research study applied a conceptual framework to underpin the study. Ngulube (2020a:29) posits five ways of formulating a conceptual framework – one being “putting together various concepts from different theories.” In line with the aforementioned statement, the current study focused on the concepts of processes and workflows, staff and resources, and lean principles to explore how access to e-resources could be enhanced at NMULIS. The case study used inductive reasoning whereby the data were systematically analysed and synthesised to allow concepts and patterns to emerge from the data.

Access to e-resources is one of the core functions of NMULIS. This function may be achieved through skilled staff and effective resources, as well as processes and workflows that are streamlined and improvement initiatives that are cost-effective and sustainable. The researcher constructed a conceptual model using three concepts – staff and resources, processes and workflows, and lean principles to achieve the objective of the study, which is to explore how lean principles can enhance the processes and workflows to seamlessly access e-resources at NMULIS. The conceptual framework is discussed in greater detail in Chapter Three.

## **1.2 PROBLEM STATEMENT**

Processes and workflows are critical in managing e-resources (England & Miller 2016). The complexities associated with e-resource access models, require documented processes and workflows, systems and tools as they assist in facilitating the discoverability and accessibility of e-resources (England & Miller 2016). However, the lack of documented processes and workflows is evident according to the NMULIS 2020 Annual Report (NMU 2021) in which staff indicated that the absence of training

materials, documented processes and workflows and the virtual environment made it difficult for them to understand, learn and function effectively.

The situation was exacerbated by the global COVID-19 pandemic, when the South African president, Cyril Ramaphosa, announced a nationwide level 5 lockdown in March 2020. All South African citizens were housebound, with only essential services allowed to operate from 5am to 8pm. As a result, higher education sectors had to seek alternate ways to complete the 2020 academic year. NMU decided on a two-pathway solution (contact as well as online) but initiated the online only approach immediately after the president's announcement.

The documentation of the current processes and workflows is a short-term solution. In the long-term, the evolving technological environment and the delivery of e-resource products and services necessitate a landscape trajectory of change. This scenario necessitates seeking new ways of meeting continual changes to remain relevant, cost-efficient and current in serving users' information needs. In terms of balancing resource constraints with the demand for smarter ways of working, the notion of lean principles provides a good fit for this work-based problem and hence the current study thereof. Many methodologies for process workflow improvement have been suggested; however, lean principles are recognised as a quality improvement tool used in academic libraries (Hanken 2011; Novak & Zwiercan 2015; Pillai, Pundir & Ganapathy 2014; Thomas 2015) seeking improvement through small but continuous refinements in processes and procedures (Nicholas 2011).

### **1.3 Primary research question**

How can lean principles enhance the processes and workflows to ensure seamless access to e-resources at NMULIS?

#### **1.3.1 Secondary research questions**

- 1) What skills and resources are needed for participants to function effectively?
- 2) How do participants conceptualise processes and workflows in their work environment?
- 3) What is the condition of the current processes and workflows?
- 4) How do participants understand and utilise lean principles?

- 5) How can the current processes and workflows be adapted toward a leaner process in the future?

## 1.4 PURPOSE OF THE CURRENT STUDY

The purpose of this research study is to explore how lean principles could enhance the processes and workflows of e-resources to ensure seamless access at NMULIS.

### 1.4.1 Objectives of this study

Table 1.1 shows the relationship between the research objectives, literature review and conceptual framework, research methodology and sources of primary data which informed the study.

**Table 1.1: Research dashboard**

No.	Objectives	Conceptual framework	Research methodology	Sources of data
1.	To determine the skills and resources of the participants in executing their work.	Concepts concerning skills and resources of managing e-resources.	Semi-structured interviews	Director: Library and Information Services  Deputy Director: Technical Services  LISDA SEALS  Technical Services staff
2.	To assess how the participants conceptualise processes and workflows.	Concepts concerning processes and workflows.	Semi-structured interviews	LISDA SEALS  Technical Services staff
3.	To assess the current processes and workflows of e-resources.	Concepts concerning processes and workflows.	Semi-structured interviews  Non-participative observation	LISDA SEALS  Technical Services staff

No.	Objectives	Conceptual framework	Research methodology	Sources of data
4.	To ascertain how the participants understand and utilise lean principles.	Concepts from lean manufacturing.	Semi-structured interviews	Director: Library and Information Services  Deputy Director: Technical Services  LISDA SEALS Technical Services staff
5.	To establish how processes and workflows can be adapted to a leaner process.	Concepts from lean manufacturing.	Semi-structured interviews	Director: Library and Information Services  Deputy Director: Technical Services  LISDA SEALS Technical services staff

#### 1.4 MOTIVATION FOR THE STUDY

Lean philosophy is but one of the many business improvement tools currently available and is grounded in numerous values. Martensson (2017) states that lean values are linked to sustainable development principles and organisations that have implemented lean principles and have achieved results consistent with a more sustainable society.

This case study attempts to explore how NMULIS can make use of the benefits derived from lean principles. Scholarly literature speaks to the importance of processes and workflows in the management of e-resources (England & Miller 2016; England & Shipp 2013; Nelson 2016) and, as such, regarded as key elements facilitating the core function of an academic library. Yin (2018) defines a case study as a “bounded system or entity”; therefore, the current study – being delimited to the NMULIS – constitutes a



case study. A great corpus of scholarly works of literature on the successful implementation of lean principles (Alefari, Salonitis & Xu 2017; Prasad, Dhiyaneswari, Ridzwanul Jamaan, Mythreyan & Sutharsan 2020; Sahoo 2020) and, more significantly, in academic libraries across various disciplines (Hanken 2011; Novak & Zwiercan 2015; Pillai, Pundir & Ganapathy 2014; Thomas 2015). However, from a South African perspective, very little literature exists on the processes and workflows of e-resources, and a dearth of research globally on the implementation of lean principles to enhance access to e-resources.

### **1.5 SIGNIFICANCE OF THE STUDY**

The adoption of lean principles in academic libraries in South Africa could yield many advantages, especially with the rapid changes in information technology as a driver of electronic information resources. The feasible findings of this study could serve as a “blueprint” when libraries consider implementing lean principles, irrespective of whether it is in client services, technical services or management. In addition, documented processes and workflows could serve as a succession tool, which, if implemented, will benefit the NMULIS, the institution and libraries both in South Africa and elsewhere.

The objective of this research study is to explore how lean principles can enhance processes and workflows to ensure seamless access to e-resources. If successful, it would benefit students, researchers, lecturers and the NMU community in satisfying their information user needs. In addition, the adoption of lean principles could lead to sustainability, cost-effectiveness, efficiency in service delivery and enhanced user experience, which in turn would benefit the institution, student body, stakeholders and other academic libraries, both locally and globally.

### **1.6 SCOPE AND DELIMITATION OF THE STUDY**

One of the requirements for a research study is that it should be practically viable. To achieve this, boundaries must be clearly defined and set, narrowing down the areas to be studied. Methodologically, this study is delimited to a case study. Two elements define a case study: firstly, the case, “which can be a person, place, thing, organisation or phenomenon” and, secondly, the scope, indicating “what is and what is not (under

study), for example, time, structure or other perspectives” (Yin 2018:30) specific to the proposed study.

The boundaries set for the current study’s delimitations are the departments responsible for the access to e-resources at NMU, namely: technical services, LISDA and SEALS. Although NMULIS adheres to a hybrid collection development policy (LIS Collection Development Policy 904.03), academic libraries are moving increasingly into the online environment; therefore, the study concentrated only on the access to e-resources. Theoretically, the study was conducted primarily focusing on the principles of lean and identifying lean waste and was not extended to other theoretical areas related to processes and workflows. All semi-structured interviews were conducted online (as opposed to the conventional face-to-face approach) due to the COVID-19 restrictions and lockdown levels in the country.

## **1.7 PRELIMINARY LITERATURE REVIEW**

A literature review is a core component of a research study (Creswell & Creswell 2018; Leedy & Ormrod 2021; Flick 2020; Maree 2020; Walliman 2020) and establishes a framework for or presents the extant body of knowledge informing a study (Creswell & Creswell 2018). It may be said that the literature review is an amplification of various scholarly works on earlier studies and that the findings, similarities, contrasts and recommendations are applied to the current body of knowledge for further research. To inform the present study, the literature review concentrated on the concepts of processes and workflows when creating and managing access to e-resources, staff and resources required to be effective and efficient, and the concept of lean principles. A detailed, comprehensive literature review is presented in Chapter Three.

### **1.7.1 Digitally skilled staff and effective and efficient resources**

E-resources consist of complex processes, moving from one workflow to the next, in an ever-evolving networked landscape (Verminski & Blanchat 2017). The change in the evolving technological landscape in libraries has not only transformed the provision of information but has also influenced the way librarians perform their daily tasks. A variety of skills and competencies are required for 21<sup>st</sup>-century librarians (Raju 2014) and the more the networked society develops, the more librarians need to continue upskilling themselves to meet the needs of users (Osuiigwe 2020). Even more so, the

increasing movements of staff, recruiting of new employees and the ever-evolving changes of systems and tools have necessitated assessing whether technical and systems librarians have the necessary skills and resources to fulfil the core function of facilitating the accessibility of e-resources to its users.

Dombrowski, Mielke and Engel (2012) state that staff must fully understand the concept of lean principles as a tool, method and technique for it to be successful and sustainable. Deflorin and Scherrer-Rathje (2012) reiterate this statement, adding that staff might require additional training and skills to enable them to successfully contribute to their operations. The main motivation for a literature review is to guide the exploratory qualitative research in seeking an understanding of the experiences of the participants, rather than primarily answering the research question (Creswell & Creswell 2018) – given that not much has been written about the topic or the population being studied in the South African context.

Working in an online environment, dedicated systems and tools are core components in facilitating the accessibility and discoverability of the library's e-resource collection development. The technological resources under study are the systems and tools currently employed at NMULIS, as illustrated in Table 2.2 in Chapter Two.

### **1.7.2 Processes and workflows**

The *Cambridge Advanced Learner's Dictionary* (2013:287) defines conceptualisation as "to form an idea or principle in your mind." For the purposes of the current study, it is crucial to conceptualise and understand the processes and workflows of e-resources within an academic library, especially those tasks and activities relating to ensuring the access of e-resources to users. As well as from a non-existence of documented processes and workflows viewpoint in the creation and management access to e-resources at NMULIS.

Yael and Yigu (2017) explain that flowcharts are a diagrammatic representation by which to explain and visualise all steps of a process. The authors also contend that people normally understand their workflows but are oblivious to other staffs' equally important workflows, especially if they work towards a common goal. Although a great deal has been written on managing and accessing e-resources, the knowledge gap

persists in terms of processes and workflows between sub-departments, which includes a consortium and, more so, the population being studied.

Robinson and Yorkstone (2014) draw on the lean study, conducted at the University of St Andrews in Scotland, referring to a series of tasks with linked steps that formed a process. The life-cycle of a print book was explored – the processes from when the book was requested, acquired, catalogued, book processed, shelved, used, collection management and hypothetically repaired, long-term storage or disposed of. The authors concluded that, between the steps of the process, opportunities existed for improvement, as no step existed in isolation (Robinson & Yorkstone 2014).

From the example above, and the fact that no scholarly literature exists on the implementation of lean principles on the processes and workflows of e-resources, the current study endeavoured to bridge the contextual, conceptual and theoretical gaps, with specific reference to the academic library in the digital age.

### **1.7.3 Lean manufacturing**

The framework of lean manufacturing suggests that the development of lean principles has brought about significant changes in the elimination of waste. Implementing these principles not only streamlines processes and workflows, but it also increases customer satisfaction, reduces costs, reduces lead time and enhances sustainability (Hanken 2011; Novak & Zwiercan 2015; Pillai, Pundir & Ganapathy 2014; Thomas 2015; Van Der Merwe 2011).

Lean principles are regarded as a lean manufacturing tool to identify and eliminate waste to satisfy customers. Lean implementation requires employees actively participate in problem-solving and process improvement to enhance quality (Bhasin & Burcher 2006). For staff to actively participate, they need to be knowledgeable about lean principles, their benefits, and how they can contribute to a successful implementation. However, Kim, Spahlinger, Kin and Billi (2006) argue that the lean approach should be explained accurately to employees in its context and applicability, as well as a concept and a process, and not merely be seen as a series of techniques that can be implemented without a paradigm shift (Atkinson 2004).

Womack, Jones and Roos (1990) developed five principles of lean, namely: specify value, value stream, flow, pull and perfection. The five lean principles need to occur on every level within the organisation and require a complete transformation of the current business system (Gaza 2011). For these reasons, it is essential to understand and relate to each principle from a theoretical and practical perspective.

#### **1.7.4 Lean waste**

Womack and Jones (1996) describe the concept of lean as a production philosophy that decreases the time between the placement of an order until the product is delivered by eliminating non-value-adding factors throughout the value stream process. More specifically, the lean process entails that any activities that contribute to the effectiveness of service delivery should add value – and, conversely, any process or activity that does not should be eliminated. Hence, value in terms of lean principles is created by eliminating waste in activities or processes by means of appropriate tools and techniques (Coetzer 2017). The eight different types of waste identified by Robinson & Yorkstone (2014) are: waiting, transport, overproduction, inventory, defects, skills, inappropriate processing and motion. The aspects of waste identified by (Robinson & Yorkstone 2014) were waiting, motion/movement, action, and decision) were covered in this study. The eight wastes in terms of lean principles are discussed and contextualised in detail in the literature review presented in Chapter Three of the present study.

### **1.8 RESEARCH METHODOLOGY**

A qualitative exploratory case study was conducted because paradigmatically the research would be interpretive and allow for semi-structured interviews and observation techniques. The participants selected for this case study were those among the NMULIS staff who could best provide the information required to satisfy the research objectives and who were able to provide detailed descriptions and explanations of their experiences and challenges in their line of work when creating and managing access to e-resources at NMULIS. The qualitative methodology could also assist in ascertaining the level of acceptance among the staff with regard to changes and innovations in how work is performed in what historically was a static

environment. The methodology used in this study is discussed thoroughly in Chapter Four.

## **1.9 ETHICAL CONSIDERATIONS**

This research study was conducted in compliance with, and conformance to, the University of South Africa (UNISA) research ethics. A reciprocal ethical clearance was also obtained from NMU for obtaining the primary data from its NMULIS staff.

Denzin and Lincoln (2011) allude to “informed consent” as the cornerstone of ethical research. Furthermore, Zegwaard, Campbell and Pretti (2017) respond that, in human sciences, the level of attention to conducting research ethically has increased and broadened in response to society’s expectation of greater responsibility. In this regard, the ethical considerations adopted for this research study are elaborated on in Chapter Four.

## **1.10 DEFINITION OF KEYWORDS**

***Lean principles:*** Van Assen (2021a) defines the principles underpinning this philosophy as a collection of efficiencies that can be unleashed in an organisation to cut expenditure and reduce the cost of delivering a consistent and effective service to satisfy the customer.

***Lean waste:*** Balzer (2010) defines this concept as any step or activity in a process that consumes or uses resources that do not add value, seen from the perspective of the customer.

***e-Resources:*** Electronic resources (e-resources) refer to materials consisting of data and/or computer programs encoded for reading or the use of a peripheral device connected to a computer, for example, a CD-ROM drive or remotely via a network, such as the Internet (Jotangia 2020). Hence, e-resources include software applications, electronic texts, databases, institutional repositories, e-books, e-journals, websites, memory sticks, videos, DVDs, etc.

***Electronic Resource(s) Management (ERM):*** ERM refers to the processes associated with the acquisition and managing of library information resources in

electronic format (Verminski & Blanchat 2017). However, ERM encompasses more than merely acquisitions and managing of e-resources; it includes operations, systems, tools and staff to manage and sustain all the electronic resources from acquisition until the e-resources are accessible to users.

**Consortium:** An association of two or more individuals, companies, organisations, or governments; also, possibly a combination of these entities participating in a common activity or pooling their resources to achieve a common goal (Kenton 2021).

**Processes:** *Cambridge Advanced Learner's Dictionary* (2013) defines a process as a sequence of actions or activities to achieve the desired result. Managing e-resources comprises various stages and each stage, in turn, consists of a set of processes before proceeding to the next stage. Importantly, if these processes are not implemented correctly or completely, they can influence the access to the e-resource negatively.

**Workflows:** Eby (2016) defines a workflow as a visual diagram consisting of steps and resources (staff and equipment). Robinson and Yorkstone (2014) explain that no work can be carried out in isolation in any organisation; there will always be activities that take place beforehand and, in many cases, afterward, that result in a workflow between constituents in a series of linked steps.

**Users:** A person who actively uses the library for its information resources, online or in print. Someone who uses the services offered by the library is referred to as a library user (Barman 2020). At NMULIS the term “users” includes all registered students, researchers, lecturers, alumni, staff and the broader NMU community.

## 1.11 CHAPTER SUMMARY

Chapter One introduced the important concepts of this study. The problem statement, scope and justification, purpose, objectives and research questions were highlighted. This chapter also included a brief outline of the conceptual framework, body of knowledge and research methodology. The ethical implications for both UNISA and NMU were also considered. Lastly, definitions were provided for keywords and terms so readers could understand their context.

## **1.12 CHAPTER OUTLINE**

### Chapter One – Introduction and background to the study

This chapter provides an introduction and background to the present research study. The introduction presents and defines the key terms which informed the study. Also presented is the overall framework of the current study: the research problem, the purpose and the objectives. The delimitation of the study is addressed, along with a brief indication of participant selection and choice of research methodology.

### Chapter Two – Contextual setting of the current research

This chapter places the study into context. The management of e-resources differs from institution to institution. This is dependent on each academic library's organogram, reporting structures, vision, system and tools, access models and whether the library has its own IT department or is dependent on the institution's ICT department. Hence, an overview of the NMULIS operational and reporting structures, systems and tools and access models are presented as an orientation to this case study.

### Chapter Three – Conceptual framework and literature review

The focus of this chapter is the conceptual framework of the study and how the conceptual framework informed the research. A review of the literature most pertinent to the study is also presented.

### Chapter Four – Research methodology and design

This chapter addresses the research paradigm and methodology. The researcher explains and justifies the paradigm under which the study resorts. The research design, study population, sampling and data-gathering and analytical techniques are explained and their relevance is justified.

### Chapter Five – Data analysis and findings

This chapter consists of the presentation and description of the primary empirical data generated by the qualitative enquiry, as well as the analysis and interpretation thereof.

### Chapter Six – Discussion, recommendations and conclusion



In this concluding chapter, further interpretation is presented of the key findings, in synthesis with the most pertinent secondary data which informed the research. Recommendations and suggestions for future research are tendered.

### **1.13 CHAPTER SUMMARY**

Chapter One introduced the focal concepts of the present study. The problem statement, scope and justification, purpose, objectives and research questions were presented, and highlighted. This chapter also provided a brief outline of the conceptual framework, an extant body of knowledge and research methodology. The ethical considerations for both UNISA and NMU were also raised. Lastly, definitions of keywords and terms pertinent to the study were provided to facilitate understanding.

## **CHAPTER TWO**

### **CONTEXTUAL SETTING**

#### **2.1 INTRODUCTION**

The objective of this research was to explore, as a case study, how lean principles could enhance the processes and workflows of e-resources at NMULIS. This chapter discusses the organisational structure, roles and responsibilities of librarians in their respective departments and sub-departments, the collection development and the systems and tools employed in facilitating access to e-resources at NMULIS.

This chapter places the study in context to the vision of NMULIS, its organisational structure and collection development. Most importantly, the functions, roles and responsibilities articulated in this chapter serve to identify and relate to the focal issue of lean waste raised in research sub-question 5. According to Davis (2015), factors such as the organisational structure, institutional environment, management and the library's vision have a direct influence on the management of e-resources and, in turn, affect the processes and workflows, departments and staff responsible for the creation and managing of e-resources across institutions.

This chapter is divided into two sections. The first section presents an overview of the departments and the roles and responsibilities of staff, as well as the systems and tools which facilitate the management of access to e-resources at NMULIS. The second section gives insight into the various e-resources in the collection development, the format, access models and purchase models and how each operational stage has its own processes and workflows in ensuring discoverability and accessibility.

#### **2.2 NELSON MANDELA UNIVERSITY LIBRARY AND INFORMATION SERVICES**

Nelson Mandela University Library and Information Services (NMULIS) is one of the portfolios under the aegis of the Deputy Vice-Chancellor: Research, Innovation and Internationalisation, entrusted with the function of information stewardship in the facilitation of access to quality information resources and services in physical and virtual spaces to its library users. This mandate is in alignment with the 2030 Vision

statement of Nelson Mandela University: “To be a dynamic African university, recognised for its leadership in generating cutting-edge knowledge for a sustainable future.” (Nelson Mandela University 2019).

In pursuance of the university’s vision, NMULIS aligns itself through its mission statement, which reads: “To facilitate access to quality information resources and services for excellence in research, teaching and learning and to provide physical and virtual spaces to our users.” The management of NMULIS consists of the Library Director, Deputy Director: Circulation, Deputy Director: Information and Training, Deputy Director: Technical Services, and Deputy Director: Library Information Systems and Digital Applications (LISDA).

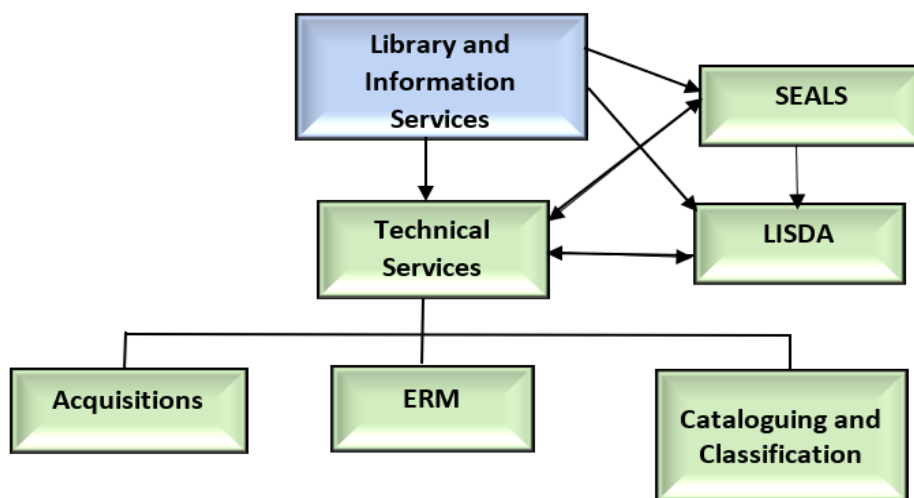
The core purpose of NMULIS is to serve its users with information resources in support of teaching, learning and research. To fulfil this mandate, the library requires systems and tools, processes and workflows, as well as skilled staff, to ensure that e-resources are accessible seamlessly. At NMULIS, the departments responsible for this task are the departments responsible for creating and managing the discoverability and accessibility of e-resources at NMULIS. These are the NMULIS technical services, LISDA and South East Academic Libraries System (SEALS). SEALS is a consortium serving four institutions of higher education within the Eastern Cape. The roles and responsibilities of all these departments in the creation and management of access to e-resources are discussed further in this chapter.

For e-resources to be accessible, each resource must go through a set of tasks or activities (processes) in each department and sub-department, as well as across each department and sub-department, in an interrelated workflow from the time the resource is acquired or subscribed to until it is available on the library portal for accession. The departments responsible for these tasks are again the technical services department, LISDA and South East Academic Libraries System (SEALS).

The remainder of the chapter concentrates on the organisational structure, roles and responsibilities of librarians in their departments and sub-departments, collection development and the systems and tools employed in the facilitation of accessing e-resources at NMULIS.

## 2.3 LIBRARY DEPARTMENTS RESPONSIBLE FOR MANAGING ACCESS TO E-RESOURCES

At NMULIS the discoverability and accessibility of e-resources are made possible through the interrelated relationships of technical services, LISDA and SEALS (see Figure 2.1). The functions of these departments are all centralised. The library does not have a dedicated IT department but relies on the institution's ICT department to assist with ICT-related problems, networking, and infrastructure. Table 2.1 depicts the roles and responsibilities of the various departments and sub-departments responsible for creating and managing access to e-resources at NMULIS



Source: Author's own compilation

**Figure 2.1: Departments responsible for managing e-resources at NMULIS**

### 2.3.1 Technical Services Department

The NMULIS technical department is managed by the Deputy Director: Technical Services. The technical services department comprises three sub-departments, namely: acquisitions, ERM, and cataloguing and classification. The operational functions of these sub-departments are centralised, serving seven campuses, namely: NMU South, North, 2<sup>nd</sup> Avenue, Missionvale, Business School, Ocean Sciences, George campuses and the Medical School. Technical Services is one of two departments that do not deal directly with library users. They operate in the background and are often known as the engine room of the library.

Each sub-department within the technical services department has definitive roles and functions, which are discussed below.

### **2.3.1.1 Acquisition sub-department**

The International Federation of Library Associations and Institutions (IFLA) defines acquisitions as activities associated with the acquiring of resource information materials in all formats, which include ordering, receiving, claiming, paying, selecting and evaluating sources, negotiating prices and licensing digital resources (IFLA 2021). The current acquisitions staff at NMULIS consists of five members. According to the NMULIS official website, the main function of the acquisitions staff is to manage and oversee the serials and books in print format only (Nelson Mandela University 2021).

However, since 2017, and by internal arrangements, two staff members from the acquisition department have assisted the ERM department with the acquisition of single-title e-books and single-title e-journals due to the increase in online requests from academia. These changes are not documented in the institution's Human Resources staff records. Hence, the functions of the acquisition of a single-title e-book and a single-title e-journal reside in the ERM department and are reflected as such in the processes and workflows when creating and managing access to e-resources at NMULIS.

### **2.3.1.2 ERM sub-department**

ERM is defined as “the system and techniques used by library professionals to monitor the selection, acquisition, access, maintenance, licensing, usage and evaluations of a library's electronic information resources” (Raj & De 2020:131). ERM operates within an ecosystem where publishers dominate the landscape of e-resources. For example, publishers decide which titles will be included in a package, which titles they will withdraw from a package, which access management platform can licence their content, the access models of e-books and the availability of core titles, as well as the price structures.

Within these constraints, academic libraries are forced to abide by publishers' rules and regulations, which are not often understood by students, researchers and academics. Subscribing to or purchasing e-content is either done directly through publishers, vendors, or access management hosting platforms. NMULIS is a member of the South African National Library and Information Consortium (SANLiC) which assists libraries with database subscriptions through buying power negotiations.

The library also makes use of two Information Services Management Solutions vendors, namely: Worldwide Information Services (WWIS) and the Elton B Stephens Company (EBSCOhost). These agencies primarily act as intermediaries between the library and publishers regarding subscriptions to journals (print and electronic), electronic databases and digital content, including e-book subscriptions and perpetual access and periodicals. Listed below are some of the reasons and benefits why such agencies are preferable:

- Many publishers prefer one agent and one invoice, instead of invoicing individual clients directly.
- Some publishers refuse to work directly with libraries.
- More and more publishers are using WWIS and EBSCO as their sole or preferred agency, especially regarding consortium deals, because of their experience and knowledge in electronic collection development.
- EBSCO has a subscription management platform, named EBSCONET, which offers all the subscription management functionality clients would expect – title selection, ordering, e-access activation, claims, renewals and evaluation – all within a single interface.
- WWIS functionality encompasses everything from currency exchange/hedging/futures/forward cover to invoicing on behalf of the client.
- WWIS does not charge any handling fees for consortium deals; publishers pay a commission fee to WWIS when concluding an agreement.
- WWIS and EBSCO assist NMULIS in searching the availability of e-books, journals and database requests globally and perform the majority of the administrative functions by engaging with publishers, obtaining quotations, renewals, URLs and invoices, and marketing new e-resources materials.
- The EBSCO Collection Manager platform is an online purchasing platform for e-books. The platform has the capabilities of selecting the publisher, purchase model and user model, giving the librarian the option to choose when purchasing.

SANLiC is a non-profit organisation of member institutions and client libraries aiming to acquire better value for electronic collections through the collective bargaining of its membership (SANLiC 2021). Apart from the facility of negotiation, NMULIS also

benefits from SANLiC's numerous additional services such as evaluation, marketing and promotion of e-resources and lobbying with regards to electronic products and services. Currently, SANLiC is the core driver of transformative licence agreements between academic libraries and publishers. By partaking in these types of licence agreements, NMULIS assures its library users that the library is fully committed to promoting Open Access for the advancement of South African research and research production by seeking alternative platforms for the distribution of South African scholarship at a reduced cost to the library and our researchers (Vahed 2020).

The ERM sub-department consists of a Senior Librarian: ERM, tasked with overseeing and managing the daily operations of the sub-department and two ERM librarians. Together they ensure that the ERM operational requirements are met. The functions of the ERM librarians are: acquiring all e-resources irrespective of access model, collating usage statistics and reporting on the data analytics, administrative functions of licence agreements, creating trial requests, executing technical processes in troubleshooting, liaising with publishers and vendors representing the library, profiling of e-resources in the knowledge base, implementing workflows and processes of the ERM functions, and overseeing and managing renewals and cancellations requests of e-resources.

### ***2.3.1.3 Cataloguing and classification sub-department***

Cataloguing is the process of creating and maintaining bibliographic and authority records in the library catalogue in tangible and intangible formats. Relative to the movement of information materials within technical services, cataloguing usually follows the receipt of ordered books in acquisitions and involves three major activities, namely: descriptive cataloguing, subject cataloguing and authority control (Joudrey, Taylor & Miller, 2015).

The cataloguing and classification department's operational activities are managed and overseen by the senior librarian. There are four full-time and one half-day librarians responsible for downloading the bibliographic records from the OCLC online catalogue, editing the records according to the metadata standard requirements, classification and allocation of subject headings.

Additionally, this department receives and uploads the digital content of the electronic theses and dissertations of NMU post-graduate students into the institutional repository of the library. While the cataloguing mission and core principles have remained the same over time, codes, formats and systems have advanced and will continue to evolve due to the developments of technological changes and demands.

### **2.3.2 Library Systems and Digital Applications (LISDA)**

The core function of a systems librarian is to manage the integrated computer-based library system (Yusuf 2014). Systems librarians play a critical role in academic libraries as experts who understand information technologies and libraries, thus combining these two fields to work seamlessly as a whole (Iglesias 2010). Since the systems librarian solely manages the Sierra integrated systems program at NMULIS, the incumbent is required to have certain advanced skills in library and information technology.

NMULIS has only one systems librarian, who reports to the deputy director of the LISDA department. The latter position has been vacant for the last five years and, as a result, the systems librarian currently reports directly to the director of the library. The functions of LISDA are centralised and support all the other NMULIS departments across the seven campuses. LISDA is the driving force assisting with the library's e-strategy toward becoming a virtual, digital multimedia library (Nelson Mandela University 2021).

Academic libraries employ integrated library systems (ILS) to facilitate their information resources. NMULIS subscribes to the Sierra integrated library system. Sierra is an Innovative Interface product, shared by three other institutions in the Eastern Cape as part of the SEALS consortium.

The core function of the systems librarian is to set up and manage the underlying structure of Sierra, consisting of the acquisitions, cataloguing and classification, serials, ERM, circulation and inter-library loans modules. In addition, the systems librarian is responsible for all staff training related to systems and tools at NMULIS.



### **2.3.3 The South East Academic Libraries System (SEALS)**

The South East Academic Libraries System (SEALS) is an academic libraries consortium, established in 1988 (SEALS 2018). The four membership academic libraries are Nelson Mandela University, Rhodes University, Walter Sisulu University and Fort Hare University. SEALS is one of the five South African regional academic library consortia established during the period 1992 – 1998 (Thomas 2007). The benefits of the SEALS consortium to its members are: providing seamless interaction between services and resources within the consortium, user records and transaction transparency and shared bibliographic records with attached holdings to allow for the creation of a union catalogue, cost savings by combined buying power, lower annual maintenance fees and cutting-edge library and information technology solutions for Historically Disadvantaged Institutions (HDIs) (Thomas 2007).

The SEALS Trust office is based in Gqeberha, formerly known as Port Elizabeth. The trust employs two staff members: the SEALS Trust and Systems Manager and the SEALS Trust Principal Systems Librarian, who have vast experience in systems, tools and technology. The role and responsibilities of the SEALS office staff are to manage the SEALS Trust operations and finances and the shared consortium library systems, applications and tools. SEALS' duties include systems negotiations, implementation, upgrades and maintenance, data integrity, troubleshooting and member library staff training and support. This office reports to the SEALS Trust Board, consisting of the consortium Library Directors and the DVC: Research at Rhodes University.

## 2.4 NMULIS DEPARTMENTS RESPONSIBLE FOR CREATING AND MANAGING ELECTRONIC ACCESS

Table 2.1 outlines the roles and responsibilities of the various departments and sub-departments concerning their functions in creating and managing access to e-resources at NMULIS.

**Table 2.1: Roles and responsibilities of the departments**

Department	Roles and responsibilities
ERM	<ul style="list-style-type: none"> <li>• Receive requests for e-resources irrespective of format.</li> <li>• Liaise with publishers, vendors and aggregator vendors.</li> <li>• Register on publisher and access management websites for link resolvers and admin access.</li> <li>• Check for the availability of platforms for e-resource requests.</li> <li>• Check pricing and access models.</li> <li>• Negotiate price and content of e-resources.</li> <li>• Cancellation and renewals of subscriptions.</li> <li>• Troubleshooting of deadlinks.</li> <li>• Create fund codes on Sierra for placing orders.</li> <li>• Check for title overlap or duplication.</li> <li>• Perform all the functions of database trials.</li> <li>• Supply publishers and vendors with authentication information (IP addresses).</li> <li>• Check budget availability.</li> <li>• Profile database or title on the knowledge base (KB).</li> <li>• Obtain URL links from the publisher or vendor.</li> <li>• Place orders with publishers and vendors.</li> <li>• Create resource, order and licence records on ILS.</li> <li>• Process invoices on ILS and ITS.</li> <li>• Initiate licence agreement processes.</li> <li>• Oversee and manage the approvals and signatories on the licence agreements.</li> <li>• Request coverage and publishing dates from the publisher or vendor.</li> <li>• Check perpetual access dates.</li> <li>• SANLiC liaison.</li> </ul>

Department	Roles and responsibilities
Classification and Cataloguing	<ul style="list-style-type: none"> <li>• Receive requests from the acquisitions section to download a bibliographic record from WorldShare (the global catalogue).</li> <li>• If the record does not exist on WorldShare, create the bibliographic record based on the information from the knowledge base (KB).</li> <li>• Transfer the bibliographic record of the electronic resource into the NMULIS local system (Sierra).</li> <li>• Clean the record by removing all unnecessary metadata and fields not used by the SEALS consortium.</li> <li>• Add the 090 field-call number (to indicate it is an online resource).</li> <li>• Add the SSJ number from the knowledge base to link the bibliographic record to the URL in the knowledge base.</li> <li>• Add the location into the record (stating it is an online resource).</li> <li>• Save the record.</li> <li>• Add the e-resource to the NMULIS library catalogue.</li> <li>• Send the SSJ number and the bibliographic record number to the ERM section for further profiling.</li> <li>• Copy cataloguing: In the case of SEALS consortium members having the record, the cataloguer checks and confirms that the metadata and control (SSJ/SSIB) numbers are correct and correspond with the data in the KB. NMU online location is then added to the bibliographic record and saved.</li> </ul>
LISDA	<ul style="list-style-type: none"> <li>• Load single titles manually on the ILS system, via Coverage edit.</li> <li>• Check and verify the information on the bibliographic records.</li> <li>• Change the URL access link of each title to the SEALS WAM URL.</li> <li>• Manually add the title to the applicable database, in Coverage edit.</li> <li>• Manually create and attach the check-in record to the bibliographic record.</li> <li>• Check OPAC public view to see whether the check-in record displays correctly.</li> <li>• Check the URL from the ILS system and OPAC to check whether that provides access to the correct e-resource.</li> <li>• Report non-access to Acquisitions, to follow up with the vendor.</li> <li>• If resources need to be forwarded to SEALS for batch-loading, prepare an Excel spreadsheet with all the required information, records and review file.</li> <li>• Troubleshooting for both on and off-campus access.</li> <li>• Liaison for the LIS and the institution's ICT department.</li> <li>• Check WAM table entry; check web browser and internet slowness; capture any error screens in a document that can be forwarded to the vendors for further investigation; report access issues also to the SEALS office.</li> <li>• Link the databases with the 360Link resolver OpenURL Base URL.</li> </ul>

Department	Roles and responsibilities
SEALS	<ul style="list-style-type: none"> <li>• Batch-load new database titles into Sierra as requested by libraries; reload current database titles regularly to ensure that deletions and additions are reflected correctly in the catalogue.</li> <li>• Batch-load MARC records from vendors and OCLC for new databases.</li> <li>• Update MARC records loaded via Global update and delete sub-standard records.</li> <li>• Profile batch-load database title lists in the 360 Knowledge Base (KB) via the Coverage load option on Sierra.</li> <li>• Review and investigate KB load report errors.</li> <li>• Troubleshoot metadata and dead links, which are reported to service providers. Correct metadata in the catalogue; check whether the KB profile is correct and that links open on the correct publisher webpage under the correct title as required.</li> <li>• Update the WAM authentication table.</li> <li>• Negotiate with Tertiary Education and Research Network of South Africa (TENET) re SAFIRE (SAML federated authentication) where applicable.</li> <li>• Add domain names to the SAN (Secure Area Network) certificate as required.</li> <li>• Resolve access problems reported by consortium staff.</li> <li>• Assist ERM staff with queries, especially technical and system issues and profiling.</li> <li>• Provide support concerning digital repository queries as needed.</li> <li>• Ensure data integrity and security in all systems.</li> </ul>

## 2.5 SYSTEMS AND TOOLS FACILITATING ACCESS TO E-RESOURCES AT NMULIS

Table 2.2 outlines the systems and tools employed in facilitating access to e-resources within NMULIS.

**Table 2.2: NMULIS systems and tools facilitating access to e-resources**

Name	System / Tool	Function
Authentication	Internet Protocol (IP) WAM Authentication  South African Identity Federation (SAFIRE)	Every computer on the institution's network has a unique IP address. The library provides publishers, access management platforms and vendors with their IP addresses to allow users to access requests coming from these addresses. In other words, it is effectively a security measure.  Federated identity services play an increasingly critical role in facilitating access to major science projects; South Africa's participation in this space is an important milestone towards allowing South African scientists to collaborate in international research.
Sierra	Integrated Library System (ILS)	The ILS is a software package which manages, integrates and centralises multiple core functions and services. It assists libraries to increase operational efficiency, providing access to the library's collection and providing access to external resources (Kochtanek & Matthews 2002).
Discovery Layer	Summon	The function of the discovery layer is to enable library users to search seamlessly across a wide range of information content.
Link Resolver	360 Link	OpenURL link resolvers emerged in the early 2000s to assist libraries in providing a manageable approach to linking from citations to the full text or other services to make articles available to library users. These products were able to provide context-sensitive linking to the full text on the server of the publisher to which the library subscribes.

Name	System / Tool	Function
Knowledge Base (KB)	360 Core (ExLibris)	The KB contains the metadata of subscriptions or purchased information. It also includes information on the journal titles in a database or subscription package, the journal dates held in the database and the links to access the content. The holdings information is important for generating the A-Z title lists and for creating OpenURL links, which are generated from citation information and subscribed content lists.
A-Z Listing	Library Online Catalogue 360 e-journals Portal	A–Z listings and other finding aids are often associated with link resolvers and make use of the e-resource knowledge base.
Peripheral	Third Iron Suite BrowZine LibKey link LibKey Nomad	BrowZine is a journal engagement platform. The LibKey link is a landing page connecting library users to library subscriptions and open access articles using DOI or PMID. LibKey Nomad is a browser extension.
Digital Repositories	VITAL  Figshare	Vital is a III Innovative digital object repository and management system designed for universities, libraries, museums, archives and information centres. Designed to provide seamless online search and retrieval of information for administrative staff, contributing faculty and end-users.  Fundamentally Figshare supports research. Researchers decide what digital files they want to store, who they want to share them with and whether they choose to publish them to support their research. Figshare allows researchers to retain control of their digital files throughout the research data life-cycle.

According to Weir (2012), there are approximately eight different access methods whereby users can access e-resources, namely: online public access catalogue (OPAC), e-resource portals, for example, A-Z lists, subject indexes, federated search engines, link resolvers, discovery services, browsing lists and embedded lists. At NMULIS, users can access e-resources via any of these aforementioned methods.

## **2.6 NMULIS E-RESOURCE COLLECTION DEVELOPMENT**

Collection development refers to the systematic assessment, selection and de-selection of a library's information resources (Alexander 2003). The NMULIS Collection Development Policy 904.03 provides an overview of the cooperative framework for management, planning and accountability. The purpose of the NMULIS collection development process includes the formulation and implementation process and procedures, budget allocation, needs assessment, collection maintenance, evaluation and resource-sharing. LIS acquires print and digital resources, which include books (both print and electronic), journals (print and electronic), databases, dissertations and theses, donations, government publications, loose-leaf publications, music scores, compact discs, videos and reference collections (NMU 2018). Table 2.3 provides a summary of the various e-book and e-journal access models in the NMULIS collection development.

**Table 2.3: NMULIS Collection development of e-resources access models**

Type	Access model	Description
E-books	Individual purchase	Some single-title e-books are available for individual purchase, which grants perpetual access, with a once-off purchase price. Books are hosted on aggregator or access management platforms – usually with no licence agreements.
	Individual subscription	Some single-title e-books are available on a subscription basis, with annual renewal; the content is available via either the publishers or content aggregators.
	Package	E-book packages are the entire e-book collection that the publisher makes available as a single product. The same e-book collection requires a licence agreement and annual renewal and is hosted on the publisher's platform.
Databases	Subscription	Most databases are available through yearly subscriptions. NMU as a member of the South African National Library and Information Consortium (SANLiC) partakes in the deals offered by the consortia.
E-journals	Individual subscriptions	Single-title e-journal subscription with an annual renewal. Subscription provides perpetual access rights for the year subscribed. Hosted on the publisher's website or an access management platform.
	Collection	The e-journal subscription package is governed by a licence agreement. Annual renewal or, if a SANLiC deal, could be a two-year and/or year deal.

The LIS aims to support the mission of Nelson Mandela University by providing appropriate access to a collection of materials that best serve the teaching, learning and research needs of the undergraduate and post-graduate programmes. The collection must provide resources to support and enrich teaching, learning and research for the Nelson Mandela University academic focus areas and, when financially possible, should provide some materials to meet the general and recreational needs of the Nelson Mandela University community (Nelson Mandela University 2018).

The management of e-resources differs from institution to institution. Because of the complexities of managing e-resources, some institutions use checklists such as spreadsheets, databases, flowcharts, resource management systems, or Word documents. At NMULIS, e-resources are managed predominantly using Excel



spreadsheets. In the absence of current documented processes and workflows, the researcher employed the non-participative observation data collection (see Figures 4.2 – 4.4 and Tables 4.4 – 4.9) to create processes and workflows. Sub-research Question 3 responds to the verification of the information to confirm the information as a true reflection of the current processes and workflows in creating and managing e-resources at NMULIS (see Figures 5.10 – 5.12 and Tables 5.2 – 5.9).

### 2.6.1 Collection development of e-books

**Table 2.4: NMULIS e-books collection development**

Sources	Purchasing models	Access Models	Platforms	Example
Publishers	Purchasing Subscriptions	1B1U 1B3U Unlimited	Publisher Access management platforms Aggregators	Springer LexisNexis Proquest Juta Oxford University Press Taylor & Francis Wiley Read and Publish
Aggregators	Purchasing Subscription	1B1U 1B3U Unlimited	Aggregators Ebrary MyLibrary	EBSCOhost Gobi Proquest Snapplify VLe Books
Access Management platforms	Purchasing Subscriptions	1B1U 1B3U Unlimited Lease Rent	VitalSource Snapplify	Pearson Various publishers

The NMULIS e-books collection consists of subscription single titles, purchasing and subscription packages and database access models (see Table 2.4). The acquisition of e-books is dependent on availability, access models, system compatibility and availability of budget and payment models. The biggest challenge NMULIS

experiences are the sourcing of core e-book titles and e-textbooks (prescribed books). These are normally subscription packages and are costly. The processes and workflows are dependent on the access model of the particular e-book. In terms of the present study, the e-book processes and workflows are related to a single title, perpetual access model. Although e-book single titles are also included in subscription models, the processes and workflows follow the same procedures as the processes and workflows of a single-title e-journal subscription, which is addressed below under Sub-section 2.6.2.

### **2.6.2 Collection development of e-journals**

Serials constitute an immense proportion of the current e-resources available in the library and complement the library's book collection. "Serial" is the term used to describe scholarly journals, magazines, newspapers, annuals, statistical reports, directories and yearbooks. Journals and periodicals form the serial collection. These are publications issued in successive parts and are subscription-based only. At NMULIS, the e-journal collection consists of single annual subscriptions and database packages. Single-title journals are hosted either by the publisher, access management platforms, or aggregators.

Various processes and workflows are involved in the access to and maintenance of e-journals. Keeping a daily, weekly and monthly activities sheet is essential when managing e-journal subscriptions. Processes and workflows include acquisition of a new single title, change of publisher, change of issue information, publication ceased, cancelled publication and move from print to electronic format. Each of these changes entails its own processes and workflows and therefore should be documented in an operational manual and be kept updated.

### **2.6.3 Collection development of database subscriptions**

Verminski and Blanchat (2017:233) define a database as "searchable online platforms that contain documents or information about documents." Database content can include journals, government documents, datasets, conference proceedings, book chapters, book reviews, images and streaming media. NMULIS subscribes to various selected databases providing comprehensive access to scholarly publications. Library databases are searchable online catalogues or indices (indexes) containing

information (citations, abstracts and/or full text) of journal articles, reference works, books and other documents. These resources can be searched both on-campus and off-campus.

E-resources defy the traditional linear path – they move rather through cyclical stages which are non-linear, repetitive and ongoing, known as the e-resources life-cycle. Pesch (2008) captured the non-linear cycle in six phases. These six phases are also used in the management of e-resources at NMULIS and have been renamed (see Figure 2.2) as (1) pre-section, trial and evaluation, (2) ordering, (3) licensing, (4) activation and end-user access, (5) implementation, administration and support, and (6) renewals and cancellations.



Source: Author's own compilation; an adaptation of Pesch's 2008 model

### **Figure 2.2: E-resources database life-cycle at NMULIS**

The present research study concentrated on the six phases of the processes and workflows of the e-resources life-cycle. Additionally, each phase is indicative of the department responsible for that phase and the activity taking place in that department. As mentioned before, the operations, departments, processes and workflows differ from institution to institution; it is therefore imperative that the study be read within the framework of an NMULIS case study.

## **2.7 CHAPTER SUMMARY**

This chapter places the study in context to the vision of NMULIS, its organisational structure and collection development policies. Divided into two sections, the first section discussed the respective departments and the roles and responsibilities of staff, as well as the current operating systems and tools facilitating the management of access to e-resources at NMULIS. The second section gave insight into the various e-resources in the collection development, the format, access models and purchase models and how each phase entails its own processes and workflows in ensuring discoverability and accessibility.

## **CHAPTER THREE**

### **LITERATURE REVIEW ON THE APPLICATION OF LEAN PRINCIPLES IN ACADEMIC LIBRARIES**

#### **3.1 INTRODUCTION**

The objective of the present research study was to explore how lean principles can enhance the processes and workflows of e-resources at NMULIS in streamlining access to e-resources. The themes of this study are centred around the objectives of 1) skills and resources needed for participants to effectively perform their work functions, 2) participants' conceptualisation of processes and workflows in their work environment, 3) conditions of the current processes and workflows, and 4) participants' understanding of lean principles.

Academic libraries are increasingly playing a pivotal role in ensuring the information needs are discoverable and accessible anywhere and at any time in support of teaching, learning and research. Technological advances have emerged as strong transformative drivers for change in academic libraries. The State of South African Academic Libraries Report (2021) indicates that South African academic libraries need to examine emergent trends that are responsive, adaptable and agile, demonstrating their value proposition, because information fluency has become an imperative for academic success (Committee of Higher Education Libraries of South Africa 2021).

Lean principles offer the capability of streamlining processes and workflows on all activity and operational levels in organisations and institutions. For example, if an activity involves 10 steps and three steps incur an identified waste that can be eliminated, the activity has been reduced to seven steps. Thus, when one considers each activity in multiple processes and eliminates all the waste as specified in Tables 5.10 – 5.17, one achieves the fluency, responsiveness, and agility that academic libraries should strive for. Implementing lean principles into daily operational activities must be seen as an operational methodology and not a software or plug-in solution and therefore requires dedicated staff and resources for the process to be successful, effective and efficient.

The present study followed an exploratory qualitative research approach, underpinned by a conceptual framework based on three concepts, namely: processes and workflows, staff and resources, and lean principles. The aim of this literature review was to establish and seek a deeper understanding of the innate knowledge, experiences and skills required, based on prior research derived from other libraries and the librarians responsible for creating and managing access to e-resources. The review not only enriched the present research study but, by implication, would also contribute towards best practices in managing e-resources at NMULIS.

### **3.1.1 Purpose of the literature review**

Machi and McEvoy (2016:5) define a literature review as a “written document that presents a logically argued case founded on a comprehensive understanding of the current state of knowledge about a topic of study.” Ridley (2012) describes a literature review as that part of a thesis or dissertation in which there is extensive reference to prior studies related to the current research. Essentially a study of secondary data relevant to the current study, the review connects with what other researchers have written on the topic under study and establishes one’s position amongst the extant literature (Ridley 2012).

Furthermore, a literature review provides a background, serves as a motivation for the objectives that guide the research study, as well as critically interprets, evaluates, reorganises and synthesises the work of other researchers (Booth, Papaioannou & Sutton 2012). Machi and McEvoy (2016) opine that the purpose of the literature review depends on the nature of the inquiry. The authors further explain this statement by means of the following example. If the inquiry is to argue a position about the current state of knowledge on a topic, a simple literature review is required. However, if the inquiry is to solve a research problem, a more complex literature review should be effected (Machi & McEvoy 2016).

According to Arshed and Dansen (2015), the purpose of a literature review is to establish what is known about a subject area and, by association, what is not yet known – allowing the researcher to explore and understand extant literature and to establish gaps in the body of knowledge by appraising, encapsulating, comparing, contrasting and correlating scholarly books, research articles, reports and various

other sources of information. The researcher is then able to align the extant body of knowledge with the current research.

As stated in the introduction of this chapter, the literature review for the current study includes extant literature on the three concepts related to the conceptual model (see Figure 3.1). A sound literature review establishes a direct link between the components of a theory and what is included in the literature review. The purpose of this literature review extends beyond what other researchers have published; it includes an analysis to formulate and contextualise the rationale for and justification of the present research.

There are various types of literature reviews. Masuku (2019) advises researchers to select the type of literature review that would best advance the research study. For the purposes of the present research study, a thematic literature review was implemented.

### **3.1.2 Types of literature review**

Onwuegbuzie and Frels (2016) mention that there are two branches of traditional literature reviews, namely: narrative reviews and systematic reviews (see Table 3.1). Each of these two main branch types of review in turn has four major (sub)types of review. For example, the major types of narrative review are historical review, theoretical review, methodological review and general review. The four major types of a systematic review are meta-analysis review, meta-summary review, meta-synthesis review and rapid review (Onwuegbuzie & Frels 2016). Ferrari (2015) differentiates between narrative reviews and systematic reviews according to their main features, uses/applications and limitations, as shown in Table 3.1, as follows:

**Table 3.1: Comparison between narrative and systematic review**

Description	Narrative review	Systematic review
Main Features	<ul style="list-style-type: none"> <li>• Describe and appraise published articles but the methods used to select the articles may not be described.</li> </ul>	<ul style="list-style-type: none"> <li>• The query is well-defined.</li> <li>• Clearly defined criteria for the selection of articles from the literature.</li> <li>• Explicit methods of extraction and synthesis of the data.</li> <li>• Comprehensive research to find all the relevant studies.</li> <li>• Application of standards for the critical appraisal of the studies' quality.</li> </ul>
Uses/applications	<ul style="list-style-type: none"> <li>• General debates, appraisal of previous studies and current lack of knowledge. Rationales for future research.</li> <li>• Speculate on new types of interventions available.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify, assess and synthesise the literature gathered in response to a specific query.</li> <li>• Collect what is known about the topic and identify the basis of that knowledge.</li> <li>• Comprehensive report with explicit processes so that rationale, assumptions and methods are open to examination by external organisations.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>• The assumptions and planning are not often known.</li> <li>• Selection and evaluation biases are not known.</li> <li>• Not reproducible.</li> </ul>	<ul style="list-style-type: none"> <li>• The scope is limited by the defined query, search terms and selection criteria.</li> <li>• Usually, the reader needs to reformulate the alternative questions that have not been answered by the main query.</li> </ul>

### **3.1.3 Types of narrative review**

#### **3.1.3.1 Theoretical review**

The purpose of a theoretical review is to examine the body of knowledge regarding an issue, concept, theory, or phenomenon. The theoretical literature review facilitates establishing extant theories, the relationships between them, to what degree the existing theories have been investigated and where any knowledge gap occurs. Often this form is used to establish a lack of appropriate theories or reveal that current theories are inadequate for explaining new or emerging research problems. The unit of analysis can focus on a theoretical concept or an entire theory or framework (University of Alabama Library 2019).



### **3.1.3.2 Thematic review**

Thematic reviews focus on divergent schools of thought, from different perspectives or views, in a critical survey and assessment of the existing literature on a particular topic. With their focus on diverse schools of thought, thematic reviews group the literature into differing views, perspectives, or themes. For example, in researching the effects of smoking on the risk of developing cancer, a thematic review would include a variety of sources which present opposing views on the issue.

A thematic review approach entails categorising the literature by a theme or category of the research under study. According to the Cambridge Advanced Learner's Dictionary (2013:1506), a theme is "the main subject of a talk", hence the adjective "thematic" is described as meaning "relating to or based in subjects." Thus, thematic reviews describe particular areas of literature, particular approaches, or learning models on a specific topic. The literature gathered is organised according to themes or categories with a similar focus – for example, the factors that have an impact on a specific outcome.

Additionally, as the researcher collates and synthesises the literature accumulated, themes and patterns emerge. These emergent themes and patterns are then structured in the body of the discussion. By structuring the review of literature thematically, the literature review addresses each of the themes individually.

### **3.1.3.3 Historical review**

Historical reviews focus on examining research throughout a period of time, often starting with the first time an issue, concept, theory, or phenomenon emerged in the literature and then tracing its evolution within the scholarship of a particular discipline. The purpose is to place research in a historical context to show familiarity with state-of-the-art developments and to identify the likely directions for future research (University of Alabama Library 2019).

If the review follows the chronological method, the researcher would start to review the body of knowledge with what was published first, working through the literature until the current publications on a specific topic and/or in a particular field.

#### **3.1.3.4 Empirical review**

Empirical review, also referred to as methodological review, is a means of structuring the review of literature by exploring the research methodologies of prior studies. For example, organising the literature review based on the angle of the approach, such as qualitative, quantitative, or mixed-method methodologies of the research study. Simply put, this form of research focuses on the methodologies adopted and consequent findings.

#### **3.1.4 Justification for a thematic literature review**

As stated, in performing a thematic literature review, the researcher organises and discusses existing literature based on themes or theoretical concepts the researcher deems important to understanding a topic (Editage Insights 2017). To achieve the objective of the research study on how lean principles could enhance access to e-resources at NMULIS, the researcher devised a conceptual model, consisting of three concepts, namely: processes and workflows, staff and resources, and lean principles (see Figure 3.1). It is the opinion of the researcher that these three concepts are the key elements to be considered and on which the themes of this study were built.

Choosing the thematic review afforded the researcher the opportunity to gather and source literature directly related to the present research study. The review of the literature was organised according to the themes of processes and workflows, staff and resources, and lean principles, as depicted in the conceptual model (see Figure 3.1). By identifying the themes, the researcher was able to demonstrate the various discussions in the literature on the topic of each concept. This was crucial because, although there was an overarching theme, each source approach differed or was slightly different, valuing certain aspects or methods more than others, concentrating on a particular area of the theme and highlighting areas for further research and into what is not yet known. The researcher structured the literature review in a manner which revealed the overlaps and complements, as well as the extant gaps, in the literature – not only on the topic but also in terms of each concept.

These various bodies of knowledge concerning each concept assisted the researcher in developing the research questions for the present study. As stated in the research problem (see Section 1.2), the lack of documented processes and workflows, the

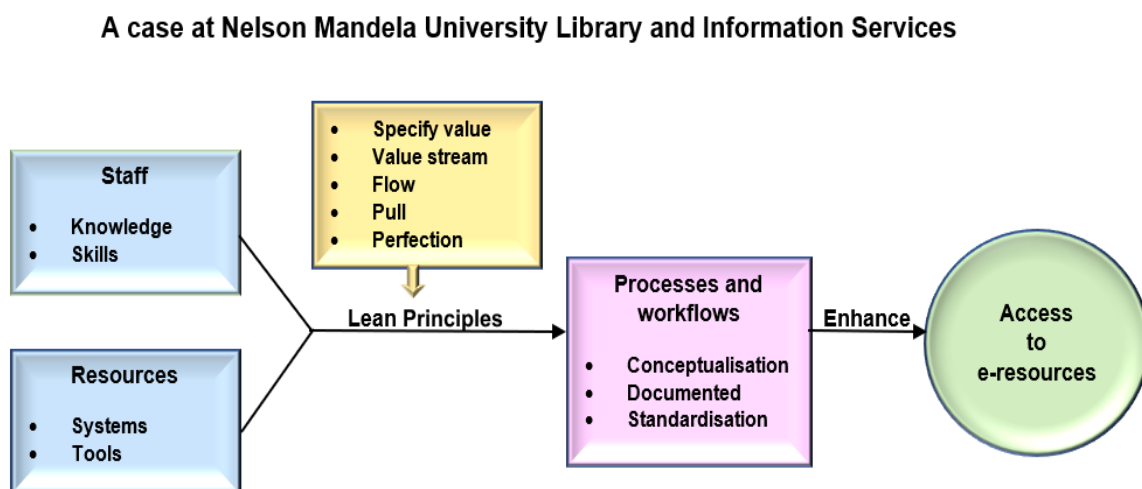
required skills and resources, and the dearth of literature on lean principles in a South African context, meant that each concept was dealt with in its own entirety. In each instance, the researcher included a background description and theoretical, conceptual and contextual framework. Therefore, the research questions were crafted to ensure that each concept was addressed and that the empirical primary data gathered could be categorised according to the themes assigned.

### **3.2 DEFINITION OF CONCEPTUAL FRAMEWORK**

A conceptual framework can be defined as a structure, which is best explained as the natural progression of the phenomenon being studied (Camp 2001). Furthermore, a conceptual framework is a construct derived from concepts, empirical research and theories used in supporting and systemising the knowledge advocated by the researcher (Peshkin 1993). Ngulube (2020a:29) affirms that a conceptual framework links concepts from several theories and contexts and suggests five ways in which a conceptual framework could be formulated, namely: “(i) putting together concepts from various theories, (ii) aspects of theories, (iii) incorporating aspects of a theory or theories, concepts from the literature, personal experiences, knowledge of the context and models, (iv) integrating all the concepts from more than one theory, and (v) combining concepts from the extant literature.”

Furthermore, Svinicki (2010) asserts that every person can conceptualise reality in terms of how he or she perceives or experiences things. Thus, the researcher conceptualises the issue(s) under study, based on his or her knowledge and experience, and in this way can construct their own understanding and relationship of the concepts involved – thus approaching the research from a specific angle or perspective. Ngulube (2018) explains that conceptual frameworks are not existing frameworks - they are built by the researcher’s thought processes, assisted by literature, and the researcher’s understanding of how best to present the concepts so that they could be understood. It should be noted that these concepts are not exhaustive. Masuku (2019) states that the flexibility of constructs makes provision for modification, with an emphasis on understanding rather than prediction.

Ivey (2015) affirms that models are used to test or represent a theory. However, they should not be considered theories; rather they form intermediaries between ideas and realities. Models illustrate relationships and the direction of the relationships between variables or concepts and they facilitate understanding a process or how the process works (Ivey 2015). For the purposes of the current research, the researcher has compiled concepts in a linear conceptual model (Figure 3.1) depicting the scope and structure of this study.



Source: Author's own compilation

**Figure 3.1: Conceptual model for NMULIS case study**

Extant literature, models and concepts employed in this study are the ideas and works of other researchers in support of the present research. Thus, the conceptual framework was meant to demonstrate how the concepts of staff and resources, processes and workflows, and lean principles, formed the core components in the creation and management of access to e-resources at NMULIS.

### **3.2.1 Justification of a conceptual framework for NMULIS study**

Ngulube (2018) cautions researchers to use conceptual and theoretical frameworks for their research studies because they hold the components of social research together. Furthermore, the concepts and theories are the tools that provide direction and meaning, and the collected data and interpretations depend on the researcher's conceptual and theoretical perspective (Ngulube 2018). The present study was qualitative and, according to (Creswell 2014), in qualitative research, when exploring areas which are understudied or searching for emergent theory, a conceptual

framework is essential to situating the study. The objective of the present research is to explore how lean principles could enhance access to e-resources at NMULIS. The existing literature is silent on lean principles in an academic library in a South African context – making a conceptual framework all the more relevant for emergent theory.

The present research study is underpinned by a conceptual model (Figure 3.1) consisting of three concepts, namely: processes and workflows, staff and resources, and lean principles, illustrating their relationships in a simplified form. According to Jabareen (2009), a conceptual framework is not only a collection of concepts but rather a construct in which each concept plays an integral role. The researcher linked the concepts in the conceptual framework together to provide a comprehensive understanding of what data are needed in realising the objective of the present study.

Social sciences literature is indicative of concepts which are often operationalised before they are theorised, especially in terms of complex concepts (Bazeley 2013). The application of a conceptual framework for the current study was therefore intended to project logically how the research was to be undertaken, aiming at encouraging the development of a theory that would make a valuable contribution to the field of library science in the immensely challenging contemporary academic environment.

### **3.3 SKILLS AND RESOURCES REQUIREMENTS IN TECHNICAL AND SYSTEMS DEPARTMENTS**

Contemporary academic libraries are split into two definitive divisions: client services and technical services. Client services support academic libraries towards achieving customer-centric service provision, while the technical and systems departments provide information resources through procurement, providing access and maintenance. Some skills and resources might overlap in certain areas, while some skills and resources are only required in specific departments. This section of the research study provides an in-depth discussion regarding the skills and resources needed for an effective and efficient technical and systems department.

### **3.3.1 The concept of staff**

The term “staff” (also known as employees) refers to the people who work for an organisation or business or anyone who is remunerated for services. The South African Labour Relations Act (LRA) 66 of 1995 defines an employee as:

- any person, excluding an independent contractor, who works for another person or the state and who receives, or is entitled to receive, any remuneration, and
- any other person who “in any manner assists in carrying on or conducting the business of an employer” (South African Labour Relations 2022).

One of the key components in the success of an organisation is the ability to use its employees effectively and efficiently (Coetzee 2005). Businesses and organisations globally consider their employees core in achieving their goals and objectives (Nguyen 2017). Some organisations define their employees as assets because they are the reason why some businesses overcome their difficulties or exceed the organisational goals. Therefore, such organisations ensure that their relationships remain positive and strong, often resulting in higher effectiveness and productivity (Nguyen 2017).

Sharp and McDermott (2008) cite as an example the demise of craftworkers when work became increasingly complex and eventually divided amongst teams of workers – with each one performing a specific or specialised task. Similarly, the traditional librarianship profession has changed. Arumuru (2020) explains that the avalanche of information in circulation and the corresponding emerging evolution of ICTs brought about the application of various automation software and tools to carry out routine library activities.

### **3.3.2 Human capital management**

Wright and McMahan (2011) posit that the concept of human capital originates from economic literature, where “capital” is seen as an asset which yields income over time. Human capital, as an intangible resource, is defined as skills, knowledge, ideas and information acquired by staff from investing in on-the-job training, formal education and other practical exposure (Becker 2002; Salim 2018; Wright & McMahan 2011) and is considered one of the most valuable resources in organisations (Elsharnouby &

Elbanna 2021). However, organisations do not own human capital. Human capital involves the innate abilities, behaviours, skills, knowledge and experience of individuals. Therefore, organisations and institutions need to recognise human capital, because not all labour is equal and people come from diverse backgrounds, with different levels of skills and knowledge. Albeit the level of human capital does not solely rest on the shoulders of the employer, through formal studies employees can also create further opportunities for themselves.

Ehsani, Shojaei, Samiei and Zargar (2021) support the preceding statement; however, the authors assert that the biggest challenge businesses and organisations currently face is retaining talented staff. Wright and McMahan (2011) contend that human capital, as an asset, also “depreciates”, as with any other asset except for land, when underperforming. Reasons, why employees underperform, include the lack of skills, knowledge, or resources necessary to perform their work effectively (Karim, Choudhury & Bin Latif 2019). There are various ways organisations can assist in capacitating their employees. Capacity-building encompasses training and development, reskilling and upskilling – making it possible for organisations to use their existing staff to meet the organisation's goals and objectives. Karim, Choudhury and Bin Latif (2019) recommend that organisations capacitate their employees with development in career-minding skills because it facilitates employee motivation and retention. Obisi (2011) asserts that the difference between training employees and developing employees is that training enhances the skills of a particular work function, while the scope of development stretches across growth and personal development.

The elimination of manual work has always been a by-product of technological advancements. According to an article in Innovation NewsNetwork (2021), the author claims that digital technology embedded in workplaces unsettles workers because, so far in every industrial revolution, the jobs that were made redundant were those that were low-skilled and easily replicated by automation (The true impact of digital technology on the workplace, 2021).

### **3.3.3 The impact of technology on employment**

The ever-evolving changes flowing from technological developments are broad-based in their scope and affect the capacity to change organisational activities and labour demands – thus having a direct impact on employment patterns (Wisskirchen, Thibault, Bormann, Muntz, Niehaus, Soler & von Brauchitsch 2017).

Dukashe (2021) argues that technology brings about a positive impact on increasing productivity, economic growth and creating new employment opportunities (Dukashe 2021). Kim (2019) contends, however, that technology bears a negative impact in the form of labour redundancy or displacement of employees as organisations opt for cheaper and more efficient technological equivalents. Manyika (2017) reports that a study conducted in 2011 by global company McKinsey & Company concluded that when the bulk of its business operations was moved onto the Internet, over 500 000 job losses resulted globally over a period of 15 years. However, it was later discovered that during the same period, 1.2 million other jobs with Internet capabilities were created. Assuredly, technology facilitates job creation. Autor (2015) asserts that although technology can eliminate jobs, it does not eliminate the work – rather, it automates specific tasks than whole occupations.

Automated processes have become very popular in the healthcare sector. West (2015) reports that through technology many patients' lives are saved – especially in terms of patients from rural areas. Machine-to-machine communications and remote monitoring sensors to record patients' vital signs, blood pressure, blood oxygen levels and heart rates are reported electronically to medical doctors, which in return assists doctors to adjust medications speedily. As a result, a significant decline in hospital admissions has been observed (West 2015).

As technology becomes increasingly sophisticated, it has a significant impact on the workforce, especially on middle-level positions and income (West 2015). The author alludes that the US Bureau of Labour Statistics future employment projection report for the period 2012–2022 confirmed that the healthcare and social assistance sectors were expected to grow by an annual rate of 2.6%. Comparatively, and considering technological advances, many businesses could potentially revolutionise their



operations and secure employment. However, the same could not be said for information sectors with regard to job retainment (West 2015).

South Africa reported GDP growth for the period 2006 to 2018 of an average of 2% per annum, down from 3.4% the previous decade, which resulted in high unemployment and depressed wage growth (Magwentshu, Rajagopaul, Chui & Singh 2019). The authors suggest that the country needs to reignite growth through technological advancements – and although the impact would be disruptive, digital technologies represent immense opportunities for productivity, income and economic growth for South Africa. In addition, these technologies have the potential to create millions of high-quality jobs, improve operational efficiency in both business and government and contribute towards delivering better outcomes for customers and the citizens of the country (Magwentshu *et al.* 2019).

Ayentimi and Burgess (2019) indicate that scholarly literature on the impact of technological advancements largely concerns developed countries, with limited reviews relating to developing countries like South Africa that struggle to solve the existing unemployment challenges and technological displacement of staff (Maloka 2020). Thereby, Sithole and Buchana (2020) argue that employment growth in developing countries has been negatively impacted by process innovations in both the manufacturing and services sectors. Magwentshu *et al.* (2019) dispute this statement, arguing that the advancement of technology could bring about far-reaching change in South Africa if the public, private and education sectors work together by harnessing digitisation to catalyse a skills revolution in creating high-level quality jobs, unlocking new opportunities to build meaningful and rewarding careers.

Klain-Gabbay and Shoham (2017) cite Israel as an example. The authors attest that in Israel, technology is extensive and well-developed across all areas of life. Its academic librarians must therefore stay abreast and current on all technological changes and developments in library resources and scholarly communication to serve their users (Klain-Gabbay & Shoham 2017). These findings are corroborated by subsequent research by Arumuru (2020); Ashiq, Ur Rehman and Mujtaba (2021); Hamad, Al-Fadel and Fakhouri (2021); Hossain and Sormunen (2019) and Sawant

and Yadav (2020) regarding the transformation in the roles of academic librarians, the need for the change and the expectations of today's library users.

### **3.3.4 21<sup>st</sup>-century ICT skills for librarians**

Technology is considered one of the key drivers of quality and efficiency in library operations (Hamad, Al-Fadel & Fakhouri 2021). Dukashe (2021) cautions about the effect technologies have on employment and that management needs to take cognisance of the implications thereof. It is therefore essential for management to review education and training needs to better understand future employment possibilities and avoid situations in which staff train or are trained for occupations that will cease to exist in the future (Dukashe 2021).

Library and information service (LIS) is one of the most challenging professions in the contemporary phenomenon referred to as the "knowledge society" (Obegi & Nyamboga 2011). The adoption of information and communication technology (ICT) in the advancement of LIS is immeasurable. Academic libraries compete with the likes of Google, Google Scholar and Open Science, amongst a plethora of search engines. Mafungwa (2017) iterates that academic libraries must keep up with new trends and technological developments to serve users' information needs.

For academic librarians to be relevant, digital skills are required (Davis 2015; Hamad, Al-Fadel & Fakhouri 2021; Moonasar & Underwood 2018; Patil 2018). Technological advances in academic libraries result in new emerging roles for librarians which require practical and technical skills, digital competencies, the ability to perform and constant staying abreast of any technological changes that might impact the accessibility of e-resources. In the contemporary library information landscape, technology has become mission-critical for libraries to manage complex collections of print, digital and electronic materials. Chiware (2007) notes that some African libraries experience challenges in terms of skills and knowledge to implement digital and electronic services. The author observes that some institutions have dedicated information technology (IT) units or appoints IT technicians as part of their staff complement to assist librarians with IT challenges.

Raju (2014) agrees that digital skills are important but concluded, however, that LIS professionals in South Africa should add personal competencies, a blend of discipline-specific knowledge and generic skills to their list of requirements. Chiware (2007) advises that a needs assessment of the training requirements must first be performed and should cover all aspects of the skills and techniques needed for implementing and managing digital collections, processes of collection development and making digital collections accessible to the academic and research communities. In contrast, Raju (2014) asserts that globally librarians are challenged with acquiring new and emerging skills – applying traditional LIS skills and reconceptualising them with the new technologies to deliver an online service.

What is evident from the literature is that evolving technological advances imply a perpetual effect on employment. In 2009, the American Library Association (ALA) Council identified “technological knowledge and skills” as one of the core competencies of librarianship. A number of major issues therefore remain. Will employees affected by these changes be able to transition to new opportunities? Additionally, is it more cost-effective and sustainable to capacitate existing librarians with ICT skills or to employ staff with ICT skills and capacitate them with library and information knowledge?

#### **3.3.4.1 ICT skills for technical and systems librarians**

A variety of skills and competencies are imperative for 21<sup>st</sup>-century librarians (Raju 2014) and the more the networked society develops, the more librarians need to continue upskilling themselves to meet the needs of their users (Osuigwe 2020). Moreover, the increasing movements of staff, recruiting of new employees and the evolving changes in systems and tools have necessitated assessing whether technical and systems librarians have the necessary skills and resources to fulfil the core function of accessibility of e-resources to users. Yet the implementation of ICT in academic libraries has undoubtedly brought about opportunities to capacitate and develop technological skills among staff to deliver a more effective and efficient service.

The ICT skills and knowledge required by the technical and library systems staff are very different from that of client services or any other member of staff in the library. Managing electronic resources consist of complex processes, moving from one workflow to the next, in an ever-evolving networked landscape (Verminski & Blanchat 2017). The evolution of the Internet, coupled with the introduction of ILS, and recently LPS, has profoundly changed and expanded the knowledge, skills and abilities of technical and systems librarians (Majumdar & Singh 2004; Obuh 2019; Rhyno 2013).

The core function of technical and systems librarians in academic libraries is to ensure that all information resources are discoverable and accessible. The roles and responsibilities of technical and systems librarians differ from institution to institution. This is dependent on whether a particular library has its own dedicated ICT or IT unit (Chiwere 2007) or whether the library is aligned to the institution's ICT department – and therefore reliant on the institutional ICT department to assume part of the responsibilities of technological support for the library; hence, each systems librarian would encounter a unique blend of responsibilities (Engard & Singer Gordon 2012).

The working relations, processes and workflows between the technical and systems librarians are highly intertwined, yet very different. Technical librarians have the responsibility of setting up access points, providing cataloguing and metadata services, troubleshooting e-resource problems, managing platform changes and migration, overseeing e-resources acquisition and vendor communications (Brisbin, Storova & Enoch 2020) when managing e-resources. Although some of the operations are similar to those of the print processes, there should be a mind shift or a change in thought when it comes to managing e-resources. According to Raju (2014), digital literacy plays a very profound role in the online library environment.

In her doctoral research study, Sutton (2011) concludes that the skills required by ERM librarians include knowledge of ILS and electronic resource management systems, technology and systems in general, reporting software (Excel, access, SQL), interpersonal communication, working independently, verbal communication, written communication, flexibility (especially in change), customer service orientation, organisational skills, analytical thinking, problem-solving and working collaboratively. Six years later, Sutton and Collinge (2018) conducted a comparative study to

investigate whether the skills requirements of e-resource librarians have changed. The authors concluded that leadership and management, technology and applications, library services platforms and communication as a personal skill should supplement the findings of Sutton's doctoral study of 2011.

Systems librarians require specific skills and have the responsibility of managing the information library systems, technologies and digital knowledge base (Obuh 2019; Yusuf 2014). However, irrespective of the responsibility, systems librarians also require high-level advanced skills in library and information technology (Obuh 2019). Yusuf (2014:8-12) believes systems librarians' skills must include "the ability to use data structures related to library materials, classification of knowledge, information storage and retrieval systems, desktop and network operating systems, programming, database design and maintenance, systems troubleshooting, information standards and protocols" to be considered fully efficient. Adebisi (2016) concurs but adds that systems librarians should also take responsibility for the ILS, as well as any system projects their library might consider or investigate the system capabilities. Moreover, systems librarians must be knowledgeable of library procedures and possess training skills to train module-specific staff.

At NMULIS, the systems and technical departments are considered the backbone or engine room of the library. Not only do these departments oversee and manage the core function of accessibility to information resources, but they also facilitate and support the client services department in driving the e-strategy toward becoming a virtual, digital and multimedia library (Nelson Mandela University, LISDA 2019). Researchers Quadri and Garaba (2019) recommend librarians continue updating their ICT skills and encourage librarians to share ICT-related skills amongst themselves and that library management has technical staff in place to assist librarians in solving ICT issues that may hinder knowledge-sharing practices.

### **3.3.5 Resources required in facilitating access to e-resources**

Academic libraries are no longer considered custodians of information resources, but rather a gateway to the implementation of ICT technologies (Oyelude & Bamigbola 2012). Academic libraries, like many other institutions, have implemented information

systems (IS) to manage their library activities to meet their library users' information needs and offer their users more effective customer service.

One of the core components in the discoverability of and accessibility to e-resources is effective and efficient library systems and tools. In facilitating its access to e-resources, each library presents a unique set of expectations and requirements as it implements its ILS system. Through a careful selection process, libraries identify the system best suited to serve their information needs (Freeman 2009).

Academic libraries experience many challenges regarding sourcing effective and compatible systems and tools with their existing hardware and software to provide and maintain access and cost-effectiveness (Sejane 2017). Therefore, many academic libraries have transitioned from integrated library systems to library service platforms. According to Patra (2017), academic libraries implement Electronic Resource Management Systems or Software (ERMS) to manage their e-resources. The author describes the ERMS as a tool for managing e-resources at every level within the e-resources life-cycle – from evaluation, selection, acquisition and renewal/cancellation to licence agreement, usage statistics, access rights, single access point and administration (Patra 2017).

The author further cautions that for managing all the steps in the e-resources life-cycle, the ERMS tool should be interoperable with the library's existing ILS or LMS, as well as all other applications and tools being used in the library. For this to happen, libraries must consider the use of standards, in the case of ERMS. Martin (2008) supports this observation by pointing out that academic library systems are more complex to use than Web search engines, such as Google. Stephen (2017) highlights a number of the benefits of implementing an ERMS system: the effectiveness and efficiency of managing the e-resource workflow, keeping track of licence agreements, a one-stop solution to view all the information needed relating to a specific resource – thereby enhancing troubleshooting and allowing users to search multiple databases simultaneously, to name a few.

Currently, many ERMS systems which have been developed are available from companies, vendors and institutions. Marshall (2016) warns that many academic libraries are transitioning to LMS systems as opposed to ILS systems because the

LMS systems provide a comprehensive set of tools able to manage library information resources in multiple formats. In addition, the LMS system relies on web-based interfaces and uses multi-tenant infrastructure, which enables shared access to knowledge bases and bibliographic resources (Breeding 2016). The systems and tools employed by NMULIS are depicted in Table 2.5.

### **3.4 CONCEPTUALISATION OF PROCESSES AND WORKFLOWS**

The *Cambridge Advanced Learner's Dictionary* (2013:287) defines conceptualisation as “to form an idea or principle in your mind.” By conceptualising a concept, people can follow instructions or be specific in what they are talking about and grasp the idea in a transferable way to understand something in its entirety. Yee and Thompson-Schill (2017) posit that conceptual representations are inextricably linked to their context.

#### **3.4.1 The concept of processes**

In terms of the current research study, it is important to understand the principles of processes and workflows within an academic library, especially those tasks and activities relating to ensuring users access to e-resources. Von Scheel, von Rosing, Fonseca, Hove and Foldager (2015:1) define the term “process” from the Latin “*processus*” which translates as “performed action of something that is done and the way it is done.”

Von der Heyde and Breiter (2017:1) define the term as “a set of tasks or activities performed to achieve a given purpose or a specified result.” The terms process and work instruction (instruction manual) are sometimes used interchangeably; however, there is a clear distinction between the terms process and work instruction. ISO 9001:2015 defines the term process as what needs to be done and why, while a work instruction explains how the procedure must be carried out (South African Bureau of Standards 2015).

When taking the process to the workplace, the principle remains the same; however, it now becomes a business or operational process consisting of “business operations and actions consisting of employees, materials, machines, systems and methods, structured in such a way as to design, create and deliver a product and service to the

customer” (Von Scheel, von Rosing, Fonseca, Hove & Foldager 2015:1). One can therefore conclude that, fundamentally, processes create structural and systematic ways of working.

### **3.4.2 The concept of workflow**

Hess (2018:576) defines workflow as “a set of chronological, organised processes and tasks designed to efficiently meet a goal through interaction with people and resources.” Eby (2016) describes a workflow as a structured visual diagram that can either consist of basic sequential steps or a complex series of events with specified dependencies, rules and requirements.

The concept of workflows originated in the 18<sup>th</sup> century during industrial process development (Garber 2017). Sharp and McDermott (2008) explain that workflows can be traced back to the demise of the role of craftworkers, known as “highly skilled people” who were responsible for all the phases of a product until its completion. As the processes and products became more and more complex, tasks and processes were broken up and divided amongst teams of workers, resulting in people specialising in certain tasks or specialised task groups (Sharp & McDermott 2008). Similarly, this phenomenon is evident, especially in an evolving technological environment. Suleykin and Panfilov (2019) refer to workflow technology as complex processes which consist of elementary operations and dependencies between various stakeholders, automating various kinds of processes such as management and data flows.

Cardito (2016) points out that regardless of the industry or type of customer served, workflow and operations across diverse platforms and systems are universal. Workflows form part of an organisational knowledge base, specifying how activities are sequenced and who is responsible for carrying out which activity within an organisation (Correa da Silva, Venero, David, Saleem & Chung 2013). Thus, Eby (2016) articulates that workflows outline the start and endpoints of a predefined set of activities – also stipulating direction(s) of movement, decision points, potential substitute steps and the responsibility assigned to each step.

Compatible and appropriate workflows are crucial for optimisation and success. Eby (2016) and Hess (2018) advise organisations to invest in the time and expertise of staff because they create the capabilities for consistency and measurement of



outcomes. Haug (2015) affirms that employee inefficiency results from poor work quality instructions. Eby (2016) lists the benefits of introducing workflows in organisations to include: reduction of errors, effective organisational change, progressive workflows leading to process change, increased access to information, delineating of work responsibility to various individuals and departments, providing visibility and transparency, providing an audit trail and as a communication enabler. Furthermore, interconnecting the processes across systems and departments provide significant benefits, such as greater transparency, higher degrees of integration and facilitation of communication (Eby 2016).

### **3.4.3 The processes and workflows of e-resources**

Traditionally, information resources were in print only, with processes and workflows linear in nature, very simple and straightforward. This is contrary to e-resources, which defy the traditional linear path, moving through cyclical stages as intangible digital objects referred to as an electronic resource cycle (Verminski & Blanchat 2017). Hence, clear workflows are essential to tracking and managing ERM tasks and activities (Brisbin, Storova & Enoch 2020).

The importance of workflow documentation is well established in the literature (Anderson 2014; Emery & Stones 2013). Anderson (2014) describes in *Electronic Resource Management Systems: a workflow approach*, the changes from print to electronic format and how these changes impacted the workflows. Afifi (2010) affirms that the continual growth of e-resources and technological changes affecting the processes associated with managing e-resources are becoming more complex. Hence, Davis (2015) alludes that academic libraries need to meet these challenges by transforming and streamlining workflows through their strategic planning processes. The author further mentions that the e-resources workflow includes multiple iterative and repeated steps; analysing these workflows systematically allows problems to be identified that otherwise would have gone unnoticed (Davis 2015). Blake and Stalberg (2016) highlight the value of documenting e-resource workflows for management, staff, users and stakeholders.

At the Baruch College Library at the City University of New York, a research project was undertaken on documenting and analysing the library's electronic resource workflows to explore inefficiencies, gaps and overlaps because of the numerous departments involved at different stages of the e-resource life-cycle and evaluated the parameters of processes, staff and platforms (Hamlett 2016). The authors concluded that documenting workflows assisted the library with the administration of requests for proposals and that the diagramming and analysing of current workflows facilitated streamlined workflows and gave a better understanding of staff functions (Hamlett 2016).

The University of Michigan Library had to find a way to retain the institutional knowledge of their long-time staff members going on retirement. Barbrow and Hartline (2015) experimented with an integrating process mapping case study and found process mapping to be an excellent method to consider for the assessment of organisational activities. The authors concluded that process mapping is time- and resource-consuming but still considered an investment (Barbrow & Hartline 2015).

The process mapping exercise empowered the library staff by being involved in the identification and implementation of the improvement in routine work. They became so motivated that they requested more information about the process mapping software that created a map for the building of a key request process (Barbrow & Hartline 2015). Furthermore, these visual process mappings facilitate in the training of new library staff and are also useful for orientation, reference and interdepartmental communication (Barbrow & Hartline 2015). Additionally, process mapping by nature allows for easy interpretation, assists in the retention of critical and valuable institutional knowledge, produces a greater shared understanding of processes amongst staff and shareholders, empowers managers to make evidence-based decisions and highlights potential breakdowns and delays (Barbrow & Hartline 2015).

Mention was made in Chapter Two of the description of flowcharts by Yael and Yigu (2017) as a diagrammatic representation visually explaining all steps of a process. Also cited was the authors' assertion that people normally understand their own workflows but are oblivious to other staff's equally important workflows, especially if they work towards a common goal. Nelson (2016) posits that standardisation of workflows and processes in lean manufacturing is one way of addressing the

challenges of continually improving products and services and often involves finding commonalities among the employment when using various methods. Although there is a considerable corpus of literature on electronic resource management, the knowledge gap persists regarding processes and workflows in the creation and management of access to e-resources.

Consistency in operations has been identified as a necessity for all organisational growth and survival (Dilts & Sun 2021). Furthermore, document processing and workflows are cited as being vital for the survival and effectiveness of business operations and serve as a crucial reference guide for employees and managers (Dilts & Sun 2021; Laguna & Marklund 2013).

#### **3.4.4 The importance of documenting processes and workflows**

Process documentation is a method of capturing all the information necessary to execute a business process within the organisation (Dilts & Sun 2021). It is considered an internal continuous activity of documenting the process while it is occurring to ensure the delivery of desired outcomes (Dilts & Sun 2021). The term “process documentation” was developed in 1978 by the Philippines National Irrigation Agency at a social science project conference. Researchers across sectors and regions documented the processes implemented by farmers and passed the documentation on between them while updating the documentation as the processes unfolded (Dilts & Sun 2021).

Any process can be improved upon, whether it presents problems or not. According to Ungan (2006), the main reasons for using process documents for improvement purposes are to detect value-adding and non-value-adding activities and to simplify work processes. Problems such as overly-complicated processes, flawed outputs, unnecessary movements, unnecessary inspections, waiting, duplication of effort and unnecessary reports are easily identified when organisations make use of process documents in processes (Rohleder & Silver 1997). Additionally, Von der Heyde and Breiter (2017) concluded, based on their research findings, that documented processes added more value to the universities they serve and appeared to be more flexible despite all the service level agreement formalities involved in IT departments.

Barbrow and Hartline (2015) affirm that process mapping is ultimately a common business practice which facilitates communication, enables organisational analysis and assists with workflow improvements. Process mapping is depicted in visual form using flowchart shapes to identify the major steps and decisions in a routine workflow (Barbrow & Hartline 2015). Hence, it has the capabilities of tracking the flow of information, materials and documents involved in the process, clarifying the tasks, decisions and actions to be taken – and, more importantly, the process maps identify the stakeholder who needs to act at that point in the process.

Boyd, Pucciarelli and Webster (2012) observe that the International Data Corporation (ICD) reported that a high percentage of organisations' document processes across industries, geographies and company sizes were not functionally viable. Moreover, the inefficiencies and ineffectiveness were notable, which caused the incurred costs to be quite substantial. Subsequently, in his research project, Bailey (2016) concluded that when knowledge is documented, well-organised and done correctly, it enhances the efficiencies of troubleshooting processes.

Table 3.2 represents the disadvantages and advantages of process documentation – with the latter noticeably outweighing the former.

**Table 3.2: Advantages and disadvantages of process documentation**

Advantages	Disadvantages
Allows for continual and timely changes in processes to increase productivity.	Stakeholders behave differently when they know what they say is being included in process documentation.
Prevents procedures from going unused due to a lack of understanding.	The person recording a process may not fully understand it themselves.
Preserves knowledge even when those involved in the process leave the company.	Special interest groups can use process documentation to start trouble.
Helps determine whether processes are efficient or whether certain steps need to be eliminated / revised.	Process documentation can slow a project down.
Assists all members of an organisation in understanding processes and knowing who to contact with problems.	
Makes it easier to maintain standards and consistency.	
Serves as on-hand teaching tools for new employees.	
Offers context for individual projects.	
Encourages debate about current processes.	
Allows for outsourcing because knowledge can easily be transferred.	

Source: Dilts & Sun (2021)

### 3.4.5 Standardisation of process documentation

According to the South African Bureau of Standards (2021), a standard is a term used commonly to refer to a specification, code of practice or standard method. Furthermore, a specification may be a description of a product or commodity, or a description of the manner of manufacture, in which case the components, material or substance, characteristics and other relevant aspects are typically included. Standardisation facilitates processes and procedures, allowing people to perform their tasks and work instructions effectively and efficiently (Zelt, Recker, Schmiedel & vom Brocke, 2018). Moreover, standardisation is a common mechanism used to manage complexities in industries (Gepp, Steinmann, Vollmar & Voigt 2012).

Consistency in operations is important for organisations to grow and survive. Sometimes this is difficult to achieve because of human dynamics. Ungan (2006) explains that people can perform the same task in many different ways as this is dependent on the person's education, experience and skill level, which results in variations in process outputs. To mitigate these various outputs, organisations standardise their operational processes by documenting processes in their best form. Employees follow job instructions step-by-step to ensure that everyone follows the procedures correctly, effectively and as safely as possible. Organisations that experience high levels of evolution and transformation often need to increase the standardisation of their tools, supplies and procedures to improve the quality, safety and efficiency of complex work outputs (Berwick 1991; Smith 2009).

Wears (2015) notes that the benefits of standardisation contribute to effective and efficient communication, creating common ground amongst parties and promoting routinisation – which enables an organisation to exploit their accumulated knowledge, thus increasing process efficiency. Another benefit worth mentioning is that standardisation focuses on consistency, which is achieved by applying a clear set of guidelines, best practices and predictability (Manders 2020). For example, one would know exactly what to expect, what the results will be and how long the process will take, which in return also benefits the customer, because the products or services will meet a certain quality standard level.

In fact, by standardising documenting processes one can retain the organisational knowledge. This knowledge provides continuity when an employee resigns or retires. It also creates flexibility when someone takes leave or sick leave, as the documented standardised processes act as a blueprint guiding those who have to step in and take over from where the process was left off. Lastly, through standardisation, it is easier to spot bottlenecks or a source of waste and ensure that goods and services produced in a specific industry are consistent and equivalent to other comparable products and services in the same industry (Manders 2020).

### **3.5 UNDERSTANDING LEAN PRINCIPLES**

The lean principles are a product of the Toyota Production System (TPS) (Mund 2011). Known within the industry as lean manufacturing, lean principles originated in the manufacturing sector and aimed at optimising the production system and process by reducing waste and increasing customer value.

Pieterse, Lourens, Louw, Murray and Van der Merwe (2010) argue that the lean philosophy is a way of thinking and working which emphasises the removal of waste and is principally based on the TPS. Core to this philosophy is the principle that anything that does not add value to the final product or service for the end customer is wasteful and therefore should be a target for elimination. The lean philosophy could be applied to every sphere of human activity, however. To instil lean thinking in one's everyday activities, irrespective of work or home, would require adopting a culture change of applying lean principles in everything. Initially, such changes could be tiresome; however, as the new simple yet effective steps become a habit, everyday living becomes simpler, less demanding and more productive.

#### **3.5.1 A brief history of the TPS**

During the 1970s, Toyota management realised that the production of cheap and poor-quality products was the result of too many unnecessary workarounds in their services supply chain, too many delays, too many imbalances and too many obstacles. Employees and the management team were tasked with devising plans and solutions for transforming their manufacturing and business processes in producing low-cost but high-quality products (Huber 2011).

At the time, Eiji Toyoda, then-president of Toyota Motor Manufacturing, travelled extensively back and forth to the US, to acquaint himself with the new technologies and methods applied in the American automotive industries. In the 20<sup>th</sup> century, the automobile industry in Japan was as yet poorly developed, with relatively low levels of production, and faced immense challenges. Toyoda, together with his plant manager, Taiichi Ohno, set about improving Toyota's manufacturing strategies to meet the challenges – thereby establishing the Toyota Production System (TPS) (Mund 2011).

The origin of the lean manufacturing concept and the success of the TPS is documented in Womack, Jones and Roos (1990). The term “lean” was coined in 1988 by John Krafcik, who used the term in an article based on his Master’s thesis, *Triumph of the Lean Production System*, and was later popularised by Womack, Jones and Roos (1990).

Definitions of lean manufacturing are abundant in literature. Examples are: lean as an application of a new form of production management to construction (Howell 1999); lean as a process (Womack, Jones & Roos 1990); lean as a set of principles (Womack, Jones & Roos 1990); lean as a system operating on zero-inventory (Christopher 2000); lean as a philosophy (Holweg 2007; Jimmerson, Weber & Sobek 2005); lean as a set of tools and techniques (Bicheno & Holweg 2009); lean as a model (Alves, Dinis-Carvalho & Sousa 2012) and lean as a practical collection of theories, principles, axioms, techniques and ways of thinking (Mossman 2018).

### **3.6 THE FIVE LEAN PRINCIPLES**

The five principles of lean underpin the implementation of the tools and techniques of the TPS system developed by Ohno (Coetzer 2017). According to Nicholas (2011), lean principles are a set of beliefs and assumptions that can work in virtually any situation, involving actions that reduce waste and result in a simplification of whatever practices existed before.

Developed by Womack and Jones (1996), the five lean principles are: (1) specify value, (2) identify the value stream, (3) create flow, (4) pull, and (5) perfection. In due course these are closely considered individually. Hines, Found, Griffiths and Harrison (2011) identified a sixth principle, namely: involvement and empowerment of employees. The authors contend that the prerequisite for lean implementation to be successful is dedicated staff able and willing to contribute to the effectiveness of the organisation (Hines *et al.* 2011).

Although lean practice originated in manufacturing, its core beliefs are found across various kinds of enterprises and are applied in diverse ways (Coetzee, Jonker, Van der Merwe & Van Dyk 2019; Jedynek 2015). Moreover, Gaza (2011) stresses that lean principles need to be implemented on every level within the organisation and require



a complete transformation of the current business system. Scholarly works are saturated with the significant role lean principles play in driving efficiency across organisations – in addition, also impacting increasing customer satisfaction, reducing costs, reducing lead time and enhancing sustainability (Hanken 2011; Novak & Zwiercan 2015; Pillai, Pundir & Ganapathy 2014; Thomas 2015; Van der Merwe 2011).

### **3.6.1 Lean principles in the manufacturing sectors**

According to Drew, McCallum and Roggenhofer (2004), lean implementation is a journey – there is no correct, prescriptive way of going about it. Emiliani (2004) informs us that the fundamental reason for implementing lean practices is to ultimately benefit the customer. Frequently, and mistakenly so, the lean application is seen merely as a business improvement tool; however, abundant literature regards lean application as a management strategy or a strategic vision of what organisations aim to achieve, driven from the top down, and thus requires a strong line management leadership that is committed to change (Henderson & Larco 1999; Hines, Found, Griffiths & Harrison 2008; Nelson-Peterson & Leppa 2007). According to Yukl (2013), the concepts of management and leadership are often used interchangeably and at times overlap; however, being a manager does not automatically mean that one is a leader and, according to Nienaber (2010), unlike management, leadership is not governed by boundaries.

Increasing global competition is forcing organisations to find more efficient and flexible means for managing challenges and meeting ever-increasing customer expectations and requirements (Yadav, Nepal, Rahaman & Lal 2017). Powell, Alfnes, Strandhagen and Dreyer (2013) observe that lean implementation and enterprise resource planning systems are often quoted as being the two most important strategies for achieving competitive advantage in today's global manufacturing environments. Regardless of the popularity of lean, Jadhav, Mantha and Rane (2014) argue that although lean is regarded as the most powerful quality improvement tool, practically two-thirds of the implementations fail – and less than one-fifth of those implemented show sustained results.

Argyris and Schön (1974) state that the strategy one applies in practice determines the way one thinks. The ultimate goal of lean implementation is the long-term benefits for all parties involved. The term “lean thinking” was coined by Womack, Jones & Roos (1990) as a way of thinking when solving problems. Orelia (2020) argues that problems are not solved by adding resources – instead one eliminates problems so that one needs fewer resources and then uses the excess resources to improve customer services. For this to happen, new behaviours and a new way of thinking should be adopted. Hence, lean thinking aims to create a lean culture, which sustains growth by aligning customer satisfaction with employee satisfaction through innovative services and products (Aziz 2012).

These results can be achieved if every employee identifies lean waste in the form of time, motion or effort in their own job spaces – thereby effecting better collaborations as a team to improve processes by eliminating these instances of waste. Lean thinking promotes a different, innovative mindset, whereby employees are encouraged and motivated to search for problems, think and solve them (Orelia 2020). In return, through these mechanisms, every employee’s confidence, competence and ability to work with others are developed. According to Orelia (2020), this kind of shift in mindset is the foundation of change – it ensures continuous improvement while being respectful of employees.

### **3.6.2 Lean principles in service organisations**

Although it is evident that lean manufacturing originated in the manufacturing sectors, with high success rates (Valamede & Akkari 2020; Vignesh, Suresh & Aramvalathan 2016), profuse strides have been made in the services arena (Alabi 2016; Kamble, Gunasekaran & Dhoni 2020; Smith, Paton & MacBryde 2018). Some professionals, however, are unconvinced and contend that the methodologies used to streamline manufacturing processes cannot simply be replicated within other industries (Elias 2016). Bortolotti and Romano (2012) highlight the fact that processes in the services sector are fundamentally different from those of manufacturing processes. Liker and Morgan (2006) concur, explaining that applying lean principles to service industries is not straightforward, because the work is less repetitive and predictable and not as tangible as in manufacturing environments.

Four factors differentiate services from manufacturing, namely: the intangibility of services, heterogeneity of services, the inseparability of service delivery and consumption, and the impossibility of storing service (Bortolotti & Romano 2012). Lovelock and Gummesson (2004) refute these factors, asserting that services are not generic and differ among themselves. Hence, Zeithaml, Berry and Parasuraman (1988) posit that intangibility is the most cited characteristic pertaining to services and, depending on the level of intangibility, services should be viewed from a performance perspective rather than the view of an object for their customers.

Businesses and organisations in the service sectors are constantly under pressure to deliver excellent customer service with faster response times and valuable support. In service organisations, customers play a much more active role than in manufacturing sectors. Simultaneously a highly diverse customer environment makes the application of lean principles increasingly challenging. It is important to understand that lean implementation is a journey, not a destination. Hence Martensson (2017:8) points out that, depending on the scope and service sector, “full implementation can be reached in five to 10 years and the application of lean never ends.”

Numerous successes have been achieved in the implementation of lean in-service delivery organisations. Healthcare services are fast gaining popularity in hospitals and medical companies around the world (Malange 2013). This trend is driven by increased competitiveness to improve operational efficiencies to stay ahead in business (Akmal, Foote, Podgorodnichenko, Greatbanks & Gauld 2022; Ebrahimi & Sadeghi 2013; Govender & Jasson 2018; Parkhi 2019; Hicks, McGovern, Prior & Smith 2015; Leite, Bateman & Radnor 2020; Naidoo 2021; Regis, Santos & Gohr 2019).

Contrary to the widely-supported belief in the value of lean principles, many organisations fail to implement them. According to their research findings, Govender and Jasson (2018) mention the challenges which hospitality service sectors experience in implementing lean principles. These factors include: management resistance to change; organisations not including lean as a business or change strategy; increased workload with cost-cutting; inability to identify waste; employee downtime and emerging economies, besides a lack of empirical studies on the application of lean in the hospitality and services industries.

In 2014, the MEC for Health in Gauteng, Qedani Mahlangu, instituted the Lean Institute Africa to assist Chris Hani Baragwanath, Leratong, Sebokeng and Kopanong hospitals in South Africa with patient complaints, such as long waiting periods for medical files, medical attention and receiving their medication (Faull 2015). The pioneering aforementioned South African business academic, Prof Norman Faull, concluded that the exercise resulted in a 56% reduction in the amount of time to retrieve patient medical files, a 45% reduction in medical waiting time and that approximately 50% faster service delivery was achieved in patients receiving their medication (Faull 2015).

### **3.6.3 Lean principles in higher education institutions**

The online and digital environment necessitates new approaches to best business practices and, as such, initiate new ways of thinking, applying different skills sets and services, often supplanting the traditional way of working (Mackenzie, Martin, Howard, Fitzgibbons & Inskip 2016). Higher education institutions are making use of these opportunities – as numerous research studies demonstrate (Cudney 2018; Gento, Pimental & Pascual 2019; Klein, Tonetto, Avila & Moreira 2020; Petrusch, Vaccaro & Luchese 2019). Yet Klein *et al.* (2020) mention that several higher education institutions have yet to explore lean principles as a business improvement initiative. Admittedly, Pucciarelli and Kaplan (2016) opine that higher education is not oblivious to the changes affecting 21<sup>st</sup>-century societies and is aware that the future of academia will always be complicated, challenging and uncertain.

According to a literature review by Balzer, Brodke and Kizhakethalackal (2015), the first six academic institutions to apply lean principles and practices to improve their services and operations were the University of Central Oklahoma, Miami University, Michigan Technology University, Oakland University (USA), University of St Andrews (Scotland) and Cardiff University (Wales). Balzer (2020) confirms that implementing lean as a problem-solving framework and management system to increase the value and performance of university processes can dramatically improve the effectiveness of their institutions.

Contrarily, Antony, Krishan, Cullen and Kumar (2012) point out several limitations that influence the application of lean at academic institutions. These were factors such as: identifying improvement processes with tunnel vision rather than from a holistic system perspective: lack of support from higher authorities; viewing lean as a quick fix; lack of process thinking and process ownership: lack of visionary leadership; lack of a culture of openness; lack of understanding the voice of the customer; lack of communication; prevalent functional silos; lack of resources, and weak connections between projects and the academic institution's objectives. Nevertheless, it is recognised that lean, when implemented, improves the processes within academic and administrative spheres and contributes significant value to higher education institutions (Balzer 2020).

Most higher education institutions are committed to improvement, whether small or phased-in changes, in response to current or imminent crises (Balzer 2010). Lean implementation has been assisting universities to reduce and eliminate non-added value waste in their services and operations (Zighan & El-Qasem 2020). Apart from the normal academic activities, studies document the successful implementation of lean principles in higher education, covering activities such as capital and building improvement (Bade & Haas 2015), university dining services (Betzinger & Wood 2013), reducing lean waste in student recruitment (Buster-Williams 2009), service improvements using value stream mapping in the academic advisory function (Fisher, Barman & Killingsworth 2011), student adaption, programme quality, learning processes and even university community engagement (Balzer 2020).

#### **3.6.4 Lean principles in academic libraries**

Traditional methods such as motion-and-time analysis have long been used to improve the efficiencies of tasks and processes. However, simplification of effort extends beyond removing waste motion and predefined tasks – also encompassing the simplification of products and services, overall processes and individual procedures (Nicholas 2011). Thus, the complexity of managing e-resources in an evolving environment requires simplification in the processes and workflows, especially in terms of working with various systems, tools and staff in the creation and management of access to e-resources.

Nelson (2016) remarks that lean principles could enable libraries, and particularly academic libraries, to better respond and adapt to changing technological demands from users while maximising employees and resources under static or declining budgets. The author further alludes that research into academic libraries concentrates more on library systems and technical services departments; however, implementing lean principles has a wider application within the general operations in libraries (Nelson 2016).

Petrusch, Vaccaro and Luchese (2019) further suggest that systems and organisational processes at universities are usually less efficient than they should be and that the elimination of waste requires a systematic approach – yet virtually no study addresses this problem in academic literature (Al-Aomar & Hussein 2019). This same can be said for academic libraries serving the strategic goals of their institutions. Nelson (2016) advocates that lean principles offer specific strategies to organisations of all sizes and types, including memory institutions such as libraries, in building strong ethnic customer service, focusing on responding to user information needs.

Huber (2011) declares that libraries must be recognised as a complex business enterprise consisting of a merger of purchasing, manufacturing, inventory control, distribution, warehousing and retail and should be managed as such. The author calls attention to the fact that libraries carry great risk, in that they select and invest in a significant amount of print and electronic information resources – and economic conditions demand that money is well spent (Huber 2011). Nelson (2016) affirms that the goal of a lean organisation is to deliver more services, faster and with excellent quality, to library users, online visitors, staff and the wider community.

Huber (2011) further advances that academic libraries must initiate projects to drive change. The author iterates that lean, as a business initiative based on simple concepts – such as that anything that does not add value is waste – creates the quickest and smoothest delivery path, with fewer errors, provides better service delivery, produces a shorter service delivery time and costs less, as well as enabling quicker response to customer flexibility requirements and reduction in disruptions and operating costs (Huber 2011).

Implementing lean, when applied properly, has the potential to reveal and expose shortcomings that may be concealed in the system or processes (Bhasin & Burcher 2006). It serves to iterate observations by Robinson and Yorkstone (2014) during their lean study conducted at the University of St Andrews. The authors described processes as being formed by a series of tasks with linked steps. The life-cycle of a print book was a case in point – from the time it was requested, acquired, catalogued, processed, shelved, used, collection managed, potentially repaired, long-term storage or disposed of. Each processed step presented opportunities for improvement and no step existed in isolation (Robinson & Yorkstone 2014).

Relatively few peer-reviewed articles and research are to be found on the successful implementation of lean principles in academic libraries (Bieraugel 2015; Garofalo 2014; Kress 2008; Nowak & Zwiercan 2015). However, Yeh, Arthaud-Day and Turvey-Welch (2021) highlight extant literature that will assist academic libraries in the digital age, such as value stream mapping and process mapping for electronic resource management. The authors are of the opinion that academic libraries are challenged to deliver high-quality services under very constrained budgets (Yeh, Arthaud & Turvey-Welch 2021). Some academic libraries still depend on budget allocation models established during times of stability and prosperity – whereas the current unpredictable and strained economic circumstances fail to provide prescriptions (Yeh, Arthaud & Turvey-Welch 2021).

The significance of the lean concept and its viability is underpinned by two pillars, namely: (1) waste elimination, and (2) customer satisfaction (Arbjorn, Freytag & de Haas 2011). In summary then: the concept of lean – based on the set of five principles of lean developed by Womack and Jones (1996) during an in-depth study of the TPS – involves a five-step approach, supplemented by different tools and techniques to assist in waste elimination, operational performance, inventory reduction and optimal quality of service to the end customers.

### **3.6.5 Lean principles in a South African context**

Pieterse (2005) refers to the paper he delivered at the 26<sup>th</sup> annual South African Production and Inventory Control Society (SAPICS) conference, in which he stated that South Africa is slow in comparison to the Western world in the adoption of lean and could even be slower than the norm amongst many other developing countries.

This statement might have been true at the time, but since, numerous articles and research studies in a South African context have emerged on both manufacturing and services sectors (Bruinders 2021; Burcu 2019; Erasmus 2020; Govender & Jasson 2018; Grewan 2019; Katts 2021; Marshall 2018; Naidoo 2021; Smith, Paton & MacBryde 2018) to name a few published in the last four years. Every year, more and more research outputs are found on lean applications and implementations, more conference papers are delivered with confidence and more workshops, webinars and seminars are offered by organisations and private institutions. One of the contributors is the establishment of the Lean Institute Africa (referred to earlier), which is based in Cape Town, South Africa.

According to its official webpage, the Lean Institute Africa is a non-profit company promoting lean thinking in sub-Saharan Africa and is a member of the Lean Global Network, which consists of more than 30 institutes worldwide. The company was founded by Emeritus Professor Norman Faull, formerly a professor of Business Administration at the Graduate School of Business at the University of Cape Town. Prof Faull was also among the first researchers in South Africa to introduce innovative manufacturing and supply chain improvement concepts in this country (Lean Institute Africa 2021).

International student Eric den Hartog observes in a blog during a study visit to South Africa that South Africa is positioning itself as a gateway to sub-Saharan Africa (den Hartog 2014). As part of the study programme arranged by Lean Institute Africa, the international students were exposed to a number of companies to observe practical examples of lean implementation in products and services innovations, processes, business models and market spaces. At Standard Bank in Cape Town, the students viewed cardless transactions and how people made use of banking services without having a bank account; they could scan products at the shop with their cellular phone



and pay digitally – providing an in-depth insight into how people with hardly any money can have access to banking services (Den Hartog 2014).

The author further mentions visits to a Gugulethu settlement, a business owner assisting small grocers (spaza shops) to improve their goods and services, the Newlands brewery of SABMiller (focusing on supply processes in the brewery for optimisation) and Woolworths (facing challenges in the Africa supply chain, which were mitigated through web shopping). Den Hartog (2014) concludes in his article that the group had learnt a great deal about South African culture and doing business in an emerging economy – and that South Africa is clearly positioning itself as the gateway to sub-Saharan Africa.

These observations are evidenced by recent studies substantiating that successful lean implementation in South Africa is expanding to more than just services. Such studies include blended learning as an instructional strategy (Marshall 2018), leadership behaviours for employee engagement (Grewan 2019), game-based learning (Burcu 2019), the impact of uniquely African traditional leadership principles (Katts 2021) and small and medium enterprises operating in the IT sector (Torri, Kundu, Frecassetti & Rossini 2021).

### **3.6.6 Contextualising the five lean principles**

#### **3.6.6.1 *The principle of “specify value”***

The principle of “specify value” refers to value from a customer’s perspective. Carlborg, Kindström and Kowalkowski (2013) urge businesses to contextualise the term “value” when referring to lean principles, because it is the customer who ultimately defines what he or she considers value to be, even though such value is created by the providers. In a manufacturing environment, value is normally determined by the amount the customer is willing to pay for the product – contrary to the value in service sectors, which is much broader and difficult to determine, because customers create value individually (Khan, Al-Ashaab, Shehab, Kerga, Martin & Ewers 2015). Do (2017) strongly advises organisations to apply techniques such as interviews, surveys, demographic information or web analysis towards deciphering and discovering what customers find valuable.

The core function of academic libraries is to serve their users by satisfying their information needs. Library users consist of undergraduates, post-graduates, researchers, lecturers and staff. It is recommended and advisable that academic libraries undertake to frequently perform user assessment information needs because the information needs of an undergraduate differ from those of a post-graduate, as well as that of researchers and staff.

Scholarly literature describes millennials and generation Z as students who want to be recognised as individuals and be part of decision-making; who like course work that is relevant to the real world and group interactions; who want information that is current and readily available and integration technology, and who prefer visual over text information and web-based courses or face-to-face, with web-based support, among numerous characteristics. (Gardner & Eng 2005; Holliday & Li 2004; Novotney 2010; Schukei 2021). Additional factors such as the discipline of study, preference between print or online, various forms of disability and multigenerational users influence how academic libraries serve their users and, in turn, influence the principle of “specify value” in terms of each user.

NMU is one of the six comprehensive universities situated in the Eastern Cape, South Africa. The student population comes from diverse backgrounds, with the majority from impoverished and frequently rural areas. When determining the scope for “specify value” for its users, the possibility of elements outside the scope of the functions of the library is highly likely – such as assistance with editing, tables or graphs for assignments, translating or explaining documents in vernacular language, etc. This information could be valuable to the institution, the library and, by implication, this particular field of study.

### **3.6.6.2 *The principle of value stream***

Bell and Orzen (2011) state that the primary purpose of the value stream lean principle is to deliver the “specify value” the customer seeks. The value stream is a process-based strategy comprising all the life-cycle processes in products and services, the improvements of which require a cross-functional perspective, drawing individuals, teams and departments away from localised optimisation and silo thinking (Sisson 2014). Womack and Jones (2003) argue that value streams cannot be improved

unless all the elements of purchasing, manufacturing, inventory control, distribution, warehousing and retail of the service have been identified and analysed. Thus, the process of streamlining value streams can only begin once each value stream has been identified (Van der Merwe 2011).

Value streams are mapped. Mapping value streams creates a visual picture of the staff, departments, resources, systems and tools working together in synergy. The process of mapping is very effective at providing a detailed step-by-step view of each process or procedure (Bell & Orzen 2011).

For value stream mapping to be effective, each movement, delay, pick-up or put-down, each paper used, is added to the map for everyone to see and examine its value. Once the map is understood by each staff member, the team takes each link in the chain and determines whether the activity should be eliminated, streamlined, automated or changed in such a way that it reduces lead time or costs.

For the last few years, library services have been increasingly challenged to be affordable, accessible, safe, efficient and cost-effective. This process presents the means to develop a best practice model. Through the application of the value stream, libraries can measure the turnaround time of their service deliveries, duplication of effort, unnecessary motion and waiting, repetition of work, generating unnecessary reports, ineffective applications and tools, etc. Turnaround time refers to the length of time from when an information resource is requested until the resource is available to be accessed, whether in print or online.

### **3.6.6.3 *The principle of creating flow***

Makondo and Chiromo (2020) state that flow is the most important lean principle to achieve. Once all the waste has been identified in the value stream mapping and eliminated, the value-adding steps flow together continuously without interruptions and delays (Makondo & Chiromo 2020).

The flow principle challenges the traditional “batch-and-queue” model in the manufacturing environment. Conventionally, manufacturing systems are structured according to the required functions; departments are created around these functions to accommodate batch production (Van der Merwe 2011). Similarly, in the library

environment, a case study of Tulsa City-County Library demonstrates how the new book service delivery chain was successfully redesigned and transformed. (Huber 2011).

The Tulsa acquisitions department encountered problems with stacks of boxes overflowing into the delivery area, causing problems for the delivery group workflow. The cataloguing department had shelves full of books and media material waiting to be catalogued, as well as full carts of books in the book processing area waiting to be processed and boxed for distribution to the campus libraries (Huber 2011). To resolve the issue, Huber (2011) explains, the manager used routing sheets to examine the lead time at every station, thereby determining the stages and how long these books were in process. Seeing the documented gap analysis, the team made core process changes, using lean principles, as a solution to their problem.

The preceding case study substantiates the importance of flow and affirms for the researcher the potential value of these principles in managing e-resources in an online environment – working with intangible objects facilitated by staff, systems and tools to ensure access to e-resources – and how the access could be enhanced using lean principles to mitigate stagnant areas, bottlenecks, manual processes and duplication of effort.

#### **3.6.6.4 *The principle of pull***

The principle of pull relates to the balance of supply and demand. Gao and Low (2014) refer to the term “pull” as a system that can be used to procure material at the right time and in the right quantities, based on actual need.

Traditionally, manufacturing corporations applied push-based systems because customer demands could be accurately predicted (Nelson 2016). These corporations expanded their marketing and advertising departments intending to create, control and manipulate the corporation's products and services. This development, coupled with natural geographic and informational barriers, and customers with limited choices, made it easy for corporations to predict and meet customers' demands. However, at the end of the 20<sup>th</sup> century, two forces broke down the push model: the first, the introduction of computers and, secondly, the Internet (Nelson 2016).

Nelson (2016) suggests that it would be beneficial for academic libraries to adopt a “pull” service, compared to the traditional “push” service approach which is based on the library’s best guesses about what the user wants or needs of the library’s collection and services. Lecturers, for instance, use marketing materials to select information content for their curriculum, instead of asking the library’s client services department to provide what is in the current collection development and build up the curriculum from that.

The demand for efficiency and quality in academic libraries has increased dramatically over the years, yet the financial conditions to procure are not improving. NMULIS makes use of a demand-driven acquisition model informed by academia which is based on research and curriculum needs. This is a form of a pull-based system that is currently being employed. Many prescribed and core title books are procured in both print and electronic format, with multiple print copies and multiple licence models. However, procuring a hybrid model can be costly and, due to financial considerations, there are instances when the library cannot fulfil the principle of “specify value” because of budget constraints.

#### **3.6.6.5 Principle of perfection**

The implementation of lean principles is not a once-off process. It is a continuous improvement strategy and requires harnessing the skills and knowledge of all participants involved (Makondo & Chiromo 2020). Perfection is attained if the institution collectively exploits the value, value stream mapping, flow and pull principles, resulting in the benefits of identification and elimination of waste in the system (Gao & Low 2018). Hines *et al.* (2011) postulate that as more and more layers of waste become visible and the process continues toward the theoretical endpoint of perfection, that is where every asset and every action adds value to the end customer (Hines *et al.* 2011).

The desire to achieve perfection requires motivation, diligence and discipline to continually assess waste reduction and to understand what the customer deems as “value.” Leong and Eng (1997) claim that constant examination and monitoring of processes and workflows lead to continuous improvement. In the constant evolution of technological advancement, perfection in an online environment would be difficult

to attain. However, to strive and continuously work towards such a goal, making library users the core focus of every business and operational decision, will ultimately lead to a satisfied library user.

### **3.6.7 The involvement and empowerment of employees**

The implementation of lean principles can only be successful when the involvement of the total employee value chain from all levels in the organisation is gained (Roslin, Ahmed, Ahamat, Bahrom & Ibrahim 2019). Employees are considered the backbone of organisations and play an integral part in the effectiveness of their organisation (Mwaniki & Gathenya 2015). The success of the organisation is largely dependent on the performance of these employees and how they are managed to achieve the organisational goals (Mwaniki & Gathenya 2015). Hence, Obiekwe, Zeb-Obipi and Ejo-Orusa (2019) state that organisations adopt policies which seek to allow their employees to be involved in certain processes to drive the performance and build up the competitive gain in the marketplace.

One of the crucial tasks before lean can be implemented is the process of employee empowerment (Doustar, Astaneh & Balalami 2014). Van Assen (2021b) argues that to develop employee involvement, the employee needs to be trained and participate in various quality and process improvement concepts. Simpson (2010) agrees but also stresses that all employees must be trained for the appropriate functions once the strategy has been implemented for a successful lean implementation. Employee empowerment is vital in forming a lean and continuous improvement culture that transforms processes through teamwork and communication into their most effective and efficient form, producing the most value for the customer.

Roslin *et al.* (2019) believe employee involvement and employee empowerment are essential factors in achieving success towards the full implementation of lean principles. In their research findings, the authors perceive that there must be mutual trust between top management and employees, especially if the employees are working in their areas of expertise. Secondly, the implementation of lean principles is a team effort and requires each team member to understand their role and thus execute their work to the best of their ability. Thirdly, managers should adopt an appreciative nature and value their employees more for their commitment to achieving

organisational goals, because such practices would create a conducive learning environment. Lastly, effective employee empowerment allows for higher participation in lean practices, it encourages strategic thinking, problem-solving and decision-making – giving the employees the liberty to make sound judgments concerning their job scope or job function (Roslin *et al.* 2019).

Kim, Kumar and Kumar (2012) allude that a well-trained and committed employee works effectively and efficiently. McLean, Antony and Dahlgaard (2017) cite the lack of training and commitment as one of the major causes of unsuccessful lean implementation.

### **3.6.8 Lean waste**

The first step in lean thinking is to understand and determine what value is and what activities and resources are necessary to create that value (Poppendieck 2011). This coincides with the first lean principle of “specify value.” Every customer’s value is unique, so a waste for one customer can be a value for another customer. Therefore Mossman (2009) advises not to focus too much on the waste, but rather focus also on the value that customers seek. The author further cautions that eliminating waste in a sub-process can optimise the sub-process but at the expense of the whole project. It is easy to be caught up in an oscillation focusing on the elimination of waste, especially with repetitive activities during high and low peaks (Mossman 2009). By contrast, focusing on the value one wants to create is inherently more rewarding and more effective (Mossman 2009).

Lean practice aims at being more efficient without becoming less effective and focus on customer demands, whereby efficiency is achieved by removing or minimising those activities that do not add value to the customer. Hence, lean is not merely a technique to reduce and eliminate waste, but also to create a process whereby every activity should add value to the end product. Dogan and Yagli (2019) categorise three types of lean waste, namely: value-added, non-value-added and necessary value-added operations. The authors further elaborate and define value-added operations as those processes that please the end customer and therefore must be included in the process. Necessary value-added operations are wasteful but considered

necessary for the operations to proceed. Non-added value operations are, by definition, wasteful operations that must be eliminated.

A case study conducted by Gladysz, Buczacki & Haskins (2020) alludes that globally hotels, restaurants, and catering businesses experience high levels of food waste; therefore, organisational improvements leading to a decrease in food waste and costs were needed, which is an important issue in many economies. Clowes, Hanson and Swannell (2019) identified five actions to reduce food waste in restaurants. Firstly, generating a food waste inventory to identify how much and where food is wasted; secondly, managers engage with staff to help prevent food waste and offer guidance to staff on how to identify food waste; thirdly, reducing overproduction (for example, batch-cooking relative to cook-to-order); fourthly, reviewing the current inventory management and purchasing practices, and lastly, planning alternatives to safely repurpose ingredients that could allow kitchen staff to generate revenue from a potential waste. Gladysz, Buczacki and Haskins (2020) conclude that by comparing existing case studies and observing similarities in approaches to reducing food waste, they created a frame of reference of interest to food service businesses regarding ways to reduce food waste that would positively impact sales and overall profitability.

A Malaysian case study conducted by Papargyropoulou, Steinberger, Wright, Lozano, Padfield and Ujang (2014) illustrates the conceptual framework of food waste generation. The authors concluded that the provision of food, consumption and waste should be studied holistically in preparation for a food waste prevention plan, which could include socio-economic aspects (Papargyropoulou *et al.* 2014). The findings of this case study indicated that restaurant operating procedures, policies and social food consumption practices were the main contributors to food waste in hotels, restaurants and catering businesses (Papargyropoulou *et al.* 2014).

As explained in Section 3.5.1, lean waste identification was pioneered by Ohno (1988) and derived from delivering value through the elimination of seven types of waste in automotive manufacturing environments. Ohno (1988) identified the seven wastes as transportation, inventory, motion, waiting, over-production, over-process-ing and defects. Bajjou and Chafi (2020), mention that lean waste in construction includes material waste and waste associated with the workforce, time and equipment. Although Robinson and Yorkstone (2014) identified eight lean wastes in service



sectors, Dogan and Yagli (2020) contend that unclear communication and variations be added to the list of lean waste in service sectors. Therefore, one can deduce that, as the application of lean principles expands or as technological advances and transformations take place, the identification of more forms of lean waste will increase proportionally. Table 3.3 reflects the lean waste as identified by Robinson and Yorkstone (2014). The lean waste examples cited were customised by the researcher to lean waste in a library environment for ease of reference.

**Table 3.3: Identified lean waste in a library environment**

<b>Lean wastes</b>	<b>Examples of lean waste in a library environment</b>
Waiting	Waiting for a response, orders, licence agreements, URLs, cataloguing, approvals, meetings, systems, equipment, tools, etc.
Transport	Limited understanding of process flow; inadequate or unnecessary motion in workflows, etc.
Over-production	Entering repetitive information on multiple work documents or forms; printing, faxing or e-mailing more than what's needed; making more copies than needed; ordering more consumables than needed, etc.
Inventory	Can we deliver what the customer wants, how much they want and when they want it; how responsive is the purchasing process to the demands of the customer, etc?
Defects	Anything that does not meet the customer's expectation; data entry errors; loss of files or records; incorrect info on records or documents; incomplete work, etc.
Skills	Insufficient training, no employee feedback, improper tools and equipment to work with, lack of challenges for employees, no succession plan, etc.
Excessive processing	Generating unnecessary reports, duplication of processes, using unnecessary complex processes, incorrect processes, etc.
Motion	Walking, searching for files, repetitive work, double data entry, re-adjustment of work, etc.

Source: Robinson & Yorkstone (2014), adapted by the researcher

In conclusion, Yeh, Arthaud and Turvey-Welch (2021) believe that because academic libraries are considered public service providers, the susceptibility to waste such as duplication, excessive amounts of guidance, handoffs, rework and unnecessary actions to obtain authorisation, the lean concept of over-burden is particularly relevant. The authors further mention that there is a common misconception that eliminating lean waste will result in job losses and those that believe so, forget that the core purpose of removing the waste from essential service activities is to make jobs easier, more efficient and effective to ensure increased employee engagement and greater long-term benefit to institutions (Yeh, Arthaud & Turvey-Welch 2021). Lean implementation success hinges upon workers actively participating in problem solving and process improvement efforts for the sake of reducing waste, increasing productivity and flexibility and enhancing quality (Bhasin and Burcher, 2006).

### **3.7 CHAPTER SUMMARY**

Based on the review of literature, there is a clear connection and relatedness between the three core components which constitute the conceptual framework of this research study, namely: processes and workflows, staff and resources, and lean principles.

Standardisation of workflows and processes and applying lean principles are means of addressing the challenges of continually improving to produce effective and efficient products and services. While the thought of standardisation invokes a feeling of dread and scepticism amongst library staff, improving the outcomes and processes of library service points and collections often involves finding commonalities of applying different methods and adjusting them, so that the processes can be applied to more workflows consistently and predictably across all the disciplines in the organisation. In addition, standardisation of processes and workflows is important, but if these are not documented, it becomes a futile exercise. Documenting processes and workflows enables sustainability, consistency, effectiveness and efficiencies.

Lean principles as a business improvement tool have been implemented successfully in both manufacturing and services industries. It is clearly understandable why library staff would refer to technical and system departments as the “engine room” of the library. Like the manufacturing environment, these departments procure the raw material (electronic information resources) and apply the processes of metadata

standards, profiling, URLs, etc., disseminating them to be discoverable and accessible to the end-user as a fully-fledged product.

For these objectives to be realised, effective and efficient staff and resources are required. Organisations that consider their staff critical to the success of their businesses will ensure that their staff performance is on par with technological developments that are inclusive of best business practices and would include upskilling, reskilling and training as part of their strategic and operational plans continuously, especially in an evolving technological environment.

From this comprehensive literature review, one can attest that there is a definite correlation and direct interconnection between processes and workflows and staff and resources and that the implementation of lean principles is conducive to enhancing processes and workflows through the principles of the value stream, flow and pull to streamline access to e-resources at academic libraries such as NMULIS.

## CHAPTER FOUR

### RESEARCH METHODOLOGY AND DESIGN

#### 4.1 INTRODUCTION

The previous chapter explored the body of knowledge on documented processes and workflows, staff and resources, and lean principles, as a business process management initiative as well as a conceptual model. Chapter Four expounds on the research paradigm within which the present research was conducted and describes the research methodology, with all its components. This includes the research design, population, data collection methods and data analysis procedures, as well as the ethical consideration and trustworthiness of the research. Table 4.1 depicts the research methodology applied to the current study.

**Table 4.1: Research methodology overview**

<b>RESEARCH METHODOLOGY AND DESIGN</b>
<b>MAIN RESEARCH QUESTION</b>
How can lean principles enhance the processes and workflows to ensure seamless access to e-resources at NMULIS?
<b>RESEARCH SUB-QUESTIONS</b>
<ol style="list-style-type: none"><li>1. What skills and resources are needed for participants to function effectively?</li><li>2. How do participants conceptualise processes and workflows in their work environment?</li><li>3. What is the condition of the current processes and workflows?</li><li>4. How do participants understand and utilise lean principles?</li><li>5. How can the current processes and workflows be adapted to a leaner process in the future?</li></ol>
<b>RESEARCH PARADIGM, APPROACH AND DESIGN</b>
Paradigm: Interpretivist Research approach: Qualitative; explorative Research design: Case study

<b>RESEARCH METHODS AND STRATEGIES</b>	
Sampling techniques	Purposive sampling
Population sample	A total of 12 participants
Data collection strategies	Semi-structured interviews and non-participatory observation; validation by means of triangulation
Data generation activities	<p>The semi-structured interviews were conducted in four phases. The first three sets were conducted with the librarians of Technical Services, LISDA and SEALS, outlined as follows:</p> <p>The first set of semi-structured interviews – Phase 1 (Appendix A) – related to answering research sub-questions 1, 2 and 4.</p> <p>The second set of semi-structured interviews – Phase 2 (Appendix B) – related to research sub-question 3. The participants were asked to verify the information the researcher collected via the observation data gathering technique (see Figures 4.2 – 4.4 and Tables 4.4 – 4.9). During the interviews, all amendments were noted and rectified.</p> <p>The third set of semi-structured interviews – Phase 3 (Appendix C) – consisted of follow-up and clarity-seeking questions that transpired from the first two sessions. In addition, this phase also consisted of the lean waste activities (see Appendices E – L), which is related to research sub-question 5.</p> <p>The fourth set of semi-structured interviews – Phase 4 (Appendix D) – was directed to the Deputy Director of Technical Services and the Library Director. Both participants are the line managers of the librarians responsible for creating and managing access to e-resources at NMULIS. These participants form part of the library directorate on a strategic and decision-making level. Phase Four was related to research sub-questions 1, 4 and 5.</p> <p>Non-participatory observation was selected as 2<sup>nd</sup> data gathering technique. An observational plan (Table 4.3) was drafted. The observational data were transferred to Visio Professional software (Figures 4.2 – 4.4 and Tables 4.4 – 4.9).</p>
Data analysis	Reflexive thematic analysis (RTA) supported by the computer-aided software ATLAS.ti 22.
<b>TRUSTWORTHINESS</b>	
Credibility	Transferability
Dependability	Confirmability
Authenticity	
<b>ETHICAL CONSIDERATIONS</b>	
<p>This research study was conducted in compliance with, and conformance to, the University of South Africa (UNISA) research ethics. A reciprocal ethical clearance was also obtained from NMU allowing for primary data collection from the NMULIS staff.</p>	

## **4.2 THE NATURE OF RESEARCH**

Walliman (2021) indicates that it is important to have a clear understanding of what the term “research” means, especially from a student or practitioner’s perspective, as it clears away misconceptions, which may arise if applied loosely. Some insight into the terminology used in the academic arena to gain a better understanding are as follows, as directly quoted:

- Research is a process of collecting, analysing and interpreting information to find answers to one’s research questions (Kumar 2014).
- Research concerns asking and answering questions – seeking knowledge and understanding the world and its processes (Wisker 2008).
- Research is a systematic and objective process of collecting and analysing data to understand a phenomenon with which we are interested or concerned with (Leedy & Ormrod 2021).
- Research is a process that involves obtaining scientific knowledge using various objectives, methods and procedures (Welman, Kruger & Mitchell 2005).

From the above definitions, and in summary, research is an investigation and a process of inquiry, conducted systematically. According to Du Plooy-Cilliers, Davis and Bezuidenhout (2021), formal research is a process of inquiry during which secondary information based on previous research is collected to gain an understanding in order to arrive at a conclusion based on new, original primary evidence, which can then be used to present a solution or generate further research.

## **4.3 RESEARCH PARADIGMS**

In scholarly communication, the research paradigm is considered the hallmark of a discipline's academic development (Musa 2013). These paradigms are the assumptions, norms and standards that underpin the different research approaches in research studies (Kivunja & Kuyini 2017). The concept of the research paradigm was first introduced by Kuhn (1962). Abdulkareem, Abacha and Jumare (2017) explain that all research conducted is based on a certain philosophical assumption about what constitutes valid research and which research technique is applicable for the development of knowledge.

Noting the description by Kivunja and Kuyini (2017) of a paradigm as a “theoretical lens” through which social scientists view the reality of a phenomenon, Ngulube (2020a) endorses that a research paradigm is not a theory – rather it provides the lenses through which the world is viewed from a researcher’s perspective (Creswell 2014; Morgan 2007). Kivunja and Kuyini (2017) postulate that the researchers’ worldviews are informed by their principles, thinking, school of thought, values and beliefs, and have a direct bearing on the research question(s), participant selection and the data collection methods, procedures and analysis. Abdulkareem, Abacha and Jumare (2017) opine that the choice of theory and research design is rooted in the research paradigm and this chosen paradigm guides the researcher on what theory is suitable for their research study.

Research paradigms provide insights into the researcher’s perception of what constitutes knowledge (Abader 2018; Taylor & Medina 2013) and establish an integrative framework for understanding knowledge, truth, values and realism (Somekh & Lewin 2005). Theoretical and conceptual frameworks form an integral part of the paradigm, highlighting the researcher’s understanding of knowledge and reality (Abader 2018; Collins & Stockton 2018; Lester 2005). Additionally, the theories and concepts inform the researcher’s methodology, because they establish the way the researcher views the research topic, which in turn shapes the research design and informs the methods for data collection and analysis (Abader 2018; Collins & Stockton 2018; Lester 2005).

According to Rehman and Alharthi (2016), a research paradigm is the researcher’s basic belief system and theoretical framework, comprising assumptions consisting of (1) ontology, (2) epistemology, (3) methodology, and (4) methods. Different paradigms have different ontologies and epistemologies. Grix (2004) refers to ontology and epistemology as the foundation that supports the structure of a research study. Therefore, it is important to understand the ontological and epistemological foundations researchers are working on, because it allows for the full understanding of the approach adopted and the assumptions underpinning the approach.

Scholars provide diverse ways of understanding research paradigms. Guba and Lincoln (1994) assert that a research paradigm is associated with ontology (the way the researcher defines truth or reality), epistemology (the process whereby the researcher comes to know the truth or reality) and methodology (the method applied in conducting the research). Taylor and Medina (2013), on the other hand, describe a paradigm as a view of reality (ontology), which one may or may not be conscious of, that is related to various types of knowledge that are justifiably generated (epistemology) in a structured manner (methodology).

Researchers must understand their own ontological and epistemological assumptions, because it is their assumptions about the world that impacts how they interact with their research. Kivunja and Kuyini (2017) postulate that the ontological question leads the researcher to investigate what kind of reality exists in order to make meaning of the data collected. Cohen, Manion and Morrison (2007) argue that epistemology is concerned with the nature and forms of knowledge, how the knowledge was acquired and how the knowledge is communicated.

Epistemology positions the researcher within the research context, enabling the researcher to establish what knowledge would be new, given what is known (Kivunja & Kuyini 2017). It is on this principle that Kivunja and Kuyini (2017) draw attention to the significance of epistemology. The authors confirm that epistemology focuses on the nature of human knowledge and how it is justified by how we know, what we know and whether what we know is factual evidence. Furthermore, Kivunja and Kuyini (2017) advise that research should ensure that the knowledge has value and that it would contribute to the existing knowledge, because beneficial knowledge is one of the criteria by which higher-degree research is judged.

Among the many diverse research paradigms available to choose from to conduct a research study are the following major paradigms: positivism, interpretivism and pragmatism (Ugwu, Ekere & Onoh 2021). These are discussed in more detail, with a conclusion and motivation for why the interpretivist paradigm was considered the best choice for the proposed study.



### 4.3.1 Positivism

The term “positivism” refers to Comte’s philosophy which rose to prominence during the 19<sup>th</sup> century (Richards 2003). Positivism holds the belief that the only way to establish the truth is by using a scientific method with factual knowledge that can only be gained through experimentation, observation and experience and which is the only legitimate way to understand human behaviour (Habib 2020; Kivunja & Kuyini 2017).

Positivism assumes that only one single external reality exists independently of humans and places a strong emphasis on objectivity (Creswell & Creswell 2018; Ngulube 2009). Aliyu, Bello, Kasim and Martin (2014:81) define positivism as the “self-governing, independent and objective existence of truth” based on the ontological principle that truth and reality are independent – and researchers being objective observers and, as such, not affecting or disturbing what is being observed. Thus, the positivist paradigm regards reality as existing independently of humans (Rehman & Alharthi 2016) and the only way that knowledge is confirmed to be true is by means of scientific methods (Kankam 2019).

In addition, the said paradigm focuses strictly on the scientific empiricist method based on pure data and facts that are observable and measurable with no human interpretation or biases (Ngulube 2009; Saunders, Bristow, Thornhill & Lewis 2019). Thereby causal relationships are established to create law-like generalisations, which could then be applied to explain and predict behaviour in organisations. Positivist research relies on deductive reasoning, a highly structured design with large samples and findings which are observable, quantifiable and developed by means of statistical analysis (Van Rensburg 2010).

In terms of the four elements which underpin this paradigm, positivism postulates the following that the world is external to every real-life phenomenon, that there is only a single, objective reality (ontology), that the knowledge generated is context-free and is controlled by the law of cause and effect (epistemology), using quantitative methods such as surveys and experimental research (methodology) and collecting data by means of questionnaires and surveys or by manipulating pre-existing statistical data by means of computational techniques (Babbie 2016; Creswell 2018; Kivunja & Kuyini 2017).

### 4.3.2 Interpretivism

The positivist paradigm was the predominant paradigm in social sciences until the 1970s, when the interpretive paradigm emerged, largely in response to the non-existence of contextual data of people's lived experiences (Hennik, Hutter & Bailey 2020). The roots of interpretivism are in hermeneutics, also known as the study of interpretation (George 2020; Mertens 2019). Interpretivism is a qualitative research approach in which reality is socially constructed by the researcher (Merriam 2009).

Interpretive research aims to gain insight into the multiple realities in understanding a social phenomenon, participants' view of the world and their social constructs of reality, and to explain the subjective reasons and meanings behind the constructs (Abdulkareem, Abacha & Jumare 2017). Geertz (1973) as cited in Walsham (2006) states that data are actually the researcher's (re)construction of other people's construction. These social constructs include participants' narratives, lived experiences, beliefs, attitudes, knowledge, expectations and behaviour.

The interpretive paradigm requires social phenomena to be understood in their context "through the eyes of the participants rather than the researcher" (Cohen, Manion & Morrison 2007:21). The analysis of data following this approach generates inductive reasoning, by which the researcher discovers patterns and themes in the data to understand the phenomenon and generate theory (Rehman & Alharthi 2016). Crotty (1998) alludes that the interpretive paradigm does not predefine dependent and independent variables – rather it focuses on the participants making sense of a phenomenon as its complexities unfold and the emic picture emerges.

Maxwell (2006) states that interpretivism stresses the need for putting the analysis in context via the inductive approach – given that the findings are based on the participants' truth or reality (Kumar 2014). Figure 4.1 depicts an inductive research approach, also known as "a bottom-up" approach. For the present study, the researcher designed a visual overview of the current NMULIS processes and workflows, which was instrumental in the non-participative observation component of primary data collection.

The inductive process was applied when the participants co-constructed the processes and workflows by verifying and/or amending the processes and workflows during the Phase 2 semi-structured interviews and thereafter, applying the interpretive repertoire (Schwartz-Shea & Yanow 2012) to analyse and interpret the understanding, within the established theories, of how the librarians could enhance the access to e-resources seamlessly at NMULIS.



Source: Author's own compilation

**Figure 4.1: Inductive research approach**

Given that the paradigm lends itself to qualitative enquiry, interpretivism is subjective and seeks to understand the emic perspective of participants' lived experiences (Hennik, Hutter & Bailey 2020), paying attention to and valuing what people say, how they feel and how they make meaning of a situation.

### 4.3.3 Pragmatism

Pragmatism is a term derived from the Greek *pragma*, meaning “action” – the notion of which is central to this research concept (Pansiri 2005) and which is also the root of the words “practice” and “practical.” Pragmatism emerged because of the intense criticism leveled at positivism (Mertens 2019). Philosophers argued that it is not possible to access the truth from a single reality (positivism), nor is it possible to determine social reality as being constructed (interpretivism), but rather it is a worldview that is most appropriate for studying the phenomenon at hand, as it happens, that is practical but also pluralistic and allows for a combination of methods being followed to conduct a research study (Kivunja & Kuyini 2017).

As a result, pragmatism emerged as a third major paradigm by reconciling the two extant paradigms (positivism and interpretivism) to work in tandem. Hence, the pragmatist paradigm is indicative of enquiry into a reality which is grounded in the environment that can be single or multiple (ontology); of knowledge and reality based on beliefs and habits that are socially constructed (epistemology), and that truth is whatever proves itself good or what has stood the test of time (methodology).

The mode of enquiry would require a combination of both qualitative and quantitative instruments, such as questionnaires, observations, document analysis, statistical data, and so forth, to execute a research study.

#### **4.3.4 Rationale for selecting the interpretivist paradigm**

The objective of the present research study was to explore how lean principles could enhance the processes and workflows to ensure seamless access to e-resources at NMULIS. In a South African context, there is a need for more research to fill the void in knowledge on how business process initiatives, such as lean principles, can be utilised to serve its users more effectively and efficiently by eliminating waste in academic libraries. Additionally, there is also a global dearth of research focusing on the processes and workflows of access to e-resources. Exploratory research designs tackle new research problems into which little or no previous research has been carried out (Brown 2006).

Questionnaires comprising closed questions, surveys or statistical data would not have captured the narrations of the lived experiences, viewpoints, problems, suggestions and recommendations of the librarians in creating and managing access to e-resources at NMULIS. Therefore, the positivist approach would not have sufficed. Additionally, the application of a pragmatist approach was not considered, because it requires a mixed methodology consisting of both qualitative and quantitative approaches.

Schwartz-Shea and Yanow (2012) claim that interpretive researchers discover reality through the perceptions and experiences of their participants. In seeking answers to specific questions, the researcher who follows the interpretive paradigm draws on participants' experiences to construct and interpret their understanding by contextualising the participants' reality. The ultimate goal of the current study is to extend our knowledge on how to enhance access to e-resources seamlessly for the users at NMULIS.

Moreover, the interpretive paradigm relies strongly on interpretive analysis, which is considered subjective and dependent on the researcher's experiences and is often criticised by positivist researchers that it lacks rigour (Bhattacharjee 2012). Contrary to this statement, Lincoln and Guba (1985) proffer a criterion that rigorousness can be

determined through dependability, credibility, confirmability and transferability of data, of which interpretive paradigms are suggestive. However, the interpretive researcher needs to take heed of the criticism against interpretivism as explained by Cohen, Manion and Morrison (2007), because the subjectivity of interpretivism might be problematic since both the researcher and participants might impose false, misleading or incomplete data.

Positivism is concerned with the validity, reliability and generalisability. To support the credibility of the present interpretive research, the researcher was guided by Yin (2018) regarding case study criteria (the use of multiple sources of evidence and establishing a chain of evidence) to construct validity (via theme building and pattern matching), internal validity (using existing theory and constructs) and for external validity and reliability (applying case study protocols). Therefore, the researcher is confident this study acceded to each of these conditions. The rich descriptions within and across data sets based on the real lived experiences created both internal and external credibility; consistency further contributed to the quality of this research study.

Therefore, the research vindicated the belief that the interpretive paradigm was most suitable for the present study. The core function of academic libraries of serving the institution's community with its information needs has not changed; that is the ontological foundation (reality). Bodin (2019) describes core functions as customer-driven business activities. Thus, one can deduce that the core function of any business or organisation is the key driver to accomplishing the mission, the goals, the value proposition, the "bread and butter" and the reason for existence. To direct the core function in alignment with the organisational goals, support is needed and therefore should be driven by the core demands.

For present research purposes, documented processes and workflows in the creation and management of e-resources, specific library staff and a business improvement tool (lean principles) were identified as the support components in attaining the research objective of enhancing access to e-resources seamlessly at NMULIS. The nature and forms of knowledge (epistemology) gathered consisted of the experiences, knowledge and skills of the librarians, peer-reviewed scholarly communication and experts in the fields of related study.

Since the focal point of the research was to explore how to enhance the core function of the library at NMU, a qualitative case study design with semi-structured interviews and non-participative observation was followed in terms of methodology and research methods/instruments. The interpretive paradigm allowed for the application of these approaches and techniques facilitating the exploration of new ideas and new ways of working in the participants' working environment. Using the primary data-gathering instruments, the researcher ensured that the data collected were relevant and aligned with the research questions. Rigour was established through dependability, credibility, confirmability, transferability and authenticity (discussed further under the topic of trustworthiness in Section 4.11).

#### **4.4 RESEARCH METHODOLOGY**

Kothari (2004) points out that there are many dimensions to research methodology and that research methods form part of research methodology. The author further alludes that research methodology includes the logic behind the research methods selected – why the researcher considered those specific research techniques to be the most appropriate and not others. In addition, the researcher should be able to do a research methodology evaluation of the research results (Kothari 2004). Punch (2009) mentions that research methodology is the science of studying how research is done scientifically. Having considered the nature of the primary data required, the qualitative methodology was deemed pertinent to the current study.

##### **4.4.1 Qualitative research approach**

Qualitative research is a holistic approach, subjective and descriptive rather than explanatory, and which either sustains or confronts the theoretical assumptions on which a study is based (Denzin & Lincoln 2005; Meyer 2001; Neuman 2014). Meyer (2001) further mentions that qualitative research also aids in understanding the meaning related to the phenomena, the distinct nature of the research problem and the impact of the problem.

There is no definitive definition for the qualitative research study (Creswell 2018). However, Creswell and Poth (2018) advance a process definition, which they refer to as a working definition and highlight the fact that the characteristics of qualitative research evolve so much because the elements of qualitative research change

constantly. However, there are some commonalities amongst researchers regarding the characteristics of qualitative research. A number of characteristics pertinent to the present study are examined.

Creswell and Poth (2018) identify five characteristics of the qualitative approach. Firstly, the aforementioned authors correlate the characteristic of the natural setting to the fact that qualitative data are often collected where the participants are located or where the problem is under study. For the present study, the researcher conducted one-on-one, semi-structured interviews and implemented non-participatory observation as data collection techniques. Both methods were employed in their natural setting, even in terms of the online semi-structured interviews. Participants worked both on and off campus and both settings are therefore considered natural in terms of work functioning.

Secondly, the authors regard the researcher as the key instrument when collecting data. A predetermined set of questions were developed by the researcher and sent to participants in advance. During the interviews, these questions were verbally asked by the researcher and each participant's response was captured verbatim via the Microsoft 360 "speech-to-text" function and recorded using the recording and transcribing functionality of MS Teams software. By means of the non-participative observation, the researcher personally observed the interactions, processes and behaviours as they occurred, for example, when the various departments followed their respective activities in creating and managing access to e-resources at NMULIS.

Thirdly, Creswell and Poth (2018) maintain, the qualitative approach is known for its multiple perspectives and meanings from participants. Qualitative data is highly contextual, consisting of data sets that are intentionally collected from selected individuals to provide a holistic picture of the many viewpoints that are representative of individual experiences (Billups 2021). In the present context, for example, the researcher asked each participant what their views were on the current resources NMULIS subscribes to. In response to this question, the researcher received 12 different perspectives and viewpoints, providing (and illustrating) the rich description qualitative research is known for.

Fourthly, another characteristic is that the qualitative approach is context-dependent. According to Creswell and Poth (2018), this means that the researcher must seek to understand the contextual structures and the extent to which they might influence the participant's experience. In terms of the present research, the complexities of creating access to e-resources cuts across two sub-departments within technical services, two departments within the library and one department that is external to the library – with each having its own role and responsibilities. Thus, the particular context made it possible for the researcher to understand how the processes and workflows of each participant are shaped by their actions and acquire meaning.

Lastly, the emergence of new data in qualitative research is distinctive. According to Billups (2021), qualitative research evolves throughout the research study, originating in the researcher's intuition, prior research studies and assessment of the phenomenon to be explored. However, this process guides the research study's development and should, therefore, be refined and solidified as the study evolves. The revelations of the lived experiences, knowledge and skills shared during primary data collection are the detailed and in-depth narrations of the participants, resulting in new information of a powerful and sometimes compelling nature.

#### **4.4.2 Rationale for selecting a qualitative research approach**

An exploratory qualitative approach within an interpretive paradigm was adopted for present study purposes. Explorative research investigates whether a phenomenon exists (Dane & Carhart 2022) or the possibility, as for present purposes, that it can exist. Qualitative research is subjective and involves assessing and reflecting on perceptions to gain an understanding of human interactions (Creswell & Creswell 2018; Maree 2020; Myers 2020). According to Merriam and Grenier (2019), the key to understanding qualitative research is that people in a particular context socially construct meaning and that the qualitative researcher is interested in knowing how the participants reason, understand their experiences and make sense of their world.

The research problem, the research objectives and the research questions of the present study guided the researcher in selecting the qualitative approach. The intention of this explorative research was to be understood through a qualitative lens to gain knowledge and insight into how the librarians at NMULIS create and manage



e-resources, what processes and workflows they follow, and what expertise, skills and knowledge they require to be effective and efficient. Thus, the researcher wanted to gain in-depth knowledge and understanding of the phenomenon and realised that a survey would not capture the narrative and daily lived experiences of these participants in creating and managing e-resources at NMULIS. Furthermore, the non-existent documentation of current processes and workflows needed to be developed, and employing non-participative observation was the only instrument suited to capturing accurately the existing processes under investigation.

## **4.5 RESEARCH DESIGN**

The research design or research strategy refers to the type of inquiry, conducted within the qualitative, quantitative or mixed-method approaches, which provides clear directions for the research processes and procedures to be undertaken (Creswell & Creswell 2018). Kothari (2004) warns that the research methodology is strongly linked to the research design and cautions the researcher to be clear about the type of research design that is most suitable for the research study, because the wrong selection may upset the project in its entirety. Five major designs typically feature in qualitative research, namely: narrative, phenomenological, grounded theory, ethnographic and case study design (Maree 2020).

Creswell and Poth (2018) advise that the researcher examine the research problem in the context of all five designs first and thereafter select the best option for the proposed study. For example, the narrative design is best suited if the researcher wants to explore the life of an individual. The phenomenological design focuses on understanding the essence of the experience. Grounded theory develops a theory grounded in data from the field, while the ethnographic design describes and interprets a culture-sharing group. The case study develops an in-depth description and analysis of a case or multiple cases. The researcher chose to follow a single case design for the proposed study and the justification thereof is elaborated on below.

### **4.5.1 Justification for a qualitative case study research design**

A case study is described as the study of a case within a real-life contemporary setting (Yin 2018). “Case studies have been used across several disciplines, for example, social sciences, education and business,” according to Ngulube (2020:95). Likewise,

case studies are in-depth research about a programme, an event, an individual, a community, a group, an episode, a town or city (Kumar 2014; Leedy & Ormrod 2021). Furthermore, Myers (2020) concedes that, in business research, a case study can also refer to understanding how or why a business decision was made – or how a business process works the way it does.

Creswell and Poth (2018), Maree (2020), Schoch (2020) and Yin (2018; 2014) describe various features of case studies worth mentioning.

- A case study is an empirical inquiry which investigates a contemporary phenomenon “case” in depth and within its real-life context.
- A case study copes with the technically distinctive situation in which there will be many more variables of interest than data points, resulting in benefits from the prior development of theoretical propositions to guide design, data collection and analysis, as well as relies on multiple sources of evidence, with data needing to converge in triangulation.
- Case study designs are known for their development of information. The narrations of the participants consist of current, real-life cases with some concrete manifestation of abstraction.
- Case study designs are bounded by set parameters, making them very specific in time, space, organisation, event, person, behavioural condition or social phenomenon.
- The intent of conducting a case study, which can either be intrinsic (unique) or instrumental.
- Case study designs can be single or multiple cases making use of various data collection methods – for example: interviews, observations, documents, textual analysis, focus group discussions and visual data – to gain an in-depth understanding of the phenomenon being studied.
- Case studies often derive their conclusions from patterns or explanations which are identified by the researcher.
- This type of inquiry allows other researchers to conduct follow-up research based on the methodology and outcomes of prior case studies.

On the other hand, despite the advantages, case studies have drawn criticism as well. Yin (2014) points out the concern for enhanced rigour, because case study investigators are often careless and allow biased views to influence the direction of the findings and research conclusions. Secondly, Yin (2014) defends the non-generalisation statement of case studies and explain how generalisation could be met for single cases. Thirdly, case studies are time-consuming, are difficult to conduct and produce a massive amount of documentation – incurring risks when the data are not managed and organised systematically.

By nature, case studies can be either explanatory, exploratory or descriptive (Myers 2020; Yin 2018). Explanatory case studies aim to describe the presumed causal links in real-life situations and to explain why particular phenomena work in the way that they do. Exploratory case studies are usually conducted when the researcher wishes to understand the research topic and the phenomena in which the interventions being evaluated have no clear, single set of outcomes (Myers 2020). Descriptive case study aims to describe or define the topic at hand. According to Yin (2018), the mode of inquiry is an important consideration – the aim being to select the design that would be most beneficial to the study.

The present research study met the criteria of an exploratory case study because the research allowed for the analysis of an individual unit (NMULIS) with regard to contemporary phenomena (lean principles) in a real-life context (enhancing the access to e-resources). Case studies are not usually generalisable, especially single-case studies such as the present. However, the purposeful use of a conceptual framework for this study allowed for the possible formation of new concepts or expansion from that which was specified at the outset. This is affirmed by Yin (2018) when he states that the theoretical propositions in the initial stage of a case study will empirically enhance the findings by, firstly, the advancement of theoretical gaps and, secondly, new concepts in the findings of the case study – thereby forming the groundwork for analytic generalisation.

Following a single-case study design had a direct influence on the research problem at hand. The elements of organisational structure, processes and workflows, systems and tools are core concepts in the creation and management of e-resources – and

these differ from institution to institution. As such, the study should be read from an NMULIS perspective because of important contextual conditions pertinent to NMULIS – hence the single case study.

Moreover, the adoption of an exploratory case study allowed the researcher to understand the participants' real-life experiences, focusing on what they say and what they do that gives meaning to the phenomena under investigation. This was achieved by means of a dialogical engagement of four semi-structured interview sessions. Dialogical engagement, which is suited to an interpretivist paradigm (Kivunja & Kuyini 2017), is characterised to understand the subjective world of human experience through active and voluntary participation and open, frank, democratic communication. This is confirmed by Yin (2014), who emphasises that interviews are essential sources for case studies, because case studies concern human experiences, actions or affairs and participants' lived experiences and narratives which serve to enrich the empirical findings – also of the present study.

#### **4.6 TARGET POPULATION AND SAMPLE**

The research population (also known as the target population) is defined as a group of distinct individuals, cases or inhabitants comprising common characteristics or phenomena the researcher wants to study (Bhattacharjee 2012; Flick 2020; Van Rensburg 2010). Bhattacharjee (2012) expounds that the unit of analysis may consist of a person, a group of persons, a country, an object or any other entity that the researcher intends to draw scientific inferences from. Concurring, Donley (2012) defines a population as a complete list of items – or individuals, as in the present instance – from which a sample can be drawn. It is important that the researcher defines, describes and stipulates the criteria required of the population, such as eligibility, inclusivity and accessibility in order to generalise the findings (Polit & Beck 2008).

The target population for the present study was a distinct and selective group of individuals comprising 18 staff members responsible for creating and managing access to e-resources at NMULIS. At the time of data collection, 12 staff members responded positively to voluntarily partake in the research study. Although there are significant advantages to case study designs, considerable criticism has been levelled

at case studies. One of these criticisms is the lack of rigour in terms of establishing reliability and generality, which creates scepticism towards small sampling, single exploration case studies. In defence, Yin (2014) and Burkholder, Cox, Crawford and Hitchcock (2019) assert that the parameter establishment and objective setting of research are of much greater consequence than the size of a sample. Table 4.2 provides a breakdown of the target population.

**Table 4.2: Sample of target population**

Participants	Total
Director: Library and Information Services	1
Deputy Director: Technical Services	1
SEALS Trust & Systems Manager	1
SEALS Trust Principal Systems Librarian	1
Senior librarians	3
Librarians	3
Assistant librarians	2

#### **4.6.1 Sampling procedure**

Non-probability sampling is a sampling method in which not all members of the population have an equal chance of participating in the study and therefore the research population may not be accurately represented (Ngulube 2009). Examples of non-probability sampling are: convenience, quota, purposive, theoretical and snowball sampling (De Vos *et al.* 2011; Maree 2020; Ngulube 2009).

##### **4.6.1.1 Purposive sampling**

Purposive sampling – also known as judgmental, selective or subjective sampling – is a non-probability sampling approach. According to Hennik, Hutter and Bailey (2020), in qualitative research the target population is deductively defined by purposive sampling during the research design phase and then inductively refined during the data collection phase. Hence, one could say that this sampling technique is applied when the researcher purposefully selects participants for a specific reason – or, as Patton (2002) states, participants who would prove “information-rich.”

Yin (2018) cautions that it is best to avoid selecting participants for something other than what the research study is concerned with. Furthermore, sharing findings with individuals who have intimate knowledge of the case under study is an important method for validating interpretive case study analysis (Yin 2014).

For this research study total purposive sampling was employed because the population was relatively small and were all included. In addition, the participants selected would be the only individuals capable of best providing the information needed to achieve the research objectives of the study

#### **4.7 DATA COLLECTION METHODS IN QUALITATIVE RESEARCH**

Research methods are the techniques implemented or tools applied to collect and analyse data which assist the researcher in achieving the research objectives (Berg 2001; Walliman 2021). According to Schoch (2020), research questions drive data collection in case studies. Five main data collection methods suited to qualitative inquiry exist, namely: observations, interviews, visual data, documentary or textual data, and focus group discussions (Creswell 2018; Creswell & Creswell 2018; Hesse-Biber 2017; Maree 2020; Yin 2018). The data-gathering techniques chosen for the present case study were semi-structured interviews and non-participative observation.

##### **4.7.1 Observation**

Maree (2020:105) defines observation as a “systematic process of recording the behavioural patterns of participants, objects and occurrences without necessarily questioning or communicating with them.” When applied as data-gathering technique in qualitative exploration, observation allows the researcher to personally hear, see and experience the actions and experiences as the situation unfolds, without any interference (Maree 2020). However, Amoah, Ferreira and Potgieter (2020) report from a business perspective and describe observation as the recording of behavioural patterns of people, objects and events in a systematic manner to obtain information about the phenomenon. Yin (2018) asserts that observation as a data collection technique is no stranger in case studies because case studies are often contemporary, with real-world problems.

Observation as data collection method is divided into two major categories, namely: participatory observation and non-participatory observation, which, in turn, are further sub-divided into their respective categories. In participatory observation, the researcher immerses completely in the setting of the participants and behaves according to their norms and values, adopting a certain social role, while maintaining sufficient distance to observe the situation (Hennik, Hutter & Bailey 2011). As opposed to participatory observation, in non-participatory observation, the researcher observes a phenomenon from a distance, blending into the background, without influencing what is being observed (Hennik, Hutter & Bailey 2011). Van Rensburg (2010) describes a non-participant researcher as being entirely removed from the social reaction; data could then be gathered from recordings or field notes or from memory.

For present purposes, the researcher employed non-participatory observation as data collection technique. The non-participative observation took place during Level 3 lockdown of the global pandemic. The restrictions were somewhat lifted; however, a mandatory space of 1.5m between people existed. Thus, the researcher was compelled in a way to observe the activities from a distance. Some participants with comorbidities were still refrained from coming to work. As such, the field notes for the current study were compiled by the researcher through observation from a distance, the experiences as an ERM librarian, note-taking and e-mail correspondence.

In the absence of documentation of existing NMULIS processes and workflows as alluded to in the research problem statement (see Section 1.2), the researcher was able to gather empirical primary data by watching the interactions, processes and interactions among the participants as they occurred. Non-participative observation provided unique contextualised insights and enabled the researcher to capture the dynamics among the participants going about their daily tasks and interactions with each other in their work environment.

Creswell (2014) mentions the advantages and disadvantages of the observation technique. The advantage includes the researcher obtaining first-hand experience, real information being recorded immediately and the researcher being able to highlight discussion topics with participants. However, the disadvantage is that the participants may not like being watched and recorded, some information might be restricted from reporting and that the observation technique lacks the researcher's viewpoint.

### **4.7.2 Interviews**

Interviews remain the most popular data collection method in qualitative research (Myers 2020). Kahn and Cannell (1957) define an interview as a conversation with a purpose, while Holstein and Gubrium (1995) extend this definition by designating qualitative interviews as purposeful social interactions between the researcher and the participants in which both are engaged in a meaning-sharing process.

Interviews as a data collection method are useful when a topic or event is highly personal and detailed (Punch 2009). Kvale and Brinkmann (2014) explain that knowledge is produced in a conversational manner, which is contextual, linguistic, narrative and pragmatic, and therefore can only be voiced by people through their level of knowledge, personal experiences and skills developed over the years, with the guidance and facilitation of the interviewer. Depending on the type of interview, the researcher can probe or explore more deeply into certain questions in line with and in the flow of the interview (Roulston 2010).

Interviews also allow the participants to elucidate their comments and express themselves more clearly and comprehensively to be better understood (Myers 2020); more importantly, the participants speak in their own voice and express their own feelings and thoughts. King and Horrocks (2011) warn researchers of the importance of the relationship between the participant and the interviewer. Billups (2021) stresses that researchers should take cognisance by observing, listening and gathering information that is not directly accessible, from the interaction and interplay between verbal and non-verbal, the seen and the heard that allows for the richness of this conversational format. Traditionally, interviews were conducted face-to-face; however, virtual communication tools such as Zoom, Microsoft Teams, Google Hangouts, Facebook and WhatsApp have provided good alternatives for researchers to advance and progress with the data collection process to support their fieldwork (Sah, Singh & Sah 2020).

Corbin and Strauss (2015) highlight areas of difficulty for novice researchers. One such instance is experiencing a period of silence and the researcher trying to salvage the situation by jumping in with questions or comments in redirecting the interview or breaking the thought processes of the person being interviewed. The authors caution



researchers that it is not unusual to encounter interviewees who agree to be interviewed but have very little to say. Therefore, a little nudging, supplemented with some back-up questions or talking about something interesting, often relaxes the participants and provides a sense of direction, builds trust and encourages a conversation (Corbin & Strauss 2015).

The various types of interviews, namely: structured, semi-structured, completely open, unstructured and focus group interviews (Van Rensburg 2010), are discussed further.

#### **4.7.2.1 Focus group interviews**

Focus group discussion is a type of interview which assumes that group interaction would be a better solution than any other form of interview (Maree 2020). For some people, interviews can be overwhelming. When being part of a group it can be easier to participate, especially if one knows the others present. However, people with strong personalities normally command the room, while participants with weaker personalities fade into the background. Focus groups most often consist of 8 to 12 target participants and are used when group dynamics and collective views on a topic are desired (Maree 2020).

Group participation allows participants to comment on each other's thoughts, experiences and responses – and it is here that the researcher uses the opportunity to probe further as participants open up and let the researcher in to better understand the phenomenon under investigation. Group interviews are cost-effective, allowing more people to be interviewed at once than one-on-one. This technique is also less time-consuming because the interviews are conducted simultaneously and the data collected rich with information through participants' interaction as well as probing.

Although focus group interviews yield many benefits, this data collection method was not considered, because the researcher felt that because of the small target sample, grouping the participants meant that some of the participants would be in a group where there would be dominant play. Because the systems and SEALS librarians are responsible for module, system and tools training and most of the research questions were based on exploring each participant's knowledge, skills and opinion of the resources (system and tools), as well as the verification of the processes and workflow designs, the researcher felt that the participants might be reluctant to share their

knowledge, skills and experiences or even express their opinion in a group on the related questions.

#### **4.7.2.2 Structured interviews**

Corbin and Strauss (2015) explain that structured interviews are conducted using interview guides and therefore are similar to a questionnaire. Unlike the other interview methods, structured interviews take away much control of the interview process from the interviewees, as well as the ability to adjust during data collection for any variation or follow-up questions (Corbin & Strauss 2015). Billups (2021) opines that with structured interviews, the predetermined list of questions limits and forces participants to respond in an almost choiceless way and that they are mainly used for their ease of administration and ability to capture data efficiently within a qualitative approach. Structured interviews are more widely used in quantitative than qualitative data collection because of their rigours (Billups 2021).

#### **4.7.2.3 Unstructured interviews**

Unstructured or open-ended interviews are the direct opposite of structured interviews. Unstructured interviews are open conversational interactions (Billups 2021). According to Nieuwenhuis (2016), researchers employ unstructured interviews to hear participants' ideas, views, beliefs and attitudes about phenomena, with a definitive intention to explore. Billups (2021) furthermore explains that unstructured interviews are designed as non-directive inquiries that allow participants to choose their own words, context, descriptions and meanings regarding their experiences. Silverman (2013) notes that unstructured interviews have gained much popularity; however, this technique remains challenging to facilitate effectively. Normally these types of interviews are time-consuming and costly and are spread over long periods, consisting of many interviews.

#### **4.7.2.4 Semi-structured interviews**

De Vos *et al.* (2011) state that semi-structured interviews are conducted around areas of interest that allow for flexibility in scope and depth. Semi-structured interviews are neither structured nor unstructured but share features of both (Nieuwenhuis 2016; Sarantakos 2013). Sewell (2005) explains that semi-structured interviews allow the researcher to generate and outline topics or issues being covered during the

interviews, including the flexibility to vary the wording and sequence of questions. One could say that semi-structured interviews have the conversational element of unstructured interviews, yet the boundaries of structured interviews are inclusive of predetermined questions and include probes, transitions and follow-up questions. Yin (2018) advises the use of semi-structured interviews as case studies are guided by conversations rather than structured questions. All participants are asked the same questions as in the structured interview, with the exception that the semi-structured interview allows for probing questions.

Semi-structured interviews were the technique of choice for the present study. The researcher drew from the theoretical propositions developed from the body of knowledge and the conceptual model to develop the questions in the interview guide. The semi-structured interviews opened up a journey of discoveries and a world of surprises. The value of data generated according to a qualitative approach lies in the multiple responses to the same question being asked. Thus, one cannot control the data of qualitative research. Yet it is those multiple views of the participants which yield the depth and richness the researcher sought during the semi-structured interviews.

#### **4.7.2.5 Pilot interview**

A pilot interview was conducted with a former colleague who resigned about 10 months before the research phase of data collection. The pilot interview was based on literature by Yin (2018), in which he explains that a pilot interview acts as a formative exercise that generates several technical and conceptual issues. As a novice researcher, each of the questions was tested against the research objectives, research questions, literature review and conceptual framework. The wording of each question was checked: whether it was clear, unambiguous and “open” enough to avoid a “yes” or “no” answer. Were the follow-up questions unnecessary or did they allow for the depth the researcher was searching for? Lastly, checks included whether the time allocated for the interviews was sufficient and whether MS Teams software recording and transcription functionality were enabled and operating correctly.

#### **4.7.2.6 Lessons learnt from the pilot interview**

Running a pilot interview before conducting the data collection is advisable. Yin (2014) confirms that in case studies, a pilot interview assists in refining the data collection

plans for both the content and procedures. As a novice researcher, and as the research process unfolded, the study became quite overwhelming. The main concern was whether the questions in the interview protocols would generate the data required to answer the research questions. Were the research questions well-articulated? Were the questions too far-ranging? Were there too many questions or were the questions too complicated? Would the data be saturated by these few questions?

The researcher attended many workshops and training sessions, both at NMU and UNISA, but still felt unprepared for the unknown or what was to come – hence, the core reason for the pilot interview.

The second challenge was finding someone to partake voluntarily in the pilot interview, because there were many elements to consider, such as:

- the work role of the participant had to be in creating and managing e-resources.
- the system used had to be the Sierra library system.
- the processes and workflows had to be like those of NMULIS.
- the organisational structure had to be similar.

Fortunately, the former colleague accepted the invitation to participate in the pilot exercise.

During the pilot interview, the researcher discovered that the MS Teams transcription functionality could not be activated; this was seen to immediately after the interview. Additionally, the pilot interview highlighted areas for consideration and the following adjustments were made. Firstly, objectives on the interview guide were deleted since it was not necessary to have the research objectives and the research questions in the same document. Secondly, when asking the participants to give a metric, for example, “on a scale of 1 to 10”, the researcher realised that these values needed to be explained – what a rating of 1 meant and what 10 meant on the scale – after the pilot interviewee had asked the question.

Question 2 of the Phase 1 interview guide contained too many unnecessary sub-questions. Additionally, the researcher included a question on how participants attained their knowledge apart from the skills they developed. Thirdly, the headings of

the appendices were not clear and research question 3 was not clearly articulated and needed to be rephrased. Lastly, not all the participants needed to partake in Phase 2; if the appendices and tables were verified by the heads of department, there was no need for the other participants to verify the same information.

Phase 1 interviews were all scheduled for 45 minutes. During the pilot interview the researcher discovered that it required an additional 15 minutes to complete the interviews. However, after a few adjustments and question alignment, as well as deleting the unnecessary sub-questions as stated above, the initially scheduled time of 45 minutes was sufficient.

Additionally, the researcher developed a checklist to ensure that all criteria were met before conducting the interviews, such as checking the MS Teams invitation that there was a link on the invitation, that all necessary documents were attached, the date and time were correct, the load-shedding schedule for both researcher and participant, that the recording and transcription functionalities were enabled and that the laptop timer was set and the cellphone recorder was on. Also, for consistency and to make sure that nothing was left out, greeting and closing notes were developed.

#### ***4.7.2.7 Justification for semi-structured interviews and non-participant observation as data collection techniques***

Non-participative observation allowed the researcher to record the information as it took place, in real-time, without attempting to manipulate or control the phenomena being observed. The researcher considered this data collection technique to be the only means of sketching and tabulating the NMULIS processes and workflows. Billups (2021) affirms that observational data adds value to a study as a supplementary source of data and can contribute a different perspective when compared with spoken or written results.

As alluded to earlier, the selection of the non-participative observation technique was partly as a result of the country being on Level 3 lockdown during the pandemic. These restrictions included a mandatory space of 1.5m between people. Thus, the researcher was compelled in a way to observe the activities being studied from a distance.

Semi-structured interviews are widely described as interviews with flexibility and adaptability. The semi-structured interview questions were informed by the research questions of this study. This allowed the researcher to prepare interview question guides in advance for participants to prepare themselves for the type of questions to be asked and to seek any clarification before the data were collected. The participants selected for this research were the only individuals creating and maintaining the accessibility of e-resources at NMULIS and their line managers. These librarians were considered experts in their roles and responsibilities with regard to these functions.

From a researcher's perspective, semi-structured interviews enabled the researcher to question certain responses in greater depth and particularly in those areas where the participant gave contradictory views. This technique allows for follow-up questions should the need to confirm or seek clarity arise. The semi-structured questions allowed the researcher not only to ask specific questions but could use the probing technique for a deeper understanding of and finding the innate knowledge, experiences and skills of the librarians. Some of these librarians have many years of experience – not just in their current work but occupied other positions in the library environment as well, whilst others come from other institutions with a different organisational structure, system and tools, which created greater depth to the empirical primary data. Most importantly, the semi-structured interviews afforded the researcher the opportunity to merge theory and practice.

Research question 5 of this study relates to a relatively new concept – lean principles – as the literature indicated. The semi-structured interviews promoted interviews of a conversational nature, thus giving the researcher scope to adapt the formulation of the probing questions to fit the background and understanding of participants by citing library examples that would be easily understood by the participant to engage. As noted in the review of literature, very few scholarly works on lean principles as a business improvement initiative in academic libraries exist, and even less so in a South African context. Furthermore, a dearth of scholarly literature exist on lean principles as a business improvement initiative in enhancing processes and workflows to streamline access of e-resources. Given this scenario, the semi-structured interviews allowed the researcher to pick up on non-verbal cues and thereby adjust or clarify the questions to be better understood.

Semi-structured interviews are also a data collection technique commonly known to be used to corroborate data emerging from other data sources or prior interview sessions. Semi-structured interviews are also a data collection technique commonly known to be used to corroborate data emerging from other data sources or prior interview sessions. For this research study, the researcher conducted four separate semi-structured interviews involving different participants in a procedure of initial data gathering followed by verification. The sequence of the semi-structured interviews therefore allowed for cross-validation of data – referred to as triangulation.

Flick (2020) explains that the term triangulation in social research can be observed from different vantage points. Consequently, Denzin (2009) distinguishes four different forms of triangulation, namely: (1) data drawn from different sources, at different times, in different places or from different people; (2) the use of different observers or interviewers to balance out the subjective influences of individuals; (3) within-method (by using different sub-scales within a questionnaire, and (4) between-method (the combination of different methods). The mode of triangulation implemented for present purposes was data drawn from different sources (semi-structured interviews and non-participative observation), as well as online semi-structured interviews (at different times, in different places or from different people).

## **4.8 DATA COLLECTION PROCEDURES**

Both the semi-structured interviews and non-participative observation procedures generated the primary data required to answer the research questions. The non-participative observation data collection took place over a period, during Covid lockdown. To mitigate the spread of the virus, staff were asked to work on a rotational basis and to keep the footprint on campus to a minimum. Capturing the observational data was very time-consuming because of a roster that was implemented and staff with co-morbidities were not allowed on campus. This resulted in some data being captured in real-time, some data through memory and the remainder by e-mail and telephone calls.

### **4.8.1 Non-participative observational data collection**

The researcher developed an observational plan (as shown in Table 4.3), based on the Cottage Center for Population Health evaluation toolkit (2022).

**Table 4.3: Observational plan**

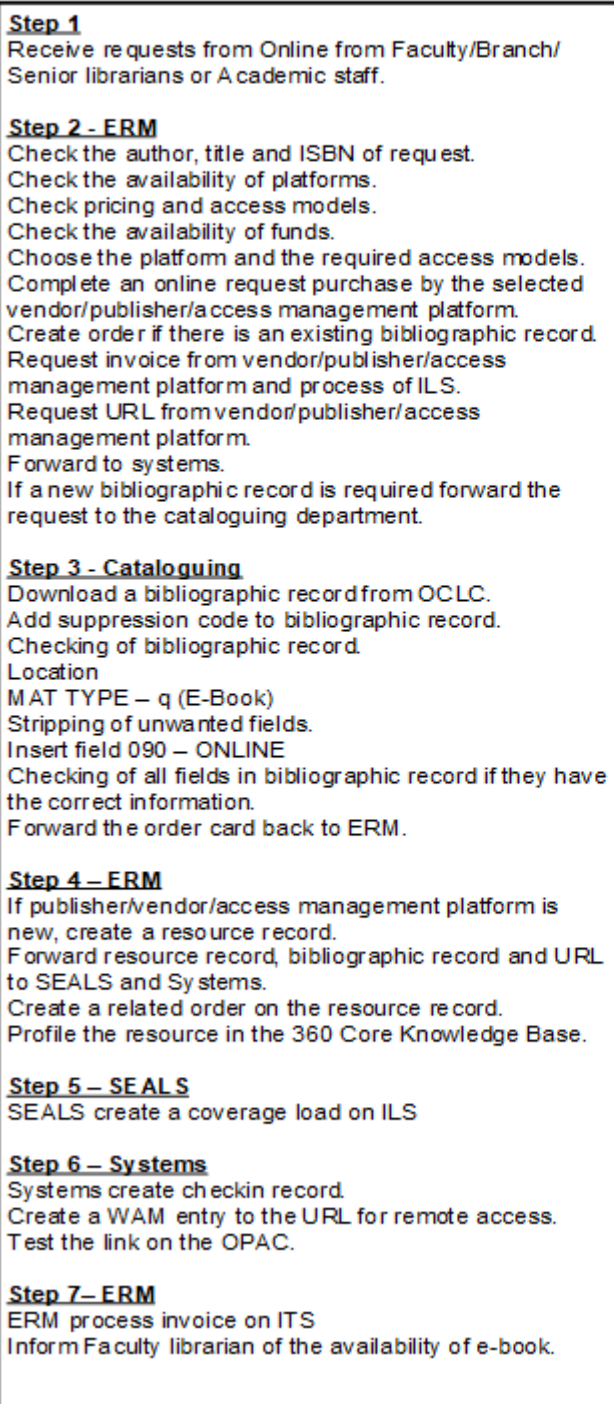
	Role	OBSERVATION		OBSERVATION		OBSERVATION	
		Date	Time	Date	Time	Date	Time
Participant 1	SEALS	4/07/2022	09h00-10h00	11/07/2022	08h30-10h00	29/07/2022	08H00
Participant 3	Acquisition	4/07/2022	12h00-13h00	11/07/2022	12h00-13h00		
Participant 4	Systems	5/07/2022	09h30-10h30	14/07/2022	09h00-10h00	28/07/2022	10H00
Participant 5	Cataloguer	5/07/2022	14h00-15h00	13/07/2022	09h00-10h00		
Participant 6	Cataloguer	4/07/2022	08h00-09h00	13/07/2022	11h00-12h00	28/07/2022	16h00
Participant 8	SEALS	4/07/2022	10h30-11h30	12/07/2022	11h00-12h00	29/07/2022	10H00
Participant 9	Acquisition	5/07/2022	10h30-11h30	15/07/2022	09h00-10h00	28/07/2022	14H00
Participant 11	Cataloguer	20/07/2022	09h00-10h00	11/07/2022	11h00-12h00		
Participant 12	Acquisition	6/07/2022	09h00-10h00	11/07/2022	14h00-15h00	28/07/2022	12H00
Participant 13	Acquisition	6/07/2022	12h00-13h00	12/07/2022	09h00-10h00	22/07/2022	09h00-10h00

Source: The author, modelled on Cottage Center for Population Health evaluation toolkit (2022)

The observational plan specified who would be observed, what would be observed and when. This structured plan assisted the researcher, especially with staff working remotely. It was important to know who would be on campus at what time and what needed to be observed at the time, according to the researcher’s operational plan and the format being observed. Figure 4.2 illustrated the processes and workflow of a single perpetual access e-book title and Figure 4.3 is representative of the process and workflow of an e-journal single title subscription. Figure 4.4 is indicative of the workflow of a newly acquired database, which is accompanied by Tables 4.2 – 4.7 indicating the processes of each phase within the database life-cycle. The verification of the observational data took place during Phase 2 of the semi-structured interviews. The verified data were then applied later in the lean waste exercise during Phase 3 of the semi-structured interviews.



## Processes



## Workflow

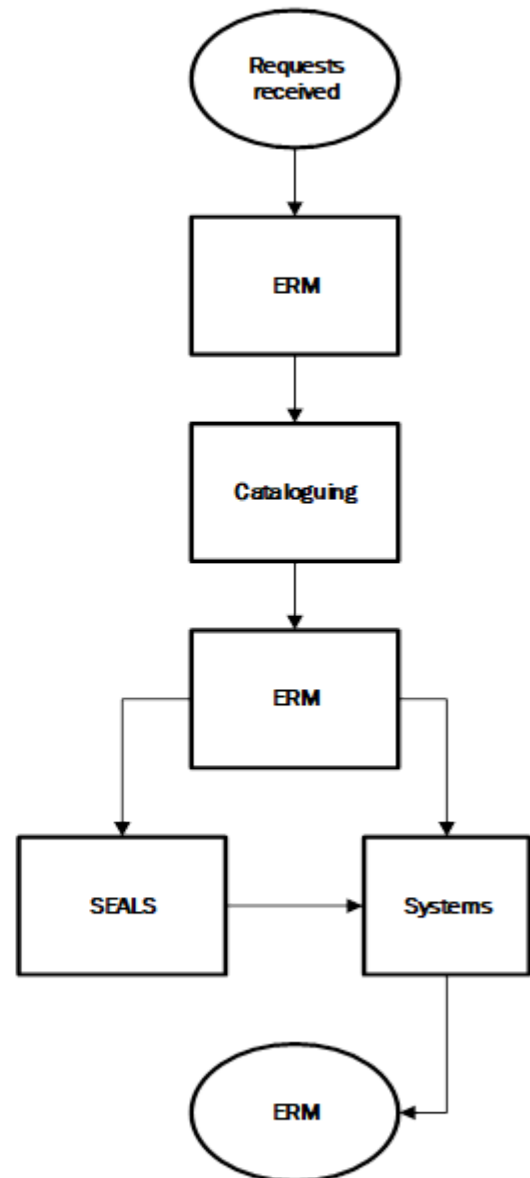


Figure 4.2: Observational data: single title e-book perpetual access process

## Processes

<p><b>Step 1 – ERM</b> Receive request for e-journal from Faculty Librarian.</p> <p><b>Step 2 – ERM</b> Check details of the e-journal subscription and verify publisher ISSN number and e-journal title. Check for overlap titles in packages. Select to either subscribe directly to the publisher or vendor. Forward e-journal request to publisher or vendor. The information received on return from the publisher, check coverage dates, embargos as well perpetual access. Request a quotation from publisher or vendor. Inform Faculty Librarian on the availability and cost to subscribe. On confirmation from Faculty Librarian forward details to cataloguing to download bib record if there is not a bib record on the ILS within the consortium.</p> <p><b>Step 3 – Cataloguing</b> Double-check and confirm bibliographic information of the record against the request received. Determine whether a new record is needed based on CONSER, RDA and NMU's cataloguing manuals. Cataloguing give attention to details and specific fields. Cataloguing giving attention to all details and specific fields. 008 – Pertaining to Continuing resources – Entry/conversation. Close date 2 if ceased/title change. 264 – Publication date if necessary. Field for RDA on print and online. 780 / 785 – Later title / earlier title. Preceding / Succeeding: Continuation, merger, split, absorption. 785 / 787 – Translation. 770 / 767 – Supplement / Parent record. 775 – Other edition available. 776 – Material format change. 787 – Non-specific relationship.</p> <p><b>Step 4 – ERM</b> Create an Order record. Email system the bibliography, resource record, coverage dates and the URL link to create a checkin record. Profile e-journal in the KB. Prepare Load Sheet (spreadsheet) to include ssj numbers and URL. NB ssj or ssi numbers are after the 10<sup>th</sup> of each month. Add numbers when available – keep a schedule list.</p> <p><b>Step 5 – System</b> Confirm and check all the details received from ERM. Create checkin record or forward to SEALS if complex database to assist. Add WAM to the URL link and check if URL opens on correct landing page.</p> <p><b>Step 6 – ERM</b> Check link on SIERRA, OPAC and KB if everything in order. Create invoice and capture payment on SIERRA and ITS. Register on Publisher site for usage stats.</p> <p><b>Step 7 – ERM</b> All single title e-journal subscription must be renewed annually for the continuation of the subscription. The Faculty Librarian indicates after consulting with the Faculty whether the e-journal should be renewed or not. For renewal the ERM librarian informs the publisher or vendor, receive the invoice and process the invoice on SIERRA and ITS.</p> <p><b>Step 8 – ERM</b> ERM librarian informs the publisher and vendor. Unsubscribe the e-journal on the KB. Change order record to status "2". Inform SEALS, LISDA and Faculty Librarian.</p> <p><b>Step 9 – SEALS</b> Delete resource from Coverage Delete bib record that has not holdings attached. Inform ERM when done.</p>
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## Workflow

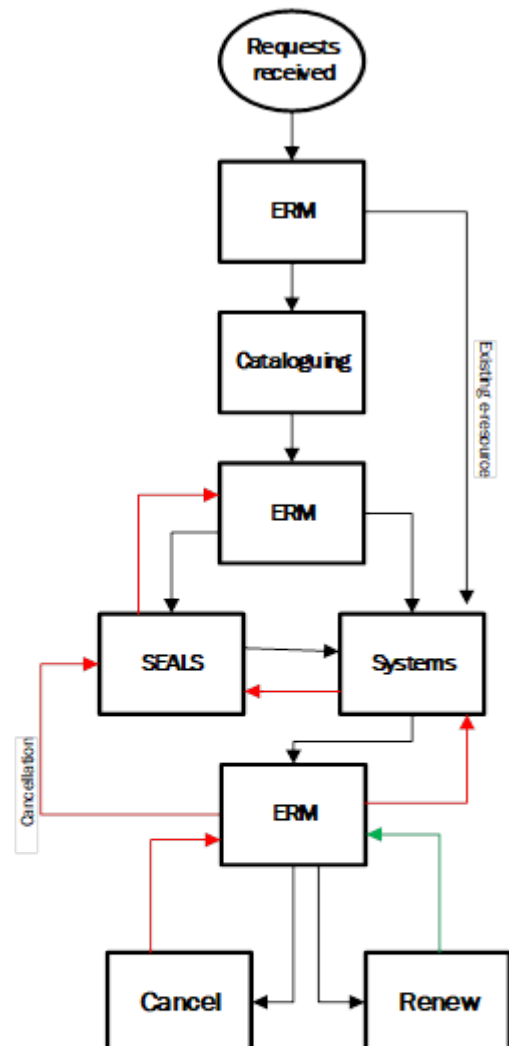


Figure 4.3: Observational data: single title e-journal subscription process

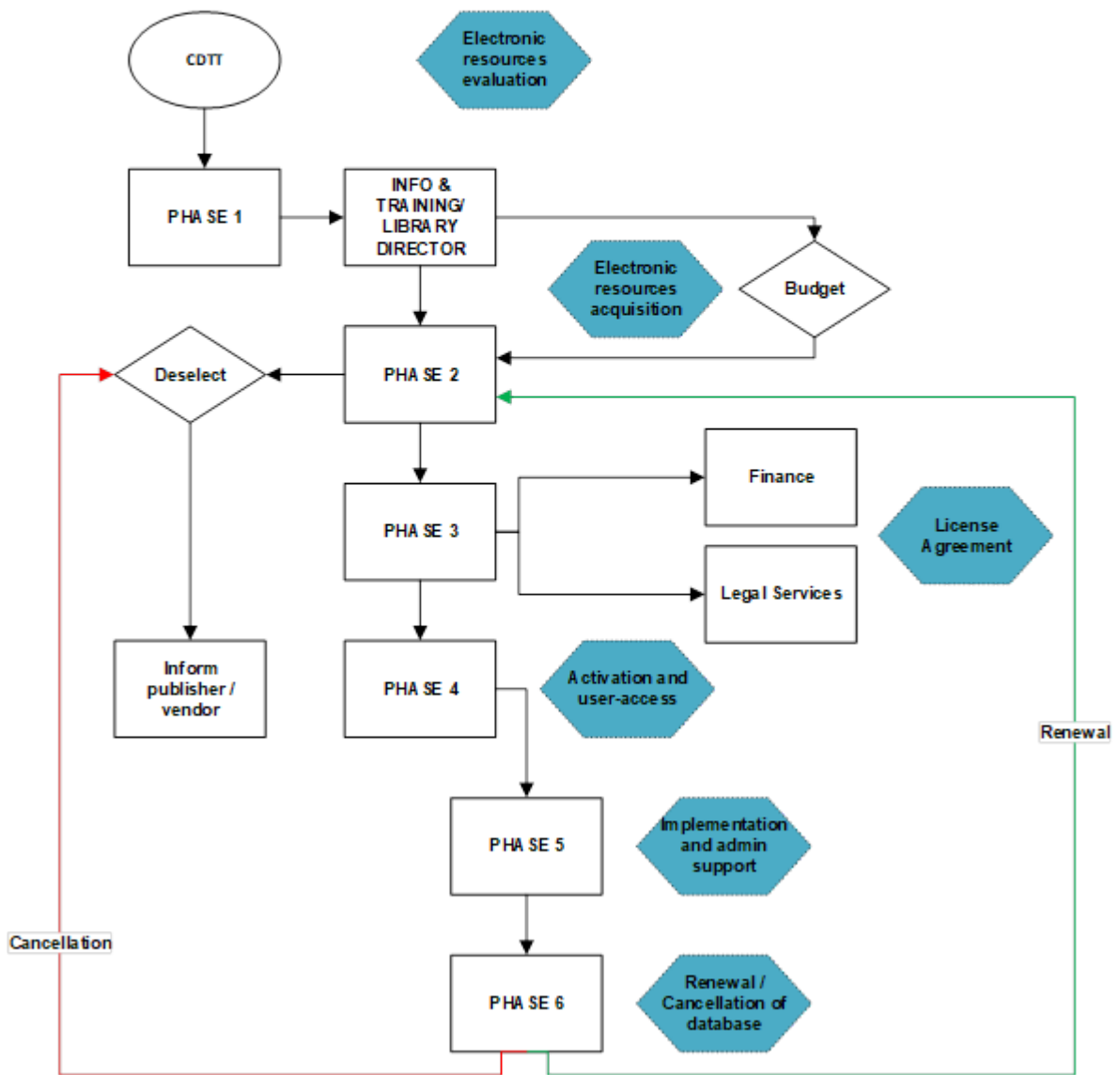


Figure 4.4: Observational data: new database acquisition

**Table 4.4: Phase 1 – Trial**

No	Process	Department
1	Receive notification of a trial request	ERM
2	Negotiate trial conditions with the publisher	ERM
3	Request URL link from publisher/vendor	ERM
4	Create an e-resource record and add URL link to the record	ERM
5	Supply IP ranges to publisher/vendor	ERM
6	At end of the trial prepare a title study overlap, usage statistic report and quotation for Info and training to evaluate the database	ERM
7	Suppress trial resource record until confirmation is received	ERM

**Table 4.5: Phase 2 – Ordering**

No	Process	Department
1	Receive request to place an order	ERM
2	Check budget availability	ERM
3	Place an order with publisher / vendor	ERM
4	Request licence agreement from publisher / vendor	ERM
5	Request bibliographic record	Cataloguing
6	Request URL link from publisher / vendor	ERM
7	Create an e-resource record / check current resource records for changes	ERM
8	Profile new database in 360Core KB	ERM
9	Process invoice on SIERRA and ITS	ERM
10	Notify SEALS that a profile has been created for a new resource or that an existing database has been upgraded. The resource records, URL link and KBART are forwarded to SEALS.	ERM

**Table 4.6: Phase 3 – Licensing**

No	Process	Department
1	Request and receive Licence Agreement from publisher/vendor	ERM
2	Verify contents of the Licence Agreement or Order Form with Terms and Conditions	ERM
3	Complete the NMU Licence Agreement Approval Form and obtain a signature from Senior Librarian: ERM	ERM
4	Forward a copy of the Approval Form, Quotation and Licence Agreement or Order Form with Terms and Conditions to the Library Director for approval and signature	ERM
5	Receive the signed Approval from the Library Director and forward all the documents to Legal Department and Finance Department to co-approve and for signature	ERM
6	Once all the documents have been co-approved and signed, documents are forwarded back to ERM	ERM
7	Forward a copy of the signed Licence Agreement or Order Form with Terms and Conditions to the publisher / vendor for counter-signature	ERM
8	Receive counter-signed documents from publisher / vendor and upload a copy of the Approval Form, counter-signed Licence Agreement and quotation onto the library SharePoint	ERM
9	Forward a copy of the counter-signed Licence Agreement or Order Form with Terms and Conditions to the Legal Department for their records.	ERM

**Table 4.7: Phase 4 – Activation and User Access**

No	Process	Department
1	Forward database details, records and KBART files to SEALS	ERM
2	SEALS office checks whether Resource ID matches the load file.	SEALS
3	ERM and cataloguing check whether any bib records on SIERRA do not have title IDs and update bib records accordingly preload.	ERM & Cataloguing
4	If new MARC records are imported, title IDs should be added for a successful load and attached check-in records for access.	Cataloguing & LISDA
5	Check for incorrect and incomplete bib data on SIERRA as it will cause errors and access to resources.	ERM, Cataloguing & LISDA
6	After the 10th of each month SEALS download the subscription data file from 360Core.	SEALS
7	Extract data appropriate to the resource being loaded from the subscription data file and create a load file.	SEALS
8	Check and match bib records with the subscription load file, checking for bib records with correct title IDs.	SEALS
9	SEALS usually inform the cataloguing department if they need to preload MARC records for holdings. Each case is evaluated according to the number of titles in the database, the number of full and fixed records on SIERRA and the number of short bib records that need to be updated.	SEALS & Cataloguing

**Table 4.8: Phase 5 – Implementation administration and support**

No	Process	Department
1	Load file into the ERM system to create check-in records with links for access and if no bib record matches, a short bib record is created.	SEALS
2	Check the load report for errors; fix multiple matches and errors appropriate to the file loaded.	SEALS
3	Forward load report to ERM librarian for information.	SEALS
4	Check information and access from all access points on various systems.	ERM
5	If full-text journals are available, forward them to LISDA to add a link resolver.	LISDA
6	Register on database platform as administrator to retrieve usage statistics.	ERM
7	Forward database information, URL and marketing material to the Web Administrator and Faculty Librarian regarding the availability and to inform users of the new resource.	ERM

**Table 4.9: Phase 6 – Renewals and Cancellations**

No	Process	Department
1	To renew a database – ERM will receive the request from Faculty Librarian.	ERM
2	ERM librarian informs publisher/vendor and requests quotation.	ERM
3	Upon receipt of the quotation, the ERM librarian approves and signs the product order and will follow the processes from the ordering phase Table 4.5 and Table 4.6 if the current license agreement expired.	ERM
4	To cancel a database - the faculty librarian informs the ERM department the database must be cancelled. ERM librarian checks the license agreement for the cancellation notification period – if within the notification period, informs the publisher/vendor.	ERM
5	Change order record status to “z” and insert a note in the note field.	ERM
6	Check license agreement for perpetual access titles.	ERM
7	Unsubscribe the resource on 360Core.	ERM
8	Create a list to include bib and checkin records and forward to SEALS	ERM
9	Check the information on Global Update if correct.	SEALS
10	Bulk-delete all records	SEALS
11	Delete the resource record from Coverage	SEALS
12	Delete bib records that have no holdings attached.	SEALS
13	Inform ERM regarding the cancellations	SEALS
14	Inform information and training and ask Web Administrator to remove link from the Library Portal.	ERM

#### 4.8.2 Qualitative data collection: Semi-structured interviews

There were four phases of semi-structured interviews. Table 4.10 summarises the phases and the phase involving each participant. Phase 2 was the verification phase and the participants selected were the core person performing that specific function. Phase 3 was similar to Phase 2 and, in some instances, only one person performs that specific function.



**Table 4.10: Summary of interview phases**

Participant	Phase 1	Phase 2	Phase 3	Phase 4
Participant 1	√	√	√	
Participant 2				√
Participant 3	√		√	
Participant 4	√	√	√	
Participant 5	√			
Participant 6	√	√	√	
Participant 7				√
Participant 8	√	√		
Participant 9	√	√	√	
Participant 11	√			
Participant 12	√	√	√	
Participant 13	√			

Figures 5.10 – 5.12 are representative of the verified processes and workflows of the single title e-book (perpetual access), single title e-journal subscription and the acquisition of a new database respectively. Tables 5.4 – 5.9 are the processes of the six phases in a database. The data were collected during observation and then transferred to Microsoft Visio Professional 10. Microsoft Visio Professional software draws flowcharts, organogram charts, building plans, floor plans, data flow diagrams, process flow diagrams and business process modeling. The information captured was the researcher's own construction of the current processes and workflows obtained during observation. The researcher developed Phase 2 (Appendix B) of the semi-structured interviews to give the participants the opportunity to verify the information or amend it so that the information would be a true reflection of the processes and workflows in their relevant spaces.

Given (2008:810) defines a semi-structured interview as a “qualitative data collection strategy in which the researcher asks informants a series of predetermined but open-ended questions.” Thus, the researcher developed interview question guides with a pre-determined list of questions for all participants. The focal aim of the pre-determined list of interview questions was to steer the interview process in the right

direction and for the participants to prepare themselves for the type of questions to be asked to reduce the anxiety they expressed.

All four semi-structured interviews were conducted online via MS Teams software. The choice of online interviews, as opposed to the traditional face-to-face mode, was also determined by the global pandemic and the accompanying uncertainties. Besides using MS Teams software's recording and transcription capabilities, the researcher also recorded the data on the Microsoft 365 "speech-to-text" function and on cellphone. This was to mitigate any technical or load-shedding problems during the scheduled data collection time.

Authors Legard, Keegan and Ward (2003) advise researchers regarding the importance of recording and making notes during interviews; these methods allow the researcher to pay full attention to what is being said and jot down important keynotes that can later be used for further probing. The authors point out that although note-taking could potentially give rise to bias, the audio recording would ensure that the whole interview is captured and allows for thorough and rigorous data analysis.

The semi-structured interviews were conducted in four phases (see Appendices A, B, C, D). The semi-structured interviews of phases 1, 2 and 3 were conducted with the librarians responsible for creating and managing access to e-resources at NMULIS and the phase 4 interviews with the line managers of these librarians. The various phases are discussed in detail below.

#### **4.8.2.1 Phase 1 – semi-structured interviews**

Phase 1 addressed research questions 1, 2 and 4, as the interview question guide (Appendix A) indicates. Initially, research question 3 was also part of this phase. The interviews were scheduled for 45-minute sessions each, but in many cases and because of the nature of semi-structured interviews, the researcher did not abruptly stop participants if they went over the 45 minutes; most of them had questions on the concept of lean principles and some found it very interesting and relevant. During the first session with Participant 1, the researcher changed the sequence of the questions to that of the interview question guide and only addressed research questions 1, 2 and 4 with the permission of the participant. After the session, the researcher decided that research question 3 would be best be dealt with on its own and therefore developed

Phase 2 to address research question 3 as it was time-consuming and participants were asked to switch on their cameras.

An interview question guide was presented to the participants in advance. This first phase was to explore the experiences, skills and knowledge needed as an academic librarian in the 21<sup>st</sup> century – as well as to establish whether the participants had the necessary skills and knowledge when creating and managing access to e-resources at NMULIS. Secondly, the researcher wanted to establish the participants' conceptualisation of processes and workflows, as well as their understanding of the concept of lean principles. The importance of conceptualisation is to have a common understanding, especially of the core functions and applications in operations.

Many participants indicated that they had never participated in a research study before and therefore felt unsure, nervous and uncomfortable participating. To assist the participants with their challenges, the researcher decided to include attachments in the online invitation: an introduction to the research topic, interview question guides, notes explaining the importance of the study, why they were specifically selected to participate and what the benefits were to themselves, the library and the institution as a whole.

Recognising Phase 1 as the most important phase of the data collection, the researcher-participant relationship was established by making sure the participants were comfortable, acknowledging that it was normal to be nervous, and assuring them of the confidentiality and anonymity of whatever was said (given that no names would be mentioned in the transcripts, analysis and findings). Furthermore, this interview was regarded as a conversation rather than an interrogation. What was evident was the working relationship of trust, respect and transparency that existed in the work environment, which spilled over in creating an atmosphere of openness and productive dialogue during data collection. This phase laid the constructive foundation for all the other semi-structured interviews that followed.

#### **4.8.2.2 Phase 2 – semi-structured interviews**

As indicated earlier, Phase 2 related to research question 3, reflected in the interview question guide Appendix B. As elaborated on in Section 4.8.1, the researcher constructed diagrams of the current NMULIS processes and workflows. The interviews

were again conducted online via MS Teams and the participants had to share their screens during interviews. During the interviews, each format was dealt with individually, because the participants felt that they could only speak about the steps their functions involved or each was responsible for and not about what happened in other departments.

Because this information was captured and recorded by the researcher as a non-participatory observer, the information needed to be verified, amended or adjusted to be a true reflection of the current processes and workflows. By verifying and / or amending the information, the participants were co-creators rather than participants in the construction of these diagrams. The verification of the information is evident in Figures 5.10 – 5.12 and Tables 5.4 – 5.9.

#### **4.8.2.3 Phase 3 – semi-structured interviews**

The Phase 3 interviews (Appendix C) were two-fold. Before the commencement of this phase, the researcher ensured that Phases 1 and 2 interviews were completed, as well as their transcriptions. New questions were drafted that resulted from contradictions and uncertainties, as well as questions asked and statements made by participants during the first two phases. Through reading and re-reading the collected transcribed data, highlighting and comparing notes, the follow-up questions for Phase 3 were developed.

The first part of the Phase 3 interviews dealt with the follow-up questions. The second part concentrated on answering research question 5 and involved an activity. Participants were given copies of the verified Figures 5.10 – 5.12 as well as Tables 5.4 – 5.9. Participants were given activity sheets (Table 4.11) as an example of the lean activity sheet, as well as a key symbol guide (see Table 4.12). The key symbol guide was customised with key descriptions and lean waste examples in an academic library environment. Using the key symbol guide, participants were asked to highlight or colour in the key description that they considered to be a possible lean waste in Appendices G – L. Participants then had to explain why the key description was considered lean waste.

**Table 4.11: Flowchart used for the lean waste activities**

	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM	○	⇒	□	◇	▽	Receive online request from Faculty / Branch / Senior librarian

Source: Author’s own compilation, from process flow diagram by Malanga (2012)

Similar to the process flow diagram, the flowchart specifies each activity and the role it plays in the process (Malanga 2012). The flowchart illustrated the steps, department, flowchart symbol, process details and sequence of each step. The reason for using a flowchart as a data collection instrument for the lean waste exercise was the visuality the chart presented. The participant could select more than one lean waste within a step and it was an easy way to follow the process from start to finish.

**Table 4.12: Key symbol guide**

Key symbol	Key description	Examples of lean waste in a library environment
○	Start	This symbol indicates the start of a process.
▽	Waiting	Waiting. This symbol is used for delays in any activity you regard as an unnecessary delay, for example: long delays in response time, receiving of orders, receiving and executing of licence agreements, obtaining URLs, creating access to e-resources, waiting for resources to be catalogued, waiting for approvals, postponed meetings, load-shedding, systems, equipment, tools, etc.
⇒	Movement / Motion	Any unnecessary movements or motions due to the layout of equipment, printers or office desk. Movement of picking up and dropping off documents, unnecessary workflows, duplication of effort, repetitive work, double entry of work, unnecessary searches, searching for files on the computer and too many clicks to access resources.

Key symbol	Key description	Examples of lean waste in a library environment
□	Action	This symbol indicates tasks or processes. Examples are completing repetitive tasks, documenting the same information in multiple places, unnecessary printing, e-mailing or making copies. Ordering stock more than what is needed, generating unnecessary reports, duplication of processes, using unnecessary complex and complicated processes, incorrect processes, anything that does not meet the customer's expectation, data error entries, loss of files and records, incorrect information on files and records, and documents that are incomplete or incorrect.
◇	Decision	Deliver what the customer wants, how much they want and when they want it; how responsive is the purchasing process to the demands of the customer? Insufficient training and development, no employee feedback, improper tools, systems and equipment to work with, lack of challenges for employees, no succession plan, no incentives and lack of or no performance management tool.

#### 4.8.2.4 Phase 4 – semi-structured interviews

The interviews during Phase 4 were conducted with the library director and the deputy director of technical services. These participants were also provided with an interview question guide (see Annexure D). The data collected in these interviews related to research questions 1, 4 and 5. Additionally, these participants were also asked clarity-seeking questions which transpired from the previous phases.

It was essential to the study to hear the views of the line managers, especially regarding statements made by participants during the previous interviews. Apart from being line managers, these participants also form part of the library directorate, where all the strategic planning and decision-making takes place. Moreover, their inclusion assisted in filling gaps in the participants' knowledge from a strategic perspective.

## 4.9 DATA ANALYSIS

According to Maguire and Delahunt (2017), the data analysis process is central to credible qualitative research and is regarded as a systematic search for meaning. According to Creswell and Poth (2018), data analysis involves preparing, organising, reducing, condensing and representing data collected during a research study. Qualitative data analysis involves several back-and-forth steps between data

collection and data analysis, which affirms the statement by Creswell (2014) that qualitative analysis requires an ongoing process of analytical reflection on the collected data.

Kalpokaite and Radivojevic (2019) elaborate that many qualitative researchers value the importance of the simultaneous involvement of both data collection and data analysis (Charmaz 2006; Creswell 2018; Saldaña 2013), resulting in a richer and more convincing analysis. Qualitative data analysis is known for its identification of themes, patterns, processes and / or profiles, which is achieved by searching for patterns or regularities across data and, as Flick (2020) postulates, is typically done by comparing and contrasting data segments – thus delineating the overarching themes, patterns and / or processes.

Miles, Huberman and Saldaña (2014) point out that creating a conceptual framework from the existing literature is a common feature across qualitative data analysis approaches. Because the framework is constructed as opposed to the extant knowledge found in prior studies, the researcher analysed and synthesised the extant information – thus laying the foundation for the collection and analysis of new, original data (Miles, Huberman & Saldaña 2014). According to Yin (2014:132), in the context of case studies, “data analysis consists of examining, categorizing, tabulating, testing or otherwise recombining evidence to produce empirically based findings.” The author further alludes that the most important strategy is to follow the theoretical intentions that led to the case study; it would assist in planning for the most relevant data and staying focused on the entire case study (Yin 2014).

There are various approaches to qualitative data analysis. One of the most widely used contemporary methods across most qualitative studies is the practice of coding (Kalpokaite & Radivojevic 2019). Creswell (2014) describes coding as the process of analysing qualitative data text by taking it apart to see what it produces and then putting the data back together in a meaningful way. Miles, Huberman and Saldaña (2014) postulate that codes are short descriptive or inferential labels that researchers assign to data segments to condense and categorise data sets. Of the various coding methods, Elliott (2018) indicates that the choice is often based on what is appropriate

to the study or the recommended coding methods applicable to the methodological strategy of the study.

The use of software such as MAXQDA, NVivo, ATLAS.ti, Provalis Research Text Analytics Software, etc., has become almost compulsory in qualitative research (Elliott 2018). Moreover, Yin (2014) asserts that software aids with coding and categorising large amounts of narrative text. To the contrary, Friese (2019) explains that some researchers are sceptical regarding the use of computer software that does not actually analyse the data but rather facilitates the process more effectively and efficiently. Bazeley (2021) posits that software and technological advances have influenced how research is done. Furthermore, software support extends beyond the traditional pencil and paper data analysis of retrieving, sorting, interrogating and recombining unstructured data; it supports multiple data types, including multi-media and web-based sources, multi-site teamwork, complex data management, manipulation, querying capacity and tools for memoing, linking and visualisation of data (Bazeley 2021).

ATLAS.ti 22 is one of the CAQDAS programs designed to organise and manage textual, visual or audio data. It is considered a toolkit – not simply a tool with multiple capabilities. It is also well-known for “processing large amounts of data, coding your original data sources, keeping track of interrelations and even visualising their importance in the coding scheme” (Friese 2022:1). According to Soratto, Pires and Friese (2019), the ATLAS.ti software facilitates content analysis and enables researchers to store all the relevant data in one place – thereby providing data security and eliminating manual tasks.

Important to note is that ATLAS.ti software does not perform automated data analysis. The researcher remains critical to the data analysis and the data analysis process during all the stages and is also responsible for creating all the relationships during the analytical process (Soratto, Pires & Friese 2019). ATLAS.ti has two principal modes of working, namely: the data level and the conceptual level. The data level includes activities such as the segmentation of data files, coding text and writing comments and memos. The conceptual level focuses on querying data and model-building activities, such as linking codes in networks and writing further memos and



comments (Friese 2019). The benefits of ATLAS.ti 22 as a data analysis software tool were four-fold. Firstly, it helped to ground the analysis in the evidence shown by the coding. Secondly, it maintained a good trail of the analytical process. Thirdly, it contributed to demonstrating rigour and, fourthly, revealed the development of the interpretation phase and final analysis by means of meaningful integration or synthesis. For present study purposes, the researcher selected Braun and Clarke's reflexive thematic analysis (RTA), supported by ATLAS.ti 22 software in the coding process.

#### **4.9.1 Braun and Clarke's reflexive thematic analysis (RTA)**

Braun and Clarke (2006) developed a recursive structure, meaning the researcher can opt to move back and forth between steps, with some being repeated more than once or as often as needed to identify broader themes and sub-themes across the data set (Terry, Hayfield, Clarke & Braun 2017). Thematic analysis (TA) is considered both an accessible and flexible approach for analysing qualitative data – with flexibility being one of the greatest benefits of this data analysis approach (Braun & Clarke 2006). According to Kiger and Varpio (2020), the technique devised by Braun and Clarke (2006) is the most widely adopted method of thematic analysis within qualitative research, consisting of six steps:

1. Familiarisation with the data – This step requires reading and re-reading the data and noting interesting quotes, ideas, relationships, contrasts and examples cited.
2. Initial coding – ATLAS.ti software was used to facilitate this first cycle of coding.
3. Search for themes – In this second cycle of coding, codes were organised and merged those that were similar or belonged to a certain group or potential themes, using labels, highlights and gathering all the data relevant to each particular theme.
4. Reviewing the themes – ATLAS.ti has an export to Excel capability that can also be used for the trail audit to see how the codes were reduced. During this step, the researcher checks the codes in relation to the coded quotations and the entire data set.

5. Defining and naming the themes – During this third cycle, the researcher finalised the themes by reducing and regrouping the fourth step. The themes were then also examined in relation to the concepts of the conceptual model.
6. Creating a report – In this last step in the analysis, the researcher captured the rich, in-depth and thought-provoking narrative, along with a final analysis of the selected quotations and relating them to the research objectives, literature review and conceptual framework.

Byrne (2022) describes reflexive thematic analysis (RTA) as an easily accessible and theoretically flexible interpretative approach that facilitates the identification and analysis of patterns and themes. Braun and Clarke (2022:5) indicate that reflexivity in thematic analysis “involves the practice of critical reflection on the role of the researcher.” In addition, reflexivity includes the researcher reflecting on methodological choices and disciplinary location, and how these shape the knowledge production of the research study (Braun & Clarke 2022).

Braun and Clarke (2022:) explain that coding is a process in reflexive thematic analysis and how the researcher codes or labels are considered as outputs and are the foundation for the initial theme development. The authors furthermore elaborate that a quality RTA is not about working through a series of steps. It concerns the researcher’s reflective and thoughtful engagement with the data, because qualitative researchers operate on a subjective platform, bringing their “own histories, values, assumptions, perspectives, politics and mannerisms into research” (Braun & Clarke 2013:36). There are various forms of thematic analysis. According to Braun, Clarke, Hayfield and Terry (2019), three principal approaches distinguish between RTA and TA, namely: (1) coding reliability to TA; (2) codebook approaches to TA, and (3) the reflexive approach to TA.

#### **4.9.2 Managing and recording data**

The research questions of this study were open-ended, yet semi-structured. These questions were related to the primary research question and aligned with the three constructs of the conceptual framework. Each theme had a specific set of questions. The data collected from each specific question was later captured under the related construct. Atkinson (2004) indicates that when conducting life story interviews, the

researcher should be flexible and adaptable in eliciting information from participants during interviews. Creswell (2014) cautions about data density and the fact that it results in hours and hours of reading, sense-making and transcribing. The data collected via observation were in the form of text derived from notes and diagrams the researcher collected during observation, as well as transcripts and recordings from the interviews.

All semi-structured interviews were conducted online by means of MS Teams software recording and transcription capabilities. Although the benefit of technology to transcribe the data brought some relief, the transcribed data required manual editing from start to finish to clean up the data and rectify certain words the software did not pick up. In addition, personally transcribing the data allows the addition of comments to certain sections of the transcriptions. The recordings of all interviews enabled the researcher to play and replay the interviews later to capture the transcripts correctly, as well as to make notes for the development of the Phase 3 interview guide to include the follow-up questions.

The researcher created a data management folder on an external hard drive. This hard drive contained all the various phases of the transcriptions and recordings in electronic format. Each transcription was labelled with the participant's allocated number (pseudonym), the phase, the date and the time of the interview. The transcripts and recordings were downloaded in Word.docx and MP4 video format and deleted from the NMU server. A summary record in Excel format was kept of all the interviews, which included all the interviews, the participant's name, department, role and allocated participant code. The summary also included what data were collected from whom, where and when. The pre-observation and post-observation data were kept in the same folder.

There were 24 transcripts in total. These transcripts were grouped according to the questions asked and the data collected from the participants on the specific question asked. Only 12 transcripts were uploaded in ATLAS.ti 22 for coding. The remainder was recorded and written up directly from the transcripts because seven of the transcripts were the amendments to the current processes and workflows and the other five concerned the lean waste activities, also written from the responses of the participants.

## **4.10 QUALITY OF DATA**

Validity differs between qualitative and quantitative research studies (Creswell & Creswell 2018; Hesse-Biber 2017; Kumar 2014; Maree 2020). In qualitative research, the researcher must establish validity through trustworthiness. Terms such as credibility, transferability, dependability and confirmability are the scientific measurements to determine the validity and reliability of a study (Creswell 2021; De Vos *et al.* 2011; Maree 2020). Quinn (2019) asserts that validity refers to the truthfulness and accuracy of the data. Atua-Ntow (2016) explains that reliability represents the extent to which data have been collected and analysed and must generate results that are sufficient authentic and trustworthy to be replicated at any time or by anyone. The trustworthiness of a study was assessed according to terms such as credibility, transferability, dependability and confirmability – the scientific measurements whereby the validity and reliability of a study are determined (Creswell 2021; De Vos *et al.* 2011; Maree 2020). These measures are each considered below.

### **4.10.1 Credibility**

According to Ravitch and Carl (2021), internal validity – known as credibility in qualitative research – is directly related to the research design and the researcher's instruments and data. For present purposes, the researcher ensured credibility by audio-recording the semi-interviews using the dictate application on Microsoft Office 365. The dictation was captured verbatim in the voice of the participant, rendering a factually accurate representation of the data collected – thereby establishing credibility.

Furthermore, credibility was established through the triangulation of the three rounds of semi-structured interviews, member checking (participant's validation of the correct interpretation of their perspectives), dense description of events and peer debriefing. Credibility related to the research design attending to the real-life complexities that exist at NMULIS regarding the non-existent documentation of processes and workflows and the procedural manual that is not regularly updated, which has a direct effect on the accessibility of the e-resources for the users.

#### **4.10.2 Transferability**

Transferability refers to the extent to which the research findings can be applied to analogous contexts (Moon, Brewer, Januchowski-Hartley, Adams & Blackman 2016). Thus, it is critical that researchers state the extent to which the research findings may or may not be relevant to other research projects in context (Moon, Brewer, Januchowski-Hartley, Adams & Blackman 2016).

Two types of generalisabilities can be drawn from research studies, namely: internal validity and external validity. Robson (2011) opines that external validity is often difficult to achieve in qualitative research. Therefore, the current study was not aimed at achieving external generalisability, but rather to concentrate on the contextual factors shaping and mediating the study.

The small number of participants and the purposive sampling of this study provided a context-specific richness of the participants' lived experiences and expert knowledge. The complexities of creating and managing e-resources are confirmed in scholarly communication. Although case study data and findings are not generalisable, the principles and lessons learnt would allow for transferability to similar contexts with a similar cohort of participants. In addition, the dearth that exists in terms of implementing lean principles to enhance the processes and workflows of e-resources will generate interest in further exploration among other researchers and librarians.

#### **4.10.3 Dependability**

Corbin and Strauss (2015) allude that dependability is concerned with consistency, which is normally achieved by implementing a planned process. Ravitch and Carl (2021) agree, elaborating that the key to attaining dependability in qualitative studies is maintaining a continuous consistency and stability over time throughout the entire research process. Dependability in the present study was achieved by ensuring that the data collection methods and measuring instruments could best serve in generating answers to the research questions – hence supporting the view that the key to attaining dependability is an appropriate and solid research design (Ravitch & Carl 2021).

The researcher selected semi-structured interviews as data collection technique because the sample selected from the target population was regarded as expert

participants and most knowledgeable in their field of work – thereby validating the processes and workflows as illustrated in Figures 5.10 – 5.12 and Tables 5.4 – 5.9. Secondly, they were also the only people who could answer research question 5 and, furthermore, do so best; working with intangibles can be tricky and mistakes only become evident when a complaint is lodged – in this case, it would be an e-resource that is inaccessible.

#### **4.10.4 Confirmability**

The concept of confirmability in qualitative research relates to the concept of objectivity in quantitative studies (Ratvich & Carl 2021). The aim of confirmability is the level of the researcher's objectivity. The level of confidence is based on the participants' narratives and words and not shaped by the biases of the researcher in the research findings.

To achieve confirmability, the researcher implemented an audit trail and reflexivity techniques. For the audit trail, the researcher kept a diary of the processes of data collection, analysis and interpretation. Moreover, the researcher recorded topics that were unique and interesting during data collection, as well as notes on the coding system, why certain codes were merged if any, explaining the various themes and what each theme meant. The reflexivity technique was applied to ensure that the background and position of the researcher within the NMULIS technical services department did not influence the research study. A reflexive diary was also maintained.

#### **4.10.5 Authenticity**

Authenticity refers to the degree to which the researcher captures the experiences of the participants correctly as they occur. Authors Schwandt, Lincoln and Guba (2007) explain that authenticity acknowledges inquiry and understanding as a process of negotiating, learning, changing and ultimately acting and therefore is recognised as an extension of the trustworthiness criteria. Bryman (2012) mentions five standards that describe the condition of authenticity, which are: fairness, educative, ontological, catalytic and tactic. For this research study, authenticity was established through the selection of the participants. The researcher selected only those librarians who were responsible for creating and managing access to e-resources at NMULIS and their line managers.

## **4.11 ETHICAL CONSIDERATIONS**

Ethical consideration in research became formalised during the 20<sup>th</sup> century due to unethical research conducted (Ngulube 2020b). The code of ethics governs the research by guiding and monitoring to ensure a systemic set of morals, values and behaviour (Kumar 2014; Ngulube 2020b; Struwig & Stead 2010).

The researcher abided by the University of South Africa's ethical research policy (2016) and followed the procedures and guidelines as stipulated when applying for ethical clearance. Permission to conduct the study was sought and obtained from the Ethics Review Committee of the University of South Africa and the researched library, NMU. The ethical considerations pertinent to this study, such as the issues of informed consent, researcher-participant relationship, confidentiality, anonymity and data storage, are addressed below.

The ethical concerns regarding the researcher-interviewer relationship were minimised as none of the participants reported directly to the researcher – therefore there was no power dynamic. All the participants were peers of the researcher. The research conducted was exploratory qualitative research and the success of the study was dependent on the researcher's experience and insights, which the researcher drew on during the semi-structured interviews, observation and findings.

### **4.11.1 Informed consent**

In the context of research, informed consent is defined as providing accessible information about the risks, benefits and procedures that allow participants to make a free and informed decision about whether they would like to participate in a research study (Creswell & Creswell 2018; Hennik, Hutter & Bailey 2020; Ravitch & Carl 2021; Walliman 2020). An invitation was extended to each participant using their work e-mail address, requesting their willingness to participate voluntarily in the research study. The topic of the research study was introduced to the participants, highlighting the benefits and importance of the study. The e-mail included the following attachments: the UNISA letter of approval to conduct the research, the ethical clearances from both institutions (NMU and UNISA) and (should the participant accept the invitation) the "consent letter to the voluntary participation" to complete, sign and return via e-mail to the researcher well in advance.

This allowed the participants sufficient time to familiarise themselves with the documentation and questions and address any questions that were unclear or that they were uncomfortable with to ensure maximum participation, as well as sufficient time to prepare for the data collection. Because data were collected online, a request to use the Microsoft 360 “text-to-speech” functionality and audio recording also needed to be obtained before the interviews. It was important to inform the participants of the duration of each interview before scheduling the interview. In the information letter, the researcher indicated that should a participant wish to withdraw from the study, the participant could either e-mail or message the researcher on WhatsApp. Any related data collected would be confiscated and not be included in the study.

In research questions 3 and 5, participants’ permission was requested to switch their cameras on for the researcher to engage with the Appendices and Tables. Once the researcher was satisfied with the data collected, participants could switch off their cameras to save data.

#### **4.11.2 Researcher-participant relationship**

In qualitative research, the researcher is in most cases considered the primary instrument when collecting data (Ravitch & Carl 2021). Hofman (2004) warns that the use of interviews as a data collection method could raise significant ethical issues and therefore could shape the data and findings in terms of its process and methods. Since the researcher is the senior librarian in the ERM department, the researcher established a researcher-participant relationship boundary – for the participants not to see the researcher as “one of their own”, but rather as a data collection instrument capturing their experiences to satisfy the research questions.

The researcher also ensured that, throughout the data collection process, the researcher remained transparent and objective and, through dialogue and critical self-reflection, remained open to critical feedback and change to mitigate any bias.

#### **4.11.3 Confidentiality**

Confidentiality relates to respecting the privacy of participants (Ravitch & Carl 2021). By nature, case study interviews are interested in the personal experiences, views and opinions of the participants and might cause exposure or embarrassment to certain



participants if too many personal details are revealed. Confidentiality builds trust; if participants trust the researcher, data collection could result in rich and in-depth information (Allinson & Chaar 2016).

For present research purposes, confidentiality was observed by ensuring that all identifying information be kept out of the transcripts, data analysis and findings. It was especially important because of the close professional working relationships, the interrelatedness of the job functions and, ultimately, the success of the research study. No names, departments or job titles were disclosed, except when work functions were related to a specific department. In the event that a participant disclosed names during the interviews, these names were omitted in all transcripts, analysis and findings.

#### **4.11.4 Anonymity**

Vainio (2012) explains that anonymity is one of the core principles of research ethics and is considered as a mechanism through which privacy and confidentiality are maintained. As a result, researchers should be cautious when publishing results and writing up a research report. For present study purposes and given the size of the target population and sample, the researcher used a participant code, for example, P1, P2, P3 etc. to ensure that all the participants' identities were kept anonymous. Only the researcher and study supervisor had access to the identity of the participants in this research study.

#### **4.11.5 Data storage**

Ravitch and Carl (2021) allude that additional challenges to anonymity and confidentiality exist when data are collected via social media and new technologies such as digital audio and video recordings, blogs, online chat rooms and other platforms, which could undermine the de-identification processes. During primary data generation, the semi-structured interview data was gathered by means of MS Teams software. MS Teams has the security function of only granting permission to the intended person to whom the invitation was forwarded; the recording comes with a permission alert, which must be accepted, and the audio file is only sent to the intended participants of that meeting. In addition, the researcher also made use of the MS Office 365 dictation function as a backup. The audio recordings were transcribed and verified via the Office 365 dictation function and all identification was removed and

transferred to a password-protected memory key. The transcripts and reflective notes from the interviews were stored on an external hard drive, clearly marked and placed in a lockable filing cabinet.

#### **4.12 EVALUATION OF THE RESEARCH METHODOLOGY**

Depending on the kind of research, researchers adopt strategies such as experiments, surveys, case studies, action research grounded theory, ethnography, etc. (Crotty 2004). The choice of strategy the researcher selects informs the research question(s), objectives, existing body of knowledge and the philosophical assumptions underpinnings of the research (Saunders, Lewis & Thornhill 2009). To resolve a research problem or answer a research question, the appropriate methodology and methods need to be applied. Thomas (2021) affirms that research methodology encompasses the planning, implementation and reporting stages of a research project, while the research methods are specific tools and techniques available for data collection and analysis.

The choice of research methods is core to the quality of the research output (Ngulube 2005). Furthermore, the author postulates that it is important to evaluate methodological approaches researchers adopt, because the rigour determines the quality of research in support of practice and the expansion of knowledge (Ngulube 2020b). In affirmation, Gray (2009:189) states that one of the criticisms levelled at qualitative researchers are that the research is “unscientific, anecdotal and based on subjective impressions.” As such, Ngulube (2020b) concludes that researchers should be very clear about their methodological standpoint, because it determines the accurate choice of data collection tools and techniques for effective research.

This section concentrates on the evaluation of the two research methods applied in pursuing the present research, namely: the semi-structured interviews and non-participative observation techniques. Data collection did not proceed as smoothly as initially anticipated and, as such, the researcher would like to communicate the unexpected obstacles, which included situations beyond the researcher's control, challenges during data collection and the non-existent documentation of the processes and workflows to answer research question 3.

To start with the latter, the absence of documented processes and workflows for the ERM department was the first problem the researcher encountered. The biggest challenge was transferring the hand-drawn sketches to the laptop using the Microsoft flowchart capabilities, but they were not sufficiently clear and functional to answer research question 5. These drawings were crucial, because processes and workflows were one of the key components of the conceptual framework and were pivotal in answering research question 3. The researcher approached the institutional ICT department, which opted to upload Microsoft Visio Professional software.

There are three departments – technical services, LISDA, and SEALS – and two sub-departments – ERM and classification and cataloguing – which are responsible for the creation and management of access to e-resources at NMULIS. The ideal method for gathering empirical data regarding their operational functioning would have been direct observation because of the intricacies of some processes. However, data were collected while the country was still under a Level 3 lockdown of the global COVID-19 pandemic. Although some of the restrictions had been lifted, the university pandemic task team was still cautious and asked staff to return on a rotational basis. The situation was exacerbated as staff with comorbidities were not allowed on campus. Therefore, some of the necessary information was either from the researcher's experience, e-mails, training and telephone calls. MS Teams calls also proved to be very valuable because of the screen share capabilities.

At the time of data collection, technical services had four vacant positions, two in the ERM department and two in classification and cataloguing; one participant also declined. The researcher felt that if these vacancies had been filled at the time data were collected, the outcome of the study would have been much more substantial. This is due to the staff responsible for the creation and management of access to e-resources at NMULIS is limited and, in some cases, only one person fulfils a specific function – thereby limiting the target sample as well as data generation.

The semi-structured interviews were all conducted online during July and August. Covid-19 had become less of a threat; however, two other variables then came into play. Firstly, Gqeberha was experiencing severe water restrictions many of the staff had to revert to remote work. Secondly, the country experienced daily load-shedding

up to Level 6. The load-shedding had the worst impact: all interviews were scheduled using the institutional email address, but during load-shedding there was no Internet signal. With staff working remotely and load-shedding being area-dependent, it became almost impossible to schedule interviews. In addition, load-shedding levels were subject to adjustment at short notice.

Lastly, during the interviews, the researcher observed that participants only spoke about their roles and their perspectives or their lived experiences. They were too apprehensive and uneasy to express an opinion of what occurred in other departments. The interactions and interrelatedness of creating and managing e-resources give one insight into what is happening in other departments and sometimes provides a broader perspective and possibly an objective opinion, however, it is not always welcomed and therefore staff rather confine themselves to their spaces of work than to offer a suggestion or opinion. This complication became evident when, at one stage during data collection, a participant stated: “I don’t want to go there – I would rather keep my opinion to myself.” The researcher is of the view that because the sample was so small and, in many instances, only one person performs a specific task, anyone reading the research report would know to whom to attribute a specific statement. In addition, some of the participants had roles and responsibilities of training staff and recommending resources for the library, which might cause some uncomfortableness between “teacher and student” or “the experienced and less experienced.”

#### **4.13 CHAPTER SUMMARY**

This chapter outlined the research methodology which guided the present study. Aspects addressed were the research paradigm and design, target population and sample, and justification of participant selection. The data collection techniques and instruments and methods of analysis were discussed in detail, as well as the considerations of trustworthiness and ethical considerations. Included in this chapter was also a methodological evaluation of the research. Chapter Five presents the primary data, data analysis and findings of this study.

## **CHAPTER FIVE**

### **DATA ANALYSIS AND FINDINGS**

#### **5.1 INTRODUCTION**

The previous chapter discussed the research methodology and design employed in conducting this research study. Also discussed were the target population and sample, as well as the techniques of data collection and analytical process. This chapter presents the descriptive analysis of the empirical primary data gathered by means of non-participation observation and semi-structured interviews. In-depth data analysis was performed by means of reflexive thematic analysis (RTA), devised by Braun and Clarke (2019a; 2006), supported by ATLAS.ti 22 software.

Participants were denoted P1 – P13 during data collection and analysis, aligned with the ethical consideration of anonymity as mentioned in Section 4.11.4 of Chapter Four. The data were collected in four phases and are discussed in the following sequence: firstly, Phases 1 and 4 simultaneously, secondly Phase 2 and, lastly, Phase 3.

The main research question focused on how lean principles were able to enhance access to e-resources at NMULIS. This research question was complemented by the following sub-questions:

- What skills and resources are needed for participants to function effectively?
- How do participants conceptualise processes and workflows in their work environment?
- What is the condition of the current processes and workflows?
- How do participants understand and utilise lean principles?
- How can the current processes and workflows be adapted toward a leaner process in the future?

#### **5.2 PRESENTATION OF PRIMARY DATA**

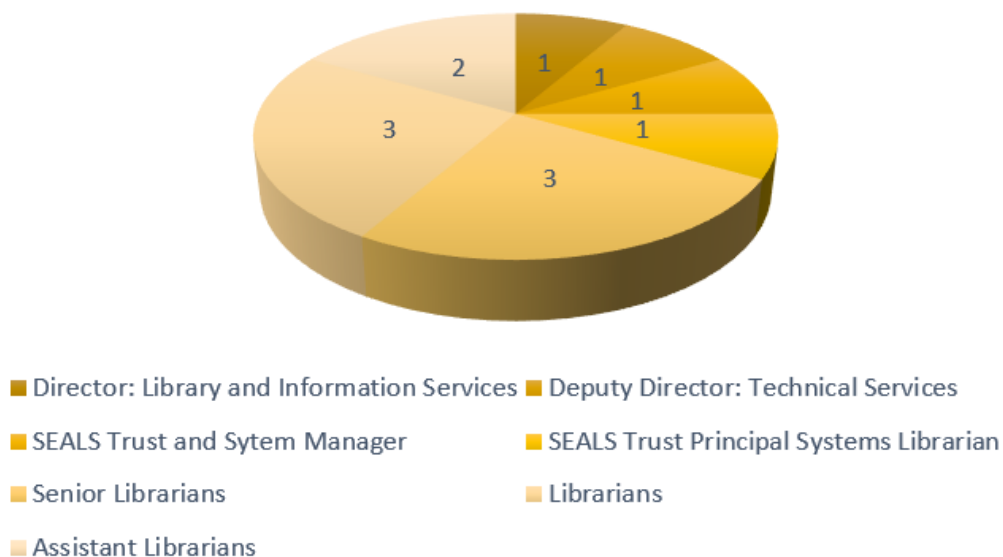
##### **5.2.1 Data presentation and findings of Phases 1 and 4 interviews**

The data generated by interview phases 1 and 4 were analysed simultaneously by means of the Braun and Clarke (2006; 2019a) RTA method, supported by ATLAS.ti

software. The network views exposed how the themes emerged, whilst the visuals demonstrated the trustworthiness of the research study.

This component of the data analysis related to research questions 1, 2 and 4. Data was collected from the 12 participants with one participant having declined; see Table 4.2). The target group consisted of the acquisition and systems librarians, which included the SEALS librarians, and their line managers. As indicated in Chapter Two, at the time of data collection, the two ERM librarian posts were still vacant and therefore data related to those particular processes and workflow were sourced from staff assisting in ERM. It is important to note that the line managers in this research study also form part of the library directorate and bring a strategic perspective to the findings. All the interviews were recorded and transcribed as indicated in Chapter Four.

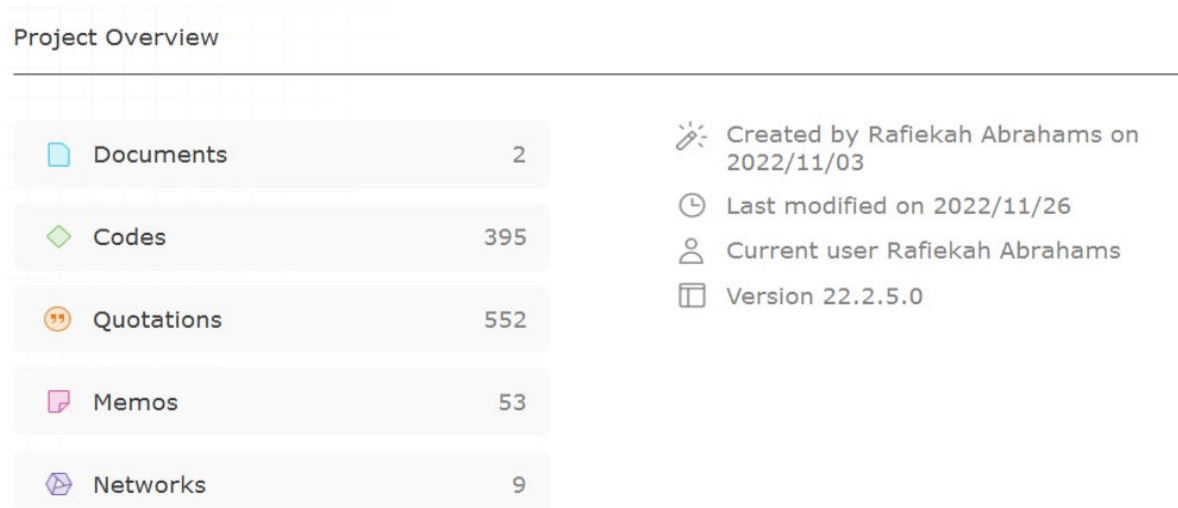
### Number of participants in their respective occupations



**Figure 5.1: Number of participants in their respective occupations**

The data analysis process started by uploading two documents (Appendices A and D) onto ATLAS.ti. These documents were transcriptions of the interview question guides for Phases 1 and 4. From these two documents, the researcher created 395 codes, 552 quotations, 53 memos, and nine networks (see Figure 5.2). Thereafter, by

selecting and grouping, renaming and merging codes, 64 categories emerged. These categories were again refined through a reduction process into 16 categories. Five major themes were constructed from the 16 categories. Creswell (2018) suggests researchers start with 25 to 30 categories and end with no more than 5 to 6 themes.



**Figure 5.2: ATLAS.ti project bundle of initial data analysis**

Friese (2022) acclaims data visualisation to be an astounding way of simplifying the complexity of revealing and understanding relationships among data. The Sankey Diagram is one such powerful technique for presenting data flows and data connections across various disciplines (Friese 2022). Some of the benefits, according to Friese (2022), are: (1) Viewers can gain a high-level view, see specific details or generate interactive views, (2) Sankey diagrams make dominant factors stand out and reveal the relative magnitudes and/or areas with the largest distribution, and (3) the Sankey diagram complements the Code Co-occurrence Table. Figure 5.3 illustrates the Sankey diagram of the current study, showcasing the emergence of patterns from interview phases 1 and 4.



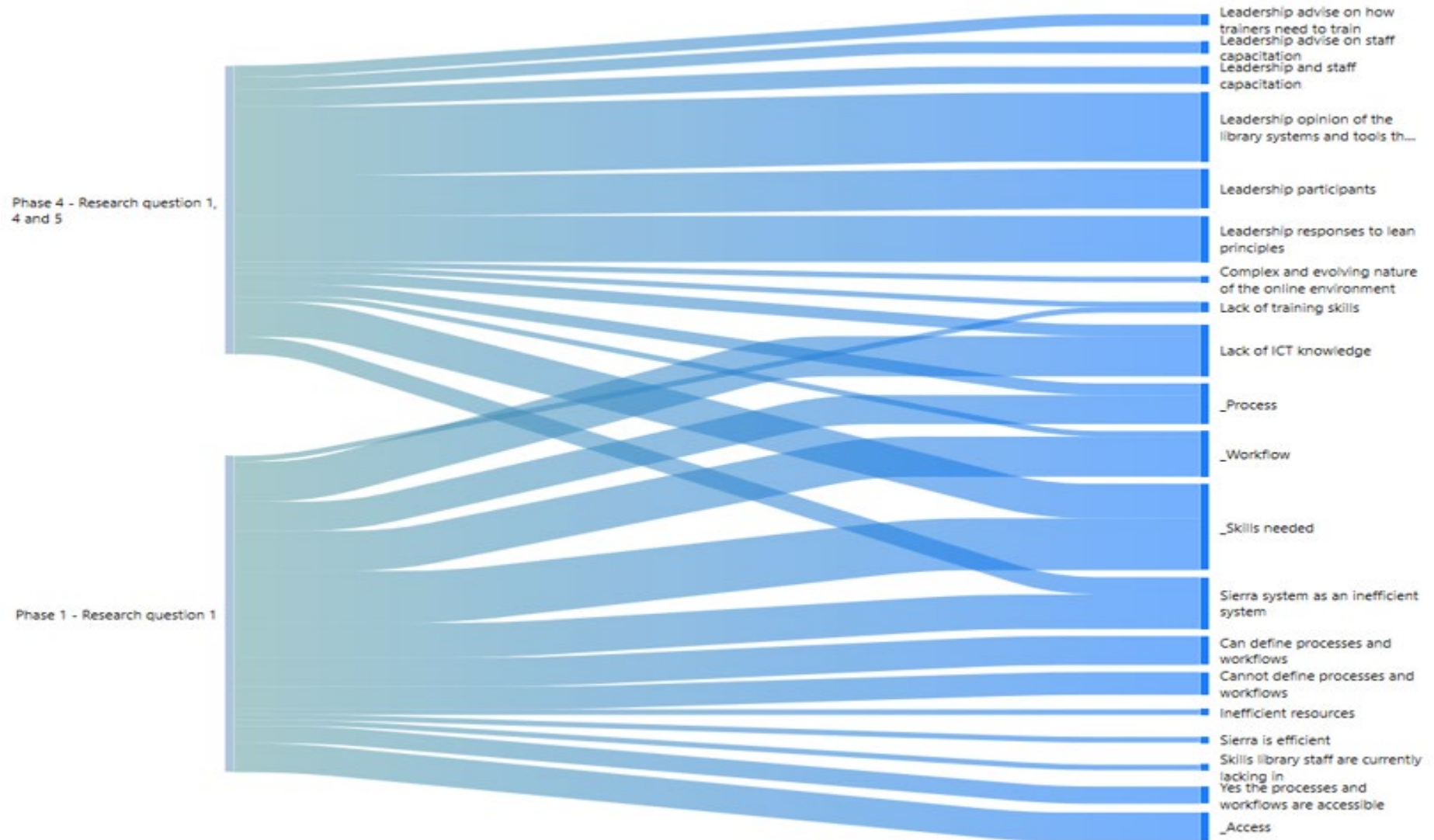
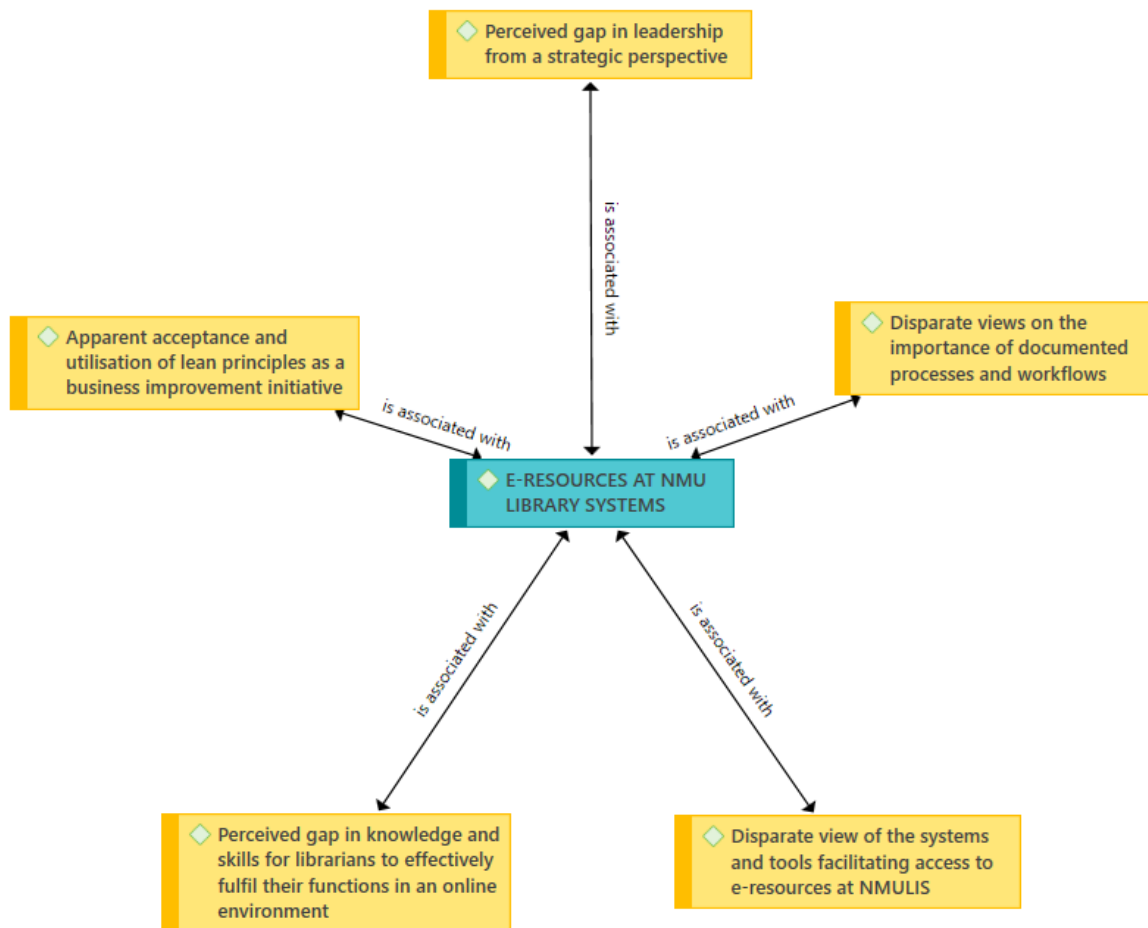


Figure 5.3: Sankey diagram depicting themes coded from interview data of Phases 1 and 4

## 5.2.2 The five key themes emerging from interview phases 1 and 4

Braun and Clarke (2006) describe themes or patterns as the final product of data analysis in the TA approach. Figure 5.4 shows the ATLAS.ti 22 networked view of the themes that emerged after a careful analysis of the first and last interview data.



**Figure 5.4: Five key emerging themes – interview phases 1 and 4**

In support of the research question and sub-questions of this study, the following themes developed. Each of these themes is individually examined further.

1. A perceived gap in knowledge and skills for librarians to effectively fulfil their functions in an online environment.
2. Disparate views of the systems and tools facilitating access to e-resources at NMULIS.
3. Disparate views on the importance of documented processes and workflows in creating and managing access to e-resources.
4. A perceived gap in leadership in fulfilling its role from a strategic perspective.

5. Apparent acceptance and utilisation of lean principles as a business improvement initiative.

### **5.2.2.1 Theme 1: A perceived gap in knowledge and skills for librarians to effectively fulfil their functions in an online environment**

The analysed data indicated that the participants attained their knowledge through many years of experience, occupying various positions in libraries, by informal methods such as independent learning and reading, and by means of on-the-job training, workshops and formal studies at higher education institutions. Eight of the 10 participants in these interview phases had more than 15 years of working experience. This indicated that the majority of participants come from a traditional print library environment. Data also showed that some participants found it exceedingly difficult to transit to working online, whilst others regarded it as simply another change they needed to embrace. This scenario was confirmed by the following responses.

P1: *“When we went to our first online system, I played a big role in helping with the setup. It was very, very difficult for me but I learned a lot.”*

P9: *“When we were forced to purchase e-books, it was difficult for us, because we didn’t know how it was working. It is different from purchasing, linking and creating access to the normal print because, with the print, once you receive the physical book, you process the invoice, link the book to the bibliographic record, and forward it to the cataloguing department.”*

*“With e-books, you need to make sure the book is accessible because these books have URL links; you must check these links, profile the book in the KB, must check if the book can open up for the users. It was very difficult. I found working in an online environment very difficult. The IT words they use, sometimes I don’t understand them. To be able to do my work, I make some notes, how to do this, how to do that. I mean, what do they mean when they say you must add a WAM or there is no SAN certificate?”*

P9: *“Sometimes I get calls from librarians and lecturers when they struggle to access e-content and they say there is an error message 404 or 403 – what must they do? How I answer the caller, press here, press on this*

*button that says this or that. We were never taught these things. We only get system training on how to perform certain processes – everything else you must find out by yourself.”*

*P12: “There is a huge difference between print and online. Working with print serials has its own problems, but online it’s more difficult, it’s a totally different environment. I personally felt that if I didn’t have the background of the print, the online would have been much more difficult to grasp. It is a language on its own; we were not trained to work in an online environment.”*

Contrary to these statements above, P4 felt that *“the move from print to electronic was a gradual change. When you move to different systems you obviously had to learn how the new system works, but behind that, the principle is still the same.”*

*P5: “To adjust to a technology way of doing things was not easy, but I’ve learned and I have managed.”*

The perceived gap in knowledge was immediately evident as the participants relied on the only coping mechanisms they had at their disposal, namely: experience, in-house training and informal teaching and learning methods.

Confirmation came from P2: *“No-one prepared us for the transition from print to electronic or working in an electronic environment. We found ourselves in a very, very challenging place, because no-one had the skill to work in an online environment. Everyone was looking at management for guidance, but management was also learning. We all came from the print era.”*

P7 acknowledged this response: *“I don’t think justice was done with regards to upskilling staff during the transition period.”*

An observation made by the researcher was that the majority of the participants had formal tertiary qualifications – some obtained a few years ago and others recently. However, every single participant indicated that they relied on in-house training, independent reading and learning, vendor training, workshops and specific courses to enable them to work in an online environment.

P3: *“There is no practical component of applying what you studied; hence it becomes critical for self-capacitation to stay abreast in an online environment.”*

P2: *“You find that for people who studied Library and Information Science there was no module per se that prepared them for the transition. So even formal education did not prepare staff for online learning.”*

In-house training consisted of systems training offered by the systems librarians, SEALS and line managers. The training consisted primarily of system (ICT) processes and did not include library-specific content – for example: how to create an order record, how to profile an e-book in the knowledge base, how to add a WAM link to the URL, and so forth.

P12: *“ICT is a language on its own.”*

P9: *“The IT words that they use, sometimes I don’t understand them. During training, when they explain a process, I get lost when they start using all these terms and I can’t follow what they are saying; it doesn’t make sense.”*

P2: *“People, all of us learn differently. Some find it difficult to grasp. I have noticed that for years now. As much as we give training, you are ticking a box, but you are not transferring knowledge. The person giving the training needs to integrate the old way and the new way and show how things had changed. Staff members from a traditional background need to relate the old with the new because they are used to a certain way of working. If you don’t do that, you will lose them completely. You need to constantly go back and link the old with the new, then people can find relationships. As a trainer or someone enabling people, you should not get agitated when people don’t know after you have explained several times. You should learn not to rush them when they learn – you need to know how they learn and take it from there.”*

P7: *“In the past, when Millennium was introduced, the vendor of the library system will send trainers and they spend two to three weeks here and*

*workshop people. Somebody will tell you exactly the functions and how to do the function on the system. At the end of the three weeks, you have almost a user manual that you can follow. There are checkboxes that you tick on how to perform a specific task. So, in between the acceleration and the drive of e-resources and the platforms that are supporting these things came in such a rush and there was not a lot of training. You had the systems librarians that would normally try and figure out the processes and workflows and how the workflows are supposed to be and then share them with staff the way they understand them, I think a lot of our things, it's trial by error."*

*P2: "Management found itself in a very, very challenging place and what I could pick up at the time is we relied a lot on the knowledge of the publishers and vendors. So, staff members operationally, you could see that they are learning from the publishers and what was very interesting because you know these people are coming here for business, you found they were influencing how we structure or the decisions that we made at the time. It was very dangerous and challenging because, as a librarian, this person coming to sell (to) you is also influencing what you need to buy."*

In the literature review (see Section 2.3.1.2), the researcher commented on the publishers as powerhouses. However, P2 had noticed a change in behaviour.

*P2: "Librarians have come far since then. They are very much aware of the pressure publishers put them through and therefore create established relationships with publishers and vendors, which then puts them on equal footing at the time of negotiations."*

Noticeably, the researcher observed from the data, the staff showed an immense willingness to learn. Many viewed themselves as traditional librarians when they mentioned their years of service with pride.

*P1: "I've had a long career from 1975."*

*P4: "I've worked for a long time – around 30-plus years."*

*P12: "I started in 1983 and have all in all about 38 years of experience."*

P11: *"I have about 20 years of library experience."*

P4: *"The knowledge I gained is because I had to do a job. So, if I had to work in interlibrary loans, I had to learn interlibrary loans. If I had to do cataloguing, I had to learn how to do cataloguing. Most of the things I have learned, and my experience is that I've learned on the job because each job is different, so you just get on with it and learn how to do it."*

The challenges staff members had to face daily in the online environment without a strategic plan or directives from leadership did not discourage them from delivering a service. However, they were determined and their work ethic was of an exceptional calibre. Evidence from the data amply illustrates this interpretation.

P2: *"As management, you create a learning environment, you encourage staff to read and learn from peer-reviewed journals that are published and try to emulate it (in) our environment. You also encourage staff to register for formal learning; you know, development for further studies. You constantly have meetings, constantly planting the seed to open up their horizon. As much as there are no electronic management resource courses, you open up their mindset in terms of how academic libraries are moving towards ICT-enabled environments."*

*"Collaboration with ICT should come back. ICT used to collaborate with the library on Fridays. ICT staff would come to the library and transfer knowledge of a concept to us as librarians. For example, in the introduction of SharePoint, they came and had a session with the library, informing us how it works, and how this tool will change the way we work and we had interaction sessions where we could ask any questions that are ICT-related."*

The second part of Theme 1 relates to the skills an academic librarian should have in the 21<sup>st</sup> century. All the participants agreed with the authors the researcher cited regarding those essential skills. P3 commented that the authors are partially correct:

P3: *"The skills we need (should) be narrowed down; we tend to neglect the other components of the library. For example, from an acquisition librarian*

*perspective, which is one of the core components of the library workflow because we acquire all those databases and e-books that the users use, but they have forgotten to mention that in terms of acquiring the knowledge and skills needed, for example, financial management, supply chain knowledge, budget management, licence agreement knowledge to make your job easier. Also, emotional intelligence in terms of personal skills is quite critical in the 21<sup>st</sup>-century working landscape. Because there are lots of generational gaps within the working force and those contribute to a very complex working situation in terms of behaviour and thinking.”*

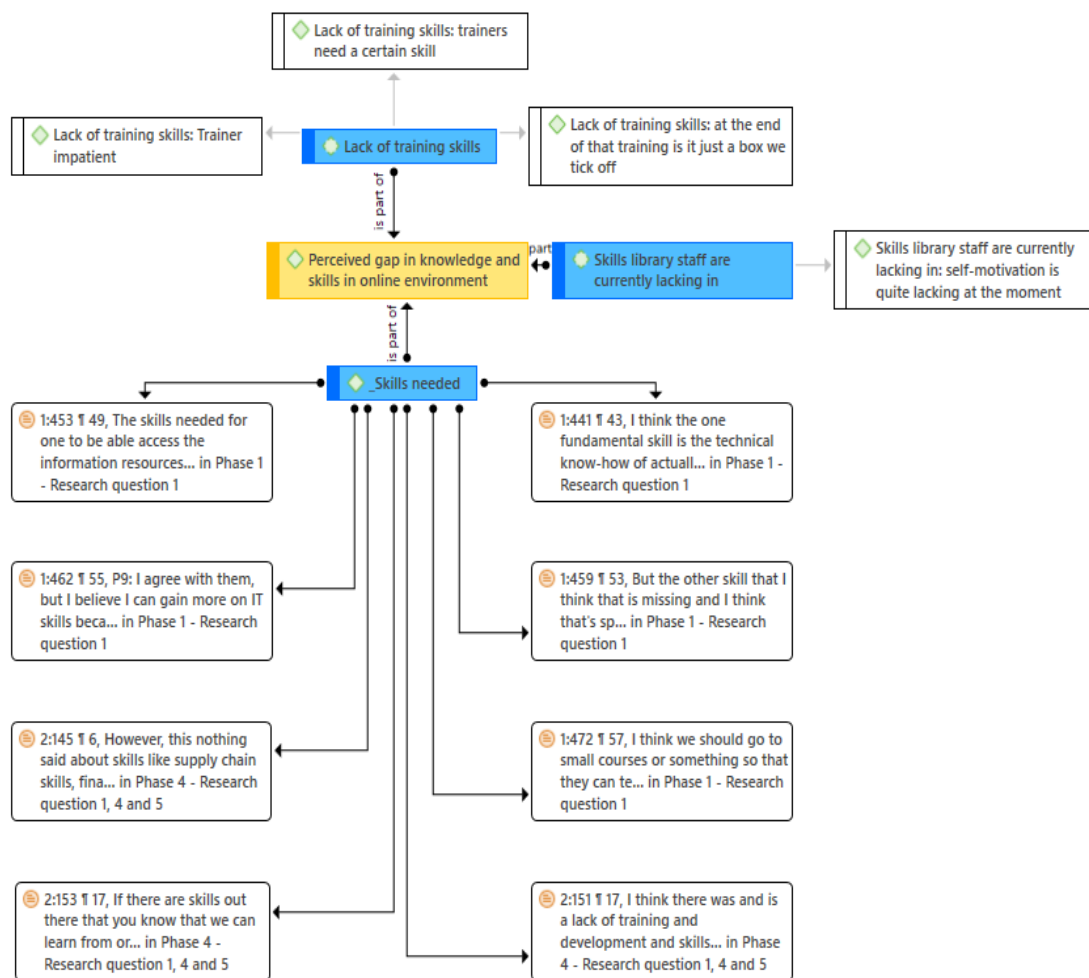
The majority of participants responded affirmatively to the importance of independently reading up and learning and self-capacitation as important skills to have when working in an online environment.

A particular skill librarians should adopt, according to the view of P4, was the following: *“Staff must take responsibility for their actions on the system, the integrated system.”* This insight is significant, given the context of working within a consortium and sharing an interrelated system.

According P12, the skill librarians should have is self-discipline: *“You must actually be disciplined. I think discipline plays a big role, because if you’re not disciplined, you become like, I don’t care, because online subscriptions are sometimes very difficult. If you are disciplined enough, you will sort of think through the problem or seek help to get a result – you will not just leave it.”*

The remaining participants felt they would like to be skilled in library IT or technical know-how. Figure 5.5 presents the network view illustrating how the theme emerged.





**Figure 5.5: Perceived gap in knowledge and skills for librarians to effectively fulfil their functions in an online environment**

### 5.2.2.2 Theme 2: Disparate views of the systems and tools facilitating access to e-resources at NMULIS

Quick and easy access to e-resources is crucial for users in academic libraries (Patra 2017). Therefore, it is imperative for academic libraries to frequently assess their systems and tools to stay abreast of ongoing advances in ICT to satisfy their users' information needs. Table 2.2 illustrates the current systems and tools at NMULIS. Each participant was asked to rate the current operational systems and tools facilitating access to e-resources. Table 5.1 illustrates participants' ratings. The high and low ratings were a clear indication that there existed a disparity of views about the systems and tools at NMULIS.

**Table 5.1: Participants' rating of the current NMULIS systems and tools**

Participants	P1	P2	P3	P4	P5	P6	P7	P8	P9	P11	P12	P13
Score rating	10	2	6	7	8	10	6	8	5	6	10	6

The researcher noticed that some participants' viewpoints were from their occupational perspective, whilst others' were from an inclusive user perspective. P6 admitted to a high score, *"but the user might not think so, because they are the ones that are forever searching."*

P12: *"To my knowledge and the way we work, journals are accessible to the students, which is in actual fact our end goal."*

This is contrary to P2's low rating of 2:

P2: *"There is a disconnect with the processes and workflows that enable access. The library is working in a siloed manner when it comes to access to e-resources. The resources, it's not integrated, interrelated or interdependent. The library should be able to assess whether the resources are impactful or not."*

The systems and tools that most participants found to be ineffective and inefficient were Sierra, Vital, 360Core and Summons.

P3: *"It's a difficult question to answer because some are quite useful and others lower than satisfactory. Vital as a (digital) repository is not user-friendly in terms of the user experience. It is not connected to the library OPAC. They don't speak one language – whereby, when a user is searching for a thesis, they have to access the link of the digital commons to access the online version."*

*"Also, the interface is also not pleasing – the searching strategies. When you search for keywords, you get lots of feedback on feeds that are not related to what you are looking for. So, you have to sift through a ton of information to actually get what you want."*

According to P3, Sierra is also not effective and efficient:

P3: *“Sierra and ITS financial system, you sort of duplicate the job – the systems are not integrated and if they were integrated you would do one seamless workflow. You process the invoice on Sierra and the same invoice is processed on ITS. So, it’s quite exhausting. Hence, I’m saying our resources are very average due to the systems and the interfaces (that) are not pleasing and I don’t think they serve our users quite well.”*

P2: *“For example, in Vital, you find that there is no flow of information within the Vital system that we use. Our systems need to be relooked at; the way we use our systems, we use them as if we are still in the print environment. My subjective opinion is through the comparison with other systems and through using other systems as a student during my formal studies.”*

P5: *“Sierra is a difficult system compared to Alma because of the whole setting of Sierra. When I catalogue an e-book in Sierra, I must make another record in WorldShare. When I worked on Alma, we were not doing that. We just download the relevant document to our system and then we (do) corrections to that. And in Alma, if the record is not available, you create that record in your system only. At NMULIS, if the record is not available, you create it on WorldShare and then you download it from OCLC to the Sierra system. To me, you work in two different systems. I can only speak on Sierra; therefore, I give a score of 8.”*

P7 rated the resources a 6 out of 10:

P7: *“Let’s start with Sierra. I think Sierra as an ILS system for academic libraries has overstayed its welcome. I think it is high time we need to look at a cloud-based system – and there are many on the market: for example, Alma, WorldShare, Folio and maybe Symphony.”*

*“My understanding is that the discovery tool, Summons, is ExLibris almost like prototype and DUT had Summons back in 2010, 2011. So, I am saying we don’t explore new trends to best serve our users; we buy outdated things and that’s why we struggle so much with our systems and tools.”*

P9 expressed dissatisfaction with the 360Core knowledge base:

*P9: “To be honest with you, it is extremely slow – many times when I need to profile e-books, it takes me 15 minutes to profile one e-book. Imagine when I need to profile 10 books – it’s very frustrating.”*

The lack of a statistical tool has a negative impact on usage, P9 pointed out, because some suppliers do not provide statistics on single e-resources:

*P9: “I use the Summons tool to check the collection development before ordering and feel that there are too many clicks if you want to narrow your search.”*

With regard to assessing NMULIS systems, P11 cited experience working on Alma:

*P11: “That system is on top of the world. I don’t know how they did it, but everything is so integrated into that system. Everything there is user-friendly. Another thing: Vital is not easy to search; for example, just a name and a topic on Vital takes you all over the place. Another resource is the 360Core knowledge base – it is terribly slow.”*

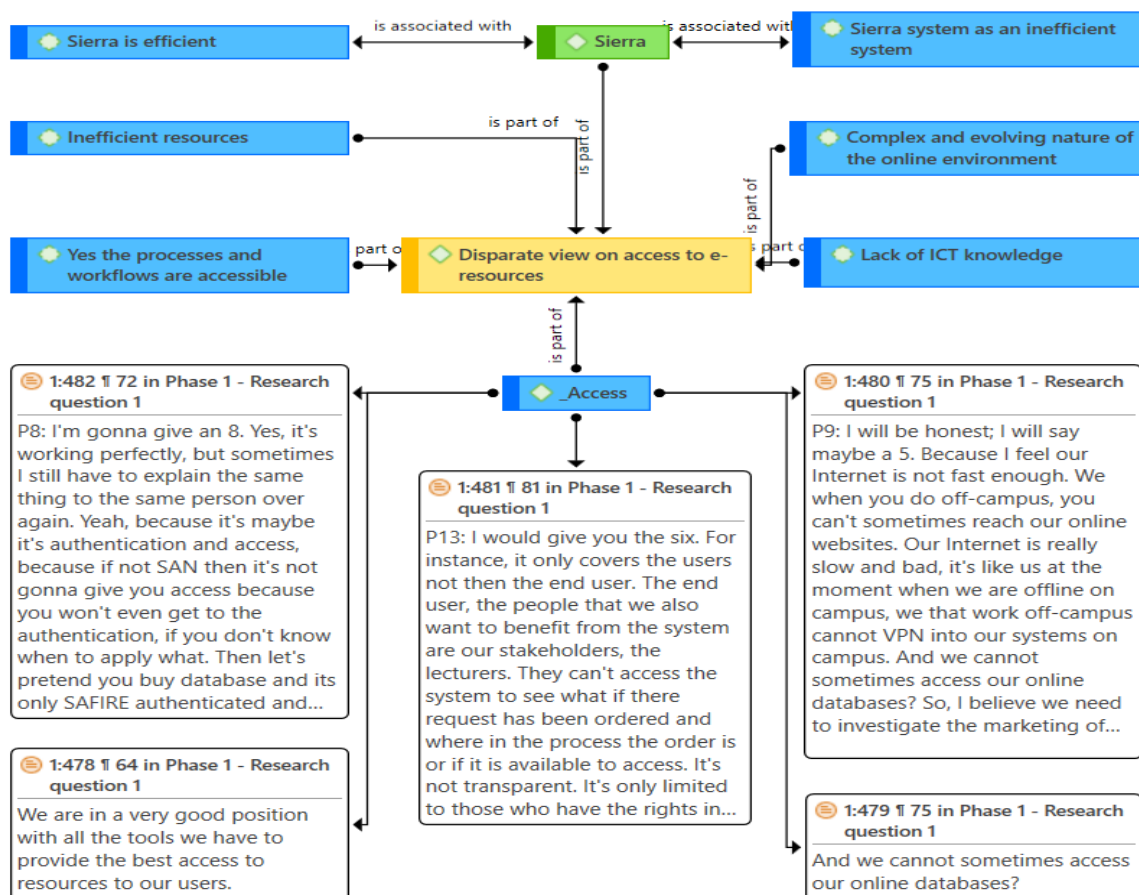
System challenges in online ordering of e-resources were raised by P13:

*P13: “The ordering system only covers the users but not the end user. It is not transparent. The end user, the people that also want to benefit from the system, for example, the lecturers. They would like to know the status of their request or where in the process the order is or if the resource is available. And in terms of ITS, what I do in Sierra, I have also got to (do) it in ITS, which is a duplication.”*

As is clear from the scoring rate of 10 (see Table 5.1), P1 gave a contrary perspective, especially with regards to Sierra:

P1: *“It’s not Sierra that can’t link – it’s the interoperability between Sierra and ITS. Sierra can do it, they can plug in. The problem is ITS needs to develop an API and they asked a huge price for it. We are in a very good position with all the tools we have to provide the best access to resources to our users.”*

Another viewpoint, according to participants P8 and P12, was that the non-access to e-resources could also be because of staff members not using the systems and tools correctly or not knowing how to use the resources.



**Figure 5.6: Disparate views of the systems and tools facilitating access e-resources at NMULIS**

### **5.2.2.3 Theme 3: Disparate views on the importance of documented processes and workflows**

The complexities of managing e-resources are well-established in the literature (Anderson 2014; Emery & Stones 2013). One strategy to mitigate the complexities is documented processes and workflows (Dilts & Sun 2021; Laguna & Marklund 2013). Asked how they understand what processes and workflows are, participants' responses varied.

P3: *“Processes are how to guide in terms of how you work to how you are supposed to work and the workflows is how those processes are implemented in terms of how the one task gets fulfilled using those processes.”*

P4 explained by means of a catalogue process: *“The process would be you need to go and catalogue whatever it is that you're doing, in this case, your e-resource. Now you have to go and create a record on the database, for example. The workflow would be who tells you to create it when you create it.”*

P5: *“I think processes is the function that we do when we receive the book from acquisitions; these are the steps that we are doing, and the workflow I think is the steps you take the book from the shelf that is from the acquisition.”*

P6: *“I understand it in the sense that we need to have the same standards or ways of doing things to ensure that everything is efficient and effective and we have to have a workflow that will work better to serve us doing our work.”*

P8: *“I would say a workflow consists of many steps of processes. That somebody or a string of people or a team of people must do to get to the point to the final goal and a workflow incorporate(s) all the processes that are needed.”*

P9: *“Processes refers to the elements necessary to accomplish a task and the workflow is the activity that is necessary to complete the task.”*

P11: *“We follow processes to do things and then we transfer it to our systems, Sierra, and do all the stripping of all the unwanted fields.”*

P12: *“Workflows are the processes that we do by, saying for instance, from ordering to making it available. The workflows are our workflows, the people that work behind the scenes. The processes are our organisational goals, the end product.”*

P13: *“The way I understand it’s a structured way of doing things. Because we know that we have regulations, we have laws. And also, in a way of trying to minimise risks. So, in other words, it’s just to say that these are the controls that we put in place to avoid certain risks.”*

From the above responses, it was clear that perception of what processes and workflows are, were diverse. The researcher noted that the lack of understanding or conceptualising processes and workflows had a direct effect on the perceived importance of documented processes and workflows, their relevance and that sharing of information through a central point of access leads to sustainability. The aforementioned was evident in the responses of the participants:

P1: *“Yes, it is documented, but it is so vast we can’t document them all. We can only document up to a point of how to do things, but nothing is static. We rely on manuals, not always our own, but the supplier manuals of how they work, or to the standard that applies to our systems.”*

P3: *“Yes, they are documented, but not up to date.”*

P4: *“I have my own little manual of the things I don’t do often and I don’t know out of my head, so I write them down, but the processes that I do a lot and therefore remember how to do it, perhaps might not be in the manual. It is something that I have to change and do slightly differently to what I have (been) doing or something like that.”*

P12: *“There are documents, as far as I know, they are current, but I don’t know where they are kept. I have my own notes – notes from seniors and notes that I got from colleagues.”*

The researcher noted that some staff members would rather have their own manuals. The concern arose as to whether such personal notes took precedence over the official manual. Personal notes are normally kept among personal belongings; they are not accessible to everyone and people have a right to whether they want to share them. Official documented processes and workflows, on the other hand, are the intellectual property of the institution; they are formalised and kept where they are accessible to all. It is the researcher’s opinion that making personal notes should not be a problem; however, this practice should not replace the official documented processes and workflows and must be kept updated. Moreover, documented processes and workflows that are accessible assist in mitigating silo working, as alluded to by P2 in Theme 1 and illustrated by the following response:

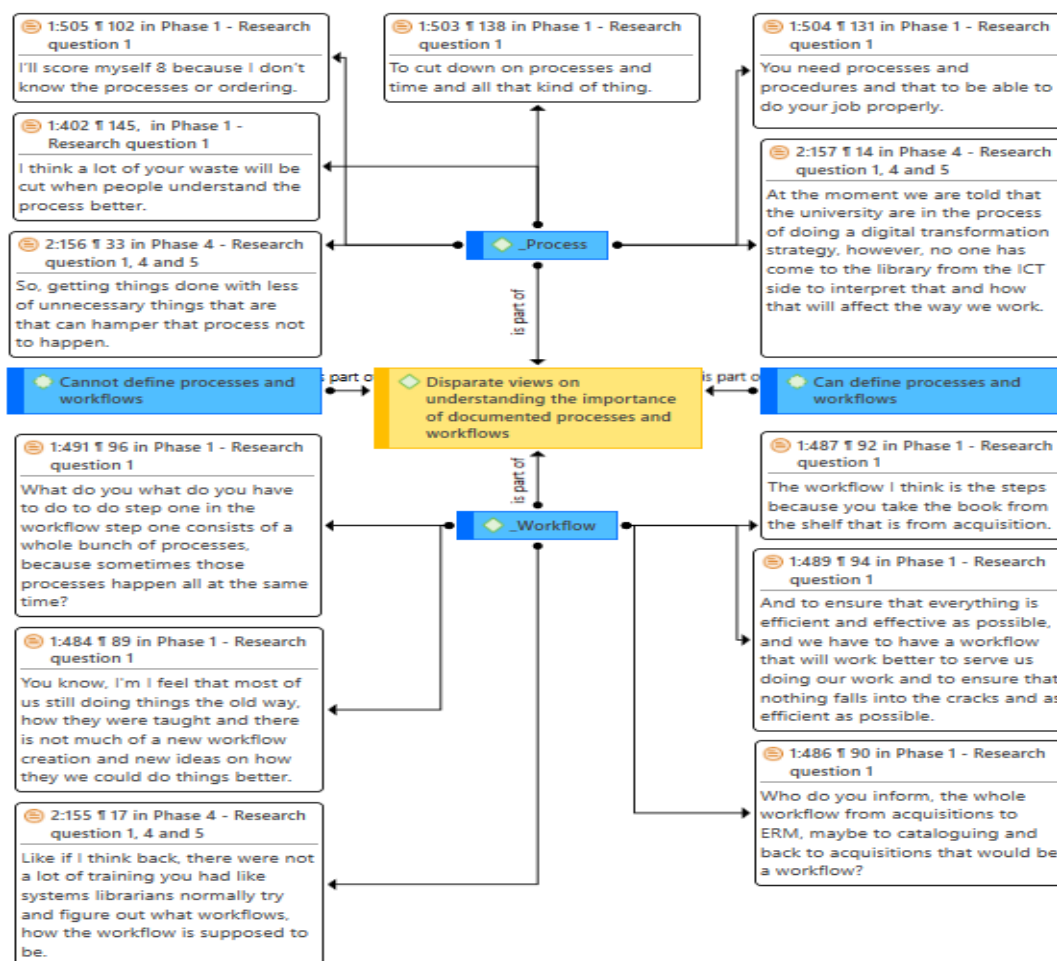
P11: *“I don’t know exactly what happens after that, after we have done our part – where does the record (go) or who does what, you know. Those are the blank spaces that I’m not familiar with.”*

Updated documented processes and workflows would therefore serve as succession plans and support the continuity of work. Such documentation would serve as a “road map” to follow when unsure how to proceed.

P13: *“I use a checklist. I am not sure if that would count as a way. No, there are no documents that I know of – I write my own manual for everything that I’m doing until I am used to it. When I came here, I knew nothing about Sierra, so I documented everything to make it easier for me to work.”*

Contrary to the disparate views of the participants in conceptualising processes and workflows, all the participants concurred that processes and workflows must be standardised for effectiveness and efficiency. Figure 5.7 depicts the ATLAS.ti network view of the various responses regarding an understanding of what processes and workflows are and the status of the current processes and workflows. Some participants knew whether any such documentation is kept, whilst others had no idea.





**Figure 5.7: Disparate views on the importance of documented processes and workflows**

#### **5.2.2.4 Theme 4: A perceived gap in leadership from a strategic perspective**

The NMU library directorate consists of the library director and four sub-directors (see Figure 1.1 in Chapter One). Data analysis of the librarian participant interviews revealed a lack of training apart from systems training for librarians to work in an online environment. During the interviews with the line managers the question of a lack of training was raised and what strategic plans there were to mitigate the situation.

*P2: “No-one prepared anyone for the transition from print to electronic or working in an electronic environment because everyone was learning on the job. Management found themselves in a very, very challenging position, because you could not say the ones who went to study, they had the skill. Because no-one had the skill. You find that people who studied Library and Information Sciences did not have the skill, because no module prepared*

*them for the transition. And those that did not go to formal studies, they also were not prepared and they come from the pre-electronic era.”*

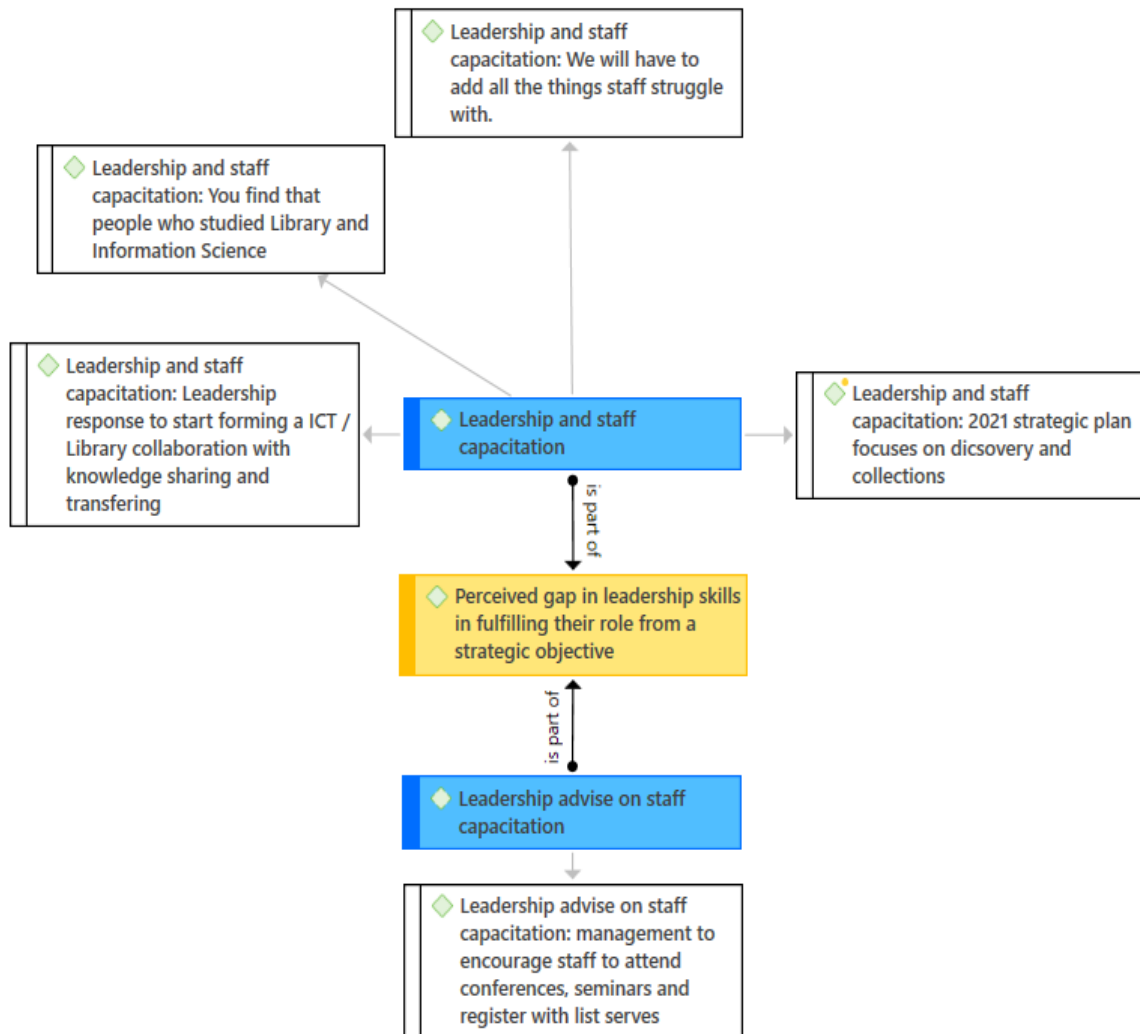
The researcher noted a perceived gap in leadership when P2 elaborated: *“I could pick up that at the time we relied a lot on the publishers for knowledge, because we did not know and you could see the operation staff also learning from publishers and vendors when they come to visit. But these people come for business and you find that they were influencing how we structure or the decision we made at the time. There was no objectivity; you find that we acquired things that we are not fully informed on. Now management sees this happening, but also, they are not equipped well enough. And the staff are looking at management for guidance, but management is still learning, you know, at the same time.”*

P7: *“I personally think that since things happen people were placed in positions, positions were created, people moved from position to position, but I don’t think perhaps justice was done with regards to upskilling. There was and is a lack of training and development and skills development in this regard.”*

*“I would agree that there is quite a lot that we still need to do to upskill our staff in preparing them and equipping them to do the best they can do to support the library and the user community. Just to take you back to our strategic plan for 2021. We focused on something like discovery and collections. I think there’s a lot that we need to do in skilling staff to achieve the discovery part and to achieve the collection part.*

*“To answer your question, after we did the strategic plan, my hope, for 2022, was for us to do like some sort of a skills analysis. To assess the staff in terms of the skills they need, what shortages there are, and then try and see how we can match those skills, how we can develop those skills, whether (it) be sending our people for training or hooking them up with other universities.”*

The researcher noted that, with 2022 drawing to a close, no steps had been taken towards staff training, reskilling or upskilling to work effectively and efficiently in an online environment – indicative of a leadership vacuum.



**Figure 5.8: Perceived gap in leadership from a strategic perspective**

### **5.2.2.5 Theme 5: Apparent acceptance and utilisation of lean principles as a business improvement initiative**

The researcher noted the positivity among all participants concerning lean principles. This was clear from the participants' responses, as stated below. In addition, during the Phase 3 interviews, the researcher observed how enthusiastically the participants engaged when they identified possible lean waste in their areas of work (see Tables 5.10 – 5.17).

P1: *"I haven't heard of the five lean principles, but I understand the concept. Yes, I agree that you have to look at your processes, simplify them and make them as easy as possible. But not to leave out important steps to make it too lean. We must look at our internal processes and workflows and see how to streamline access – it is very important, I agree 100%."*

P3 saw lean *"in an industrial setting, in a factory or a manufacturing environment."*

P3: *"But I have read about the lean management of the sneaker company, Nike. They implemented lean principles to improve their business. They had a lot of backlash because it was discovered that they were using sweatshops to produce their sneakers. In terms now of wanting them to have a good brand and good corporate image, they introduced lean principles to improve their image and also to improve their productivity and also not to infringe on the Human Rights Act."*

P4: *"It was not something that I follow; it's not part of my job. However, I do realise that it could be because you've got to think about how I can do it quicker or faster or is there not a better way of doing it. Maybe it also touches on the much larger philosophical question, you know; we haven't had the re-design – we are still stuck in departments and things like that come from a very long time. So, I think it's also part of that whole process, you know, of a redesign – for example, do you really need 10 people to do the same thing?"*

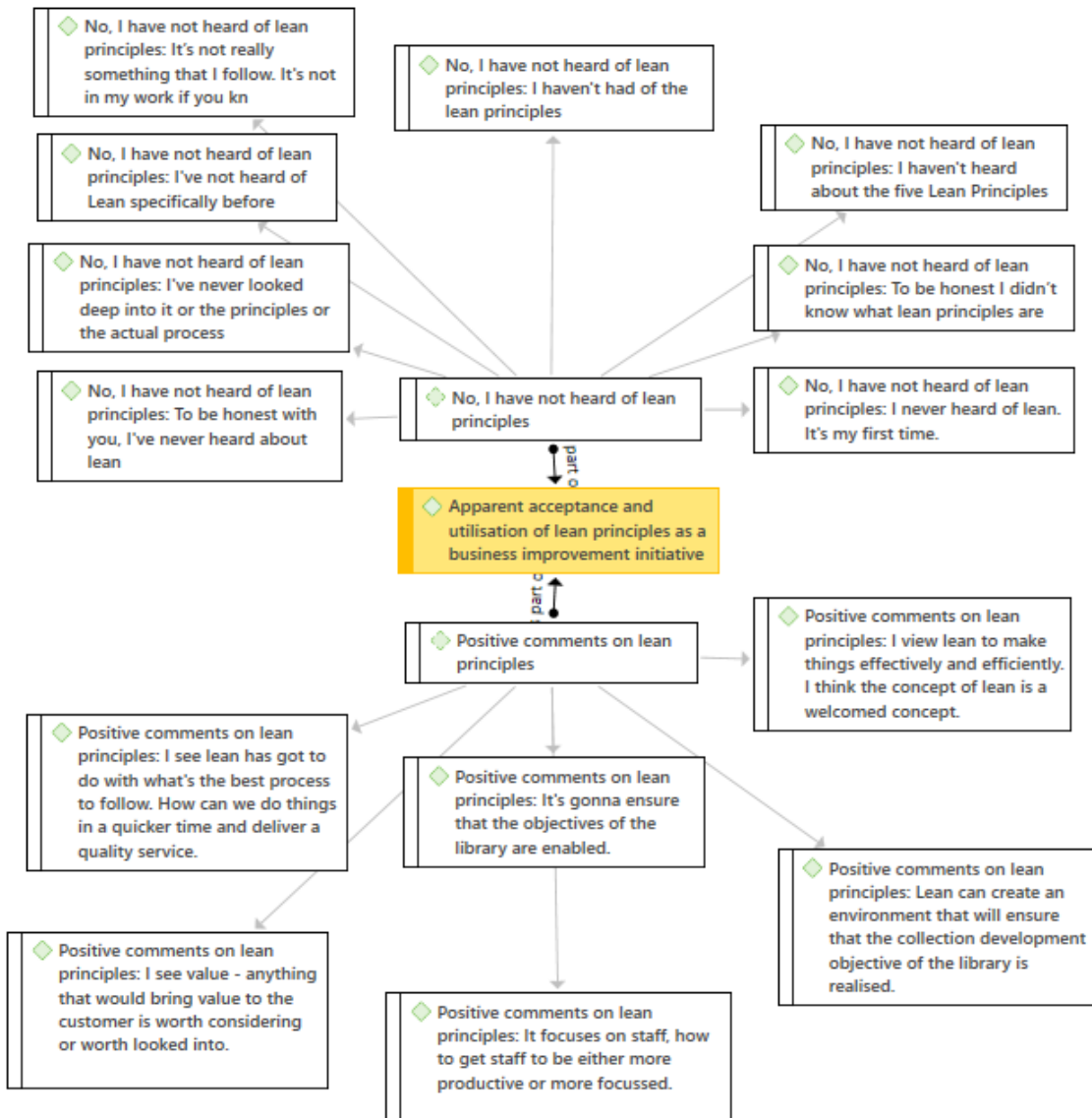
P6: *"I have very little to say, except my understanding is to be (as) effective and efficient as possible without being wasteful. I've never looked deep into it or the principles or the actual process, but just that it is being as effective and efficient without being wasteful."*

P8: *"I think a lot of waste will be cut when people understand the process better."*

P9: *“I read up on it and I must say it will work for us, because we are working with students, and we must give them value and we never get a sufficient increase in our funds.”*

P11: *“I can see where you are coming from with lean. I understand that it has to do with cutting down on costs and we must not be wasteful – and for a 21<sup>st</sup>-century library there should not be too many people at the circulation desk; it will help to place staff where it is needed.”*

P12: *“I didn’t know what lean principles are, but I read an article from the university in Malaysia and after reading the article I can relate it closer to home. I have first-hand experience; we have a small business that is run by my partner and we eliminated waste by changing the way we did our deliveries. Initially, we delivered the client orders as we complete the products, irrespective of where the client’s address was. We then decided to change the way we do our deliveries and divided our delivery areas into specific days. We could see the benefits of the changes immediately – not just saving on petrol and vehicle maintenance, but the driver is now more productive, gets back earlier and assists in the factory with other small jobs.”*



**Figure 5.9: Perceived acceptance and utilisation of lean principles as a business improvement initiative**

### 5.2.3 Data presentation and findings of Phase 2 interviews

The main research question focused on how lean principles, when applied to processes and workflows of e-resources, could facilitate enhancing access at NMULIS. This aspect directly related to the availability of officially documented processes and workflows. In the absence of such documentation of current processes and workflows, the researcher hand-sketched processes and workflows, based on primary data gathered in the field via the non-participative observation technique. The data were then visually converted via Microsoft Visio Professional software.

Questions for the Phase 2 semi-structured interviews (Appendix B) were developed and participants were asked to verify the information captured in Phase 1. The Phase 2 interviews related to research question 3 (see Section 1.2.2). The verification processes and workflows are illustrated in Figures 4.3 – 4.4 as well as Tables 4.3 – 4.9 below. The target population was exceedingly small and therefore, for the verification process, the researcher approached only selected participants (see Table 4.3), namely: line managers, and in some instances, the most knowledgeable participant.

Table 5.2 below reflects the responses of the selected participants. The clarification of data captured in phases 1 and 4 was captured in the respective steps using bold lettering. The verbatim responses of the participants were italicised for ease of reading and understanding. Figure 5.10 is a visual representation of an e-book perpetual access acquisition incorporating the procedural clarification and verification by respondents.

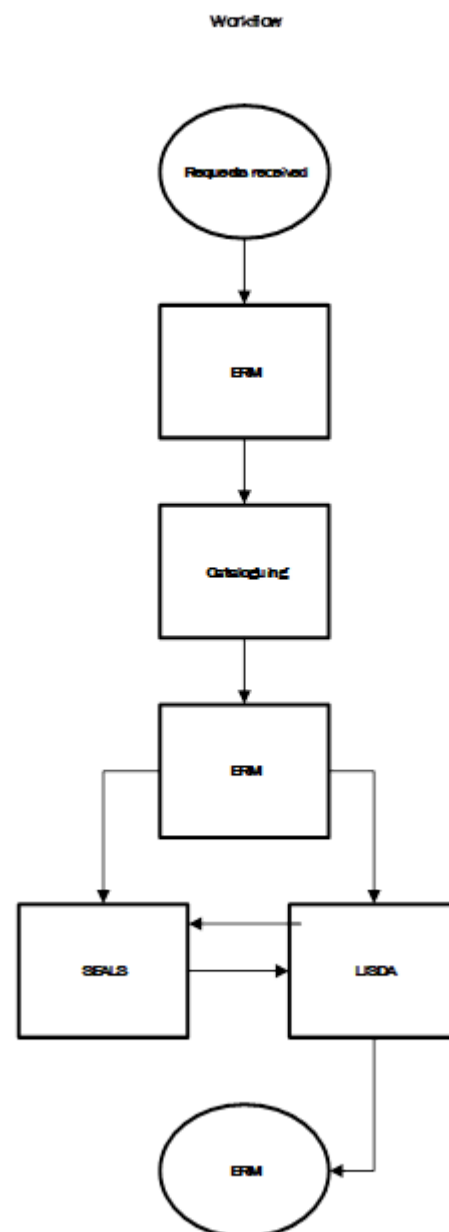
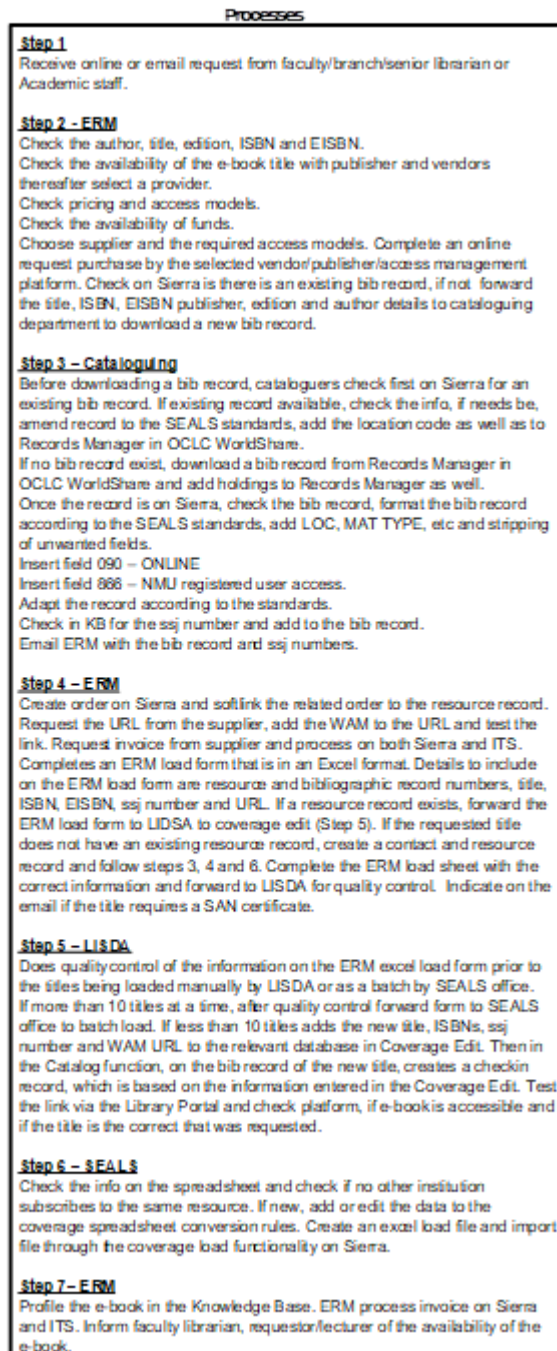
**Table 5.2: Verification and amendments of the single title e-book processes and workflows**

Steps	Responses and process amendments to an e-book perpetual access model
<b>Step 1</b>	<p>Receive an online or <b>e-mail request</b> from faculty / branch / senior librarian or academic staff.</p> <p><i>P9: "You need to add the received request by e-mail as well. Sometimes the online webpage is not working, or the lecturer prefers just to send a snapshot of what they require, and I need to work from that."</i></p> <p><i>"Sometimes I receive from students, I will then forward the request to the respective faculty librarian to follow up and resubmit the request from the lecturer intended, because I can only process requests coming from the academic departments and not the students."</i></p>
<b>Step 2</b>	<p>Check the author, title, edition, ISBN and <b>EISBN</b>.</p> <p>Check availability of the e-book title with the <b>publisher and vendors</b>: thereafter select a provider. Check pricing and access models. Check the availability of funds. Choose the supplier and the required access models. Complete an online request purchase by the selected vendor / publisher / access management platform.</p> <p><b>Check on Sierra whether there is an existing bib record; if not, forward the title, ISBN, EISBN publisher, edition and author details to cataloguing department to download a new bib record.</b></p> <p><i>P9: "I do not request the URL in step 2; the URL is requested after I placed an order with the selected provider."</i></p> <p>Some vendors do have prices on their platforms, P9 adds; however, if it is a direct purchase from the publishers, a quotation is requested.</p> <p><i>P9: "Before I can place the order on the system, I need to check if there is a bibliographic record to attach the order to."</i></p>

Steps	Responses and process amendments to an e-book perpetual access model
Step 3	<p><b>Before downloading a bibliographic (bib) record, cataloguers check first on Sierra for an existing bib record. If an existing record is available, check the info and, if needs be, amend the record to the SEALS standards and add the location code as well to the Records Manager in OCLC WorldShare.</b></p> <p><b>If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well. Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc. and stripping of unwanted fields.</b></p> <p>Insert field 090 – ONLINE</p> <p><b>Check in the KB for the SSJ number and add it to the bib record. E-mail ERM with the bib record and SSJ numbers.</b></p> <p>P6 indicates that although P9 indicated checking whether there is an existing bib record, the cataloguers also check on their side just in case it is missed.</p> <p>P6 adds: <i>“We also add the location code, because of the consortia membership. If Fort Hare, Rhodes or Walter Sisulu downloads a record, maybe at the time it was a record on the fly; you update it and then you add holdings on Records Manager in WorldShare. If there is no bib record available, you download it from Records Manager in OCLC WorldShare and add holdings to Records Manager as well.”</i></p> <p>P6 requested amending the first sentence to read <i>“checking existing record on Sierra”</i>, otherwise it might be read as <i>“checking the existing record on WorldShare.”</i></p> <p>P6: <i>“Before we e-mail the bib record number to ERM, we first check on the KB for the SSJ number and add it to the bib record.”</i></p>
Step 4	<p><b>Create an order on Sierra and soft-link the related order to the resource record. Request the URL from the supplier, add the WAM to the URL and test the link. Request invoice from supplier and process on both Sierra and ITS.</b></p> <p><b>Complete an ERM load form that is in an Excel format. Details to include on the ERM load form are: resource and bib record numbers, title, ISBN, EISBN, SSJ number and URL. If a resource record exists, forward the ERM load form to LISDA for coverage editing (Step 5).</b></p> <p><b>If the requested title does not have an existing resource record, create a contact and resource record, then follow steps 3, 4 and 6. Complete the ERM load sheet with the correct information and forward it to LISDA for quality control. Indicate in the e-mail whether the title requires a SAN certificate.</b></p> <p>The researcher rewrote step 4, because most of the information had changed during COVID-19 to include quality control and some steps that were done by LISDA were given to the ERM department for continuity.</p> <p>P9: <i>“I know we have been told to check the availability of the e-book in the KB and profile it before we place the order. I prefer to profile the e-book after the systems librarian had coverage edited the URL and tested the link; then I know the e-book is accessible to the user, because even if the e-book is available, it doesn’t tell me the access models available, the price and whether we in South Africa can have access to the e-resource. All this information I get either on EBSCOnet, Snapplify and VitalSource.”</i></p> <p>P4 advises that ERM must create the load sheet with all the correct information and forward it to LISDA for quality control before titles are loaded manually by LISDA or batch-loaded by SEALS.</p>



Steps	Responses and process amendments to an e-book perpetual access model
Step 5	<p><b>Quality control of the information on the ERM Excel load form, irrespective of manually loading or batch loading by the SEALS office.</b></p> <p>If more than 10 titles, after quality control, forward them to the SEALS office to batch-load. If less than 10 titles, add the new title, ISBNs, SSJ number and WAM URL to the relevant database in Coverage Edit.</p> <p>In the Catalogue function, on the bib record of the new title, create a check-in record, from the information entered in the Coverage Edit.</p> <p><b>Test the link via the Library Portal and check the platform: whether the e-book is accessible and whether the title is the correct one that was requested.</b></p> <p>P4: <i>“Upon receipt of the ERM load sheet, if there are more than 10 titles, the form is forwarded to the SEALS office and they bulk-load. The form always comes to me regardless of whether it has more or less than 10 items for quality control, because SEALS bulk-load from the spreadsheet; if there is anything wrong on the sheet, they won’t be able to load and then they send the form back to me.”</i></p> <p>If the new titles are to be manually loaded: <i>“I go to coverage edit on Sierra and I add the new titles with the ISBN, EISBN, SSJ number and the URL. Then I have to go to the bibliographic record, and I create a check-in record. As part of creating a check-in record process, I go to public view and I check the link from the OPAC to see if it takes me to the e-book and if can I open the e-book.”</i></p>
Step 6	<p><b>Check the info on the spreadsheet and check whether no other institution subscribes to the same resource. If new, add or edit the data to the coverage spreadsheet conversion rules. Create an Excel load file and import the file through the coverage load functionality on Sierra.</b></p> <p>P8 stated that after receiving the ERM load sheet, the information on the form is checked first to see whether it is correct before batch-loading.</p> <p><i>“For example, if there is a spelling mistake on the title, it won’t load cause the system is looking to match with what is on the spreadsheet, with the bib record, and in the coverage edit.”</i></p>
Step 7	<p><b>Profile the e-book in the Knowledge Base; ERM processes invoice on Sierra and ITS. Inform the Faculty Librarian, requestor / lecturer of the availability of the e-book.</b></p> <p>P9 indicated moving the profiling to step 7 as explained in step 4:</p> <p><i>“The faculty librarian informed me that I must inform the lecturer when the book is available and cc them in.”</i></p> <p>P9 states that in the past she used to e-mail the faculty librarians with the availability of the book or reasons why the book is not purchased. Many times, these messages are not relayed to the requestor and the requestor ends up having to e-mail P9 to enquire regarding the request. Therefore, it seemed best to e-mail the requestor and make it part of that particular workflow.</p>



**Figure 5.10: Illustration of the verified processes and workflows of a single title perpetual access e-book after verification**

Table 5.3 represents the responses regarding the acquisition of a single e-journal subscription title. As with the e-books, participants were asked to verify the information captured so that it would display a true reflection of what is happening in the field regarding the processes and workflows relating to single e-journal subscription titles. Noticeably in the first few steps of acquiring a single e-journal subscription, the

processes and workflows are similar to those of an e-book acquired perpetually. The only difference is that perpetual access has a linear process, while subscriptions have a cyclical process.

Annually, the subscriptions are either renewed or cancelled, based on the instruction the ERM department receives from academia. Figure 5.11 is a visual presentation of the processes and workflow of a newly acquired single e-journal title subscription incorporating the amendments and verification. As with the e-books, the amendments to the respective steps are denoted by bold type and the verbatim responses of the participants italicised.

**Table 5.3: Verification and amendments of the single title e-journal subscription processes and workflows**

Steps	Responses and process amendments to a new single title e-journal subscription
<b>Step 1</b>	Receive requests for e-journals by e-mail from Faculty Librarian. P12: <i>“We only receive requests for new journals by e-mail.”</i>
<b>Step 2</b>	<p>Check the details of the e-journal subscription and verify the publisher, ISSN, <b>EISSN</b> number and e-journal title. Check for overlapping <b>titles in the current collection</b>. <b>Check whether it is a direct subscription, otherwise use a vendor.</b></p> <p>Forward e-journal request to publisher or vendor to include a quotation, coverage dates, embargoes and perpetual access. In addition, check if the e-journal request requires a licence agreement. Inform the Faculty Librarian of the availability and cost to subscribe.</p> <p><b>On confirmation from the Faculty Librarian to subscribe, ERM creates a contact and resource record if there is not an existing resource record on Sierra. Forward details to cataloguing to download the bib record if there is no existing bib record on Sierra.</b></p> <p>P12: <i>“We don’t normally check if the subscription is a direct subscription – we approach the two vendors, EBSCO and WWIS, forward them the details of the new subscription and they will inform us whether we should do it directly or not, because we don’t have that information.</i></p> <p><i>“A lot has changed from my print subscription experience. We used to try and avoid direct subscriptions, because we always used to struggle to get the right titles, the queries with overseas publishers were difficult and we had to make overseas calls; then we’re also the postal service with delayed deliveries, hijackings and losing the parcels – a lot of negative things used to influence that.”</i></p>

Steps	Responses and process amendments to a new single title e-journal subscription
Step 3	<p><b>Before downloading a bib record, cataloguers check first on Sierra for an existing bib record. If an existing record is available, check the info and, if needs be, amend the record to the SEALS standards and add the location code as well to the Records Manager in OCLC WorldShare.</b></p> <p><b>If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well.</b></p> <p><b>Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc. and stripping of unwanted fields. Determine whether a new record is needed based on CONSER, RDA and NMU's cataloguing manuals.</b></p> <p>Insert field 090 – ONLINE</p> <p><b>Check in the KB for the SSJ number and add it to the bib record.</b></p> <p><b>E-mail ERM with the bib record and SSJ numbers.</b></p> <p>P6 confirmed that the information in Table 5.2, step 3, could be copied to step 3 of Table 5.3 as the processes are similar, same, except for adding the CONSER RDA Cataloging Checklist. This is important to consult for serial cataloguing purposes, because this document addresses what generally is included in CONSER bibliographic records for a textual serial; to be used with the CONSER RDA Core Elements List. Cataloguers should also consult their institution's core list. Additional elements may be needed for non-textual serials or serials in special subjects (law, music, etc.); cataloguers should consult community-specific guidelines in these cases.</p>
Step 4	<p>Create an order record and add it as a related order on the resource record. Check the URL and check whether the <b>URL requires a SAN certificate.</b></p> <p><b>Profile the e-journal in the KB. Add a WAM link to the URL. Complete the ERM Excel load sheet, including number, bibliographic record, provider, title, ISSN, EISSN, coverage dates, URL and publication date.</b> If there is an existing resource, forward the ERM load sheet to LISDA.</p> <p>P12: <i>"To tell you the truth, profiling in the KB, I don't understand that. I don't add a WAM to the URL link and also, I don't also check if the link requires a SAN certificate. It's a bit shady for me because I don't have permissions to profile and I don't know how to do the other stuff; I normally ask the supervisor to check and fix those things. But I really want to learn how to do it, you know, to complete the whole process from start to finish."</i></p> <p>P12 confirmed not making use of the spreadsheet but sending the information to the next person via e-mail. However, the spreadsheet is a better way of working, because managing e-mails are a nightmare in problem-solving.</p>
Step 5	<p>Check and do quality control of information on the ERM Excel load form. If more than 10 titles at a time, after quality control forward the form to SEALS office to bulk-load. If fewer than 10 titles, add the new title, <b>start and end dates, ISSN, EISSN, SSJ number and WAM URL</b> to the relevant database in Coverage Edit.</p> <p>Then, in the Catalog function, on the bib record of the new title, create a check-in record, based on the information entered in Coverage Edit. <b>Test the link via the Library Portal.</b></p> <p>P4: <i>"The steps are exactly the same as with the e-books. There is just additional information that I require for an e-journal – for example, the start and end date, embargo dates or something that is needed in the coverage edit."</i></p>

Steps	Responses and process amendments to a new single title e-journal subscription
Step 6	<p>Check the info on the spreadsheet and check whether no other institution subscribes to the same resource. If new, add or edit the data to the coverage spreadsheet conversion rules. Create an Excel load file and import the file through the coverage load functionality on Sierra.</p> <p>P8: <i>"The processes for loading more than 10 items are the same for e-journals as they were for e-books."</i></p>
Step 7	<p>Capture invoices on Sierra and ITS and register on the Publisher website for usage stats if required. The payment is also captured on the E-Resources spreadsheet that is on SharePoint.</p> <p>P12: <i>"In step 7, where it says capture invoice on Sierra and ITS, I take it a step further – I created a spreadsheet and exported it to SharePoint. I capture the payment details there as well. It helps me keep track of the payments and also assists with cancellations and renewals by calculating the projected cost price for the new subscription (paid amount plus 10% increase plus 15% VAT). This amount is committed against each renewal e-journal and makes the processes much quicker when doing renewals. For the cancellations, we can see exactly the amount that will be freed that we can use, should the faculty want to replace the cancelled subscription."</i></p>
Step 8	<p>Receive a request from the Faculty Librarian to either renew or cancel the subscription. For renewal, the ERM librarian informs the publisher or vendor, receives the invoice and processes the invoice on Sierra and ITS.</p> <p>P12: <i>"All renewals for accession for the 1<sup>st</sup> day of the new year must be paid before the new year begins. Sometimes it gets tricky because you have to wait for the publishers to send the quotation to the vendors, then the vendors must generate the invoice for payment. At NMU, the finance system closes around the end of November, the first week of December, and then it is always a risk that you may not get the payment through on time."</i></p>
Step 9	<p>ERM librarian informs the publisher or vendor. Unsubscribe from the e-journal in the KB, change the order record to status "z" in Sierra and inform SEALS, LISDA and the Faculty Librarian.</p> <p>P12: <i>"Always adds an internal note for the cancellation of a single subscription. Sometimes the title is available in a database, ceased or a name changed; it always helps with troubleshooting."</i></p>
Step 10	<p>Remove title entry from coverage edit. Delete the check-in record on Sierra if no perpetual access to the title. Remove the bib record if no other institutional holdings or any other kind of access. Inform ERM when done.</p>
Step 11	<p>Remove holding from Records Manager in OCLC WorldShare.</p>

Processes

**Step 1 – ERM**  
Receive request for e-journal by email from Faculty Librarian.

**Step 2 – ERM**  
Check details of the e-journal subscription and verify publisher, ISSN number and e-journal title. Check for overlapping titles in current collection. Check if it is a direct subscription, otherwise use a vendor. Forward e-journal request to publisher or vendor to include a quotation, coverage dates, embargos and perpetual access. In additionally, check if the e-journal request requires a license agreement. In form Faculty Librarian on the availability and cost to subscribe. On confirmation from the faculty librarian to subscribe, ERM creates a contact and resource record if not there is not an existing resource record on Sierra. Forward details to cataloguing to download bibliographic record if there is no existing bibliographic record on Sierra.

**Step 3 – Cataloguing**  
Before downloading a bib record, cataloguers check for existing bib record. If record is available, check the info, if necessary, amend record according to SEALS standards, add the location code as well as to Records Manager in OCLC WorldShare. If no bib record exists, download a bib record from Records Manager in OCLC WorldShare and add holdings to Records Manager as well. Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc and stripping of unwanted fields. Determine whether a new record is needed based on CONSER, RDA and NMU's cataloguing manuals. Cataloguing giving attention to all details and specific fields. Insert field 090 – ONLINE and field 888 NMU registered user access. Check in KB for the ssj number and add to the bib record. Email ERM with the bib record and ssj numbers.

**Step 4 – ERM**  
On receipt of the bibliographic record, create an order record and add as a related order on the resource record. Check the URL received from the publisher or vendor to ensure whether the URL requires a SAN certificate. Complete the ERM excel load sheet, to include ssj number, bibliographic record, provider, title, ISSN, EISSN, coverage dates, URL, and publication date. If there is an existing resource, email the systems librarian at LISDA and follow Step 5. If the requested title does not have a resource record, follow STEP 6, and forward via email to SEALS. NB ssj or ssib numbers are after the 10<sup>th</sup> of each month. Please note to inform SEALS if SAN certificate is required.

**Step 5 – LISDA**  
Checks and does quality control of information on the ERM excel load form. If more than 10 titles at a time, after quality control forward form to SEALS office to bulk load. If less than 10 titles add the new title, ISBNs, ssj number and WAM URL to the relevant database in Coverage Edit. Then in the Catalog function, on the bib record of the new title, creates a checkin record, which is based on the information entered in the Coverage Edit. Test the link via the Library Portal and check platform, if e-book is accessible and if the title is the correct that was requested.

**Step 6 - SEALS**  
Check the info on the spreadsheet and check if no other institution subscribes to the same resource. If new, add or edit the data to the coverage spreadsheet conversion rules. Create an excel load file and import file through the coverage load functionality on Sierra.

**Step 7 – ERM**  
Profile e-journal in the Knowledge Base. Capture invoice on Sierra and ITS and register on Publisher website for usage stats if required. The payment is also captured on the E-Resources spreadsheet that is on SharePoint.

**Step 8 – ERM (Renewal)**  
All single title e-journal subscription must be renewed annually for the continuation of the subscription. Receive request from the faculty librarian to either renew or cancel the subscription. For renewal the ERM librarian informs the publisher or vendor, receive the invoice, and process the invoice on Sierra and ITS.

**Step 9 – ERM (Cancellation)**  
ERM librarian informs the publisher or vendor. Unsubscribe the e-journal in the KB, change order record to status "z" in Sierra, and inform SEALS, LISDA and the Faculty Librarian.

**Step 10 – LISDA**  
Remove title entry from coverage edit. Delete checkin record on Sierra if no perpetual access to title. Remove bib record if no other institutional holdings or any other kind of access. Inform ERM when done.

**Step 11 – SEALS**  
Delete resource from Coverage  
Delete bib record that has not holdings attached. Inform ERM when done.

**Step 12 – Cataloguing**  
Remove holding from Records Manager in OCLC WorldShare.

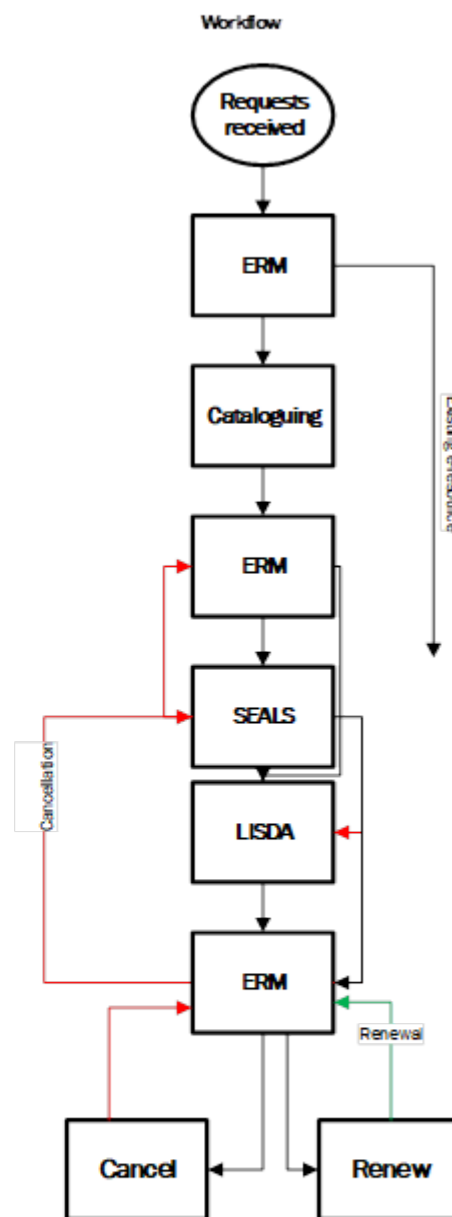
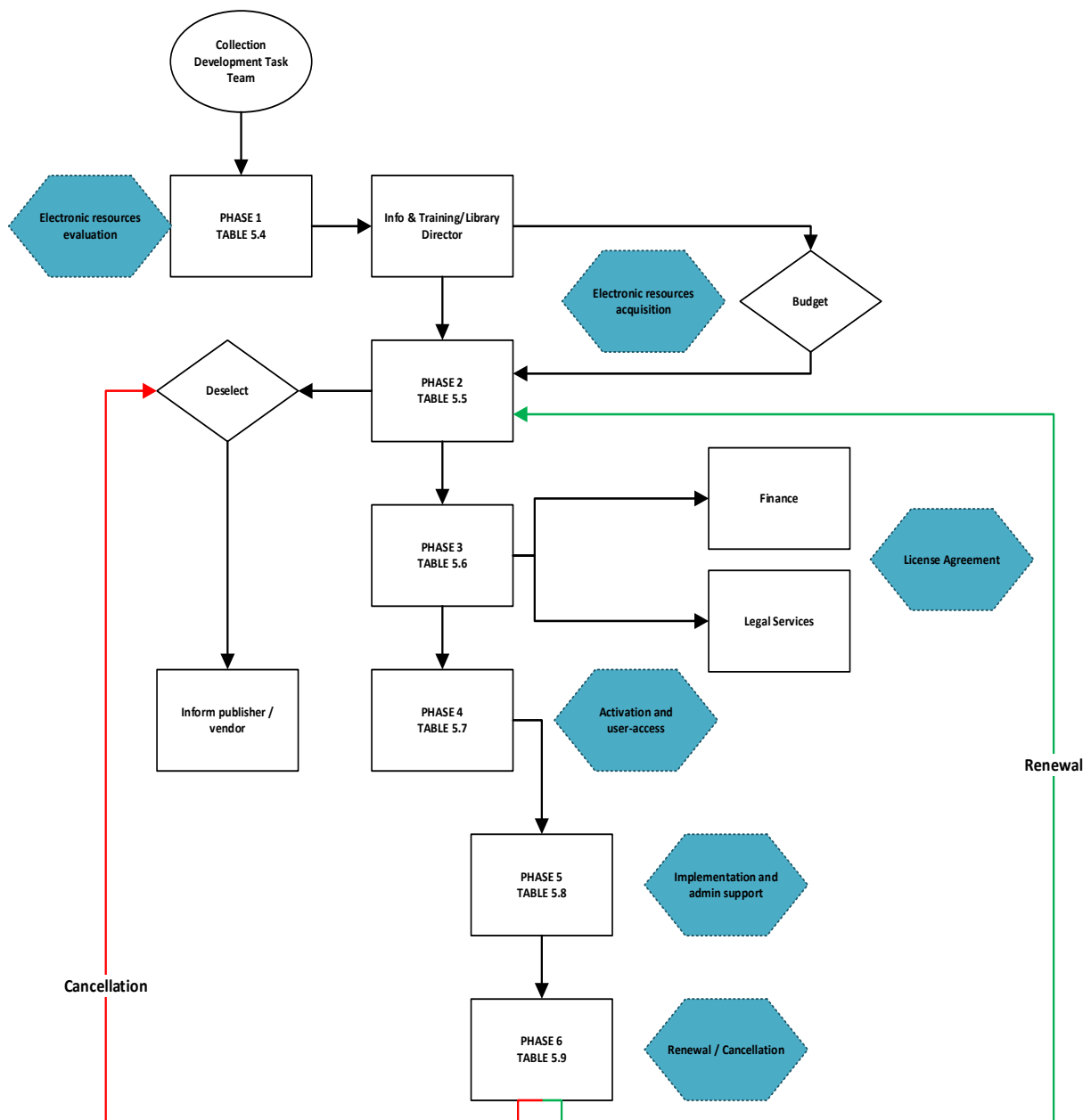


Figure 5.11: Illustration of the verified processes and workflows of a single title e-journal subscription after verification

As mentioned in Chapter Two (Section 2.6.3), NMULIS used an adapted version of the Pesch (2008) six-phase life-cycle (see Figure 2.2). This adapted version was used in the Phase 2 semi-structured interviews for verification. The verified process illustration is depicted in Appendix G. Because each phase of the cycle has its own set of processes and workflows, each phase was discussed individually. The responses were captured in the same block of the steps and italicised for ease of reading. Tables 5.4 – 5.9 represent the verified data concerning the various phases of the database.



**Figure 5.12: Illustration of the verified processes and workflows of a new database subscription after verification**

**Table 5.4: Verification and amendments of the database trial processes**

Steps	Processes	Department
<b>Step 1</b>	Receive notification of a trial request.	ERM
<b>Step 2</b>	Negotiate trial conditions with the publisher.	ERM
<b>Step 3</b>	Supply publisher with IP Ranges or SAML ID if required. Request URL link from publisher / vendor.	ERM
<b>Step 4</b>	Create contact and trial resource records with the start and end dates of the trial period and add a URL to the resource record.  If no single URL, a short bib record must be created. Add the WAM to the URL for off-campus access. Profile resource in 360Core.	ERM
<b>Step 5</b>	If there is an existing bib record, amend record according to the SEALS standards on Sierra. Add location code as well as to Records Manager in OCLC WorldShare.  If no bib record, download a bib record from the Records Manager in OCLC WorldShare. Check URL whether the correct record has been downloaded.  Once the record is in Sierra format record according to standards, add LOC, MAT TYPE, etc. Strip all unwanted fields. Forward the bib record and SSJ number to the ERM department.  <i>P6: "We don't always know if the bib record requested is for a database or a single title – we treat all bib record requests the same."</i>	Cataloguing
<b>Step 6</b>	At the end of the trial period, prepare a title overlap report.  Forward this report, the usage statistic report and the quotation to the Information and Training Department to evaluate and recommendation whether to proceed with the subscription or not.  Suppress trial resource records until confirmation is received.  If no subscription, inform LISDA to cancel the bib record. Delete resource record.  <i>(Information telephonically confirmed by LISDA)</i>	ERM
<b>Step 7</b>	Suppress trial resource until confirmation is received.  If negative, inform SEALS and reverse the process. Delete resource record.  If approved, proceed with ordering phase (Table 5.5).	ERM



**Table 5.5: Verification and amendments of the database ordering processes**

Steps	Processes	Department
Step 1	Check budget availability. Place an order with the vendor or publisher.	ERM
Step 2	Request Licence / Terms & Conditions Agreement documents from the publisher or vendor.	ERM
Step 3	Unsuppress the trial resource record and update the fields of the resource record to an active resource record. Delete trial dates and update activation and registration dates.	ERM
Step 4	Create an order record and soft-link the order record as a related order to the resource record. Process invoices on Sierra and ITS.	ERM
Step 5	Inform SEALS that the database is active and not on trial.	ERM

**Table 5.6: Verification and amendments of the database licence agreement processes**

Steps	Processes	Department
Step 1	Receive the Licence Agreement or Terms & Conditions Agreement from the publisher or vendor. Verify the contents of the agreement and the order form.	ERM
Step 2	Complete an NMU Licence Agreement Approval form. E-mail the form for approval signatories to the Senior Librarian: ERM and the Library Director.	ERM
Step 3	Upon receipt of these signed documents, attach a copy of the invoice and forward these documents to the Legal and Finance departments to co-approve and co-sign.	ERM
Step 4	The co-approved and co-signed documents are received back in the ERM department from Legal Services.	ERM
Step 5	The co-signed Licence Agreement is sent to the publisher or vendor to obtain countersignatures.	ERM
Step 6	The countersigned Licence Agreements or Terms & Conditions Agreements, co-signed approval form and copy of the invoice are scanned and uploaded to the SharePoint server for record-keeping. A copy of the countersigned documents is forwarded to Legal upload on the Records Management System.	ERM
Step 7	Create a Licence Agreement record on Sierra.	ERM

**Table 5.7: Verification and amendments of the database activation and user access processes**

Steps	Processes	Department
<b>Step 1</b>	Check whether the resource profile is on the Data on Demand on 360 Core and whether the number of titles matches the number of titles in OCLC WorldShare Collection Manager.  If it is a good match, subscribe to the OCLC WorldShare Collection Manager. Check whether the Resource ID matches the load file	SEALS
<b>Step 2</b>	If a new database, MARC records are imported from OCLC WorldShare; title IDs should be added for a successful load and attach check-in records for access.	SEALS
<b>Step 3</b>	Check for incorrect and incomplete bibliographic data on Sierra as it will cause errors and block access to resources. Prep the load file.	SEALS
<b>Step 4</b>	Extract data appropriate to the resource being loaded from the subscription data file and create a load file.  Check and match bib records with the subscription load file, checking for bib records with correct title IDs.	SEALS
<b>Step 5</b>	SEALS usually inform the cataloguing department if they need to preload MARC records for holdings.  Each case is evaluated according to the number of titles in the database, the number of full and fixed records on Sierra, and the number of short bib records that need to be updated.	SEALS

**Table 5.8: Verification and amendments of the database implementation administration and support processes**

Steps	Processes	Department
<b>Step 1</b>	Load file into the ERM system to create check-in records with links for access; if no bib record matches, a short bib record is created.	SEALS
<b>Step 2</b>	Check the load report for errors; fix multiple matches and errors appropriate to the file loaded. Forward load report to ERM librarian for information.	SEALS
<b>Step 3</b>	Check access from all the various access points and inform the Faculty Librarian that the database is accessible and ready for use.	ERM
<b>Step 4</b>	Register on the database platform as an administrator to retrieve usage statistics.	ERM
<b>Step 5</b>	Forward database information, URL and marketing material to the Web Administrator and Faculty Librarian regarding the availability and inform users of the new resource.	ERM
















**Table 5.9: Verification and amendments of the database renewals and cancellations processes**

Steps	Processes	Department
<b>Step 1</b>	For the renewal request, the ERM librarian informs the publishers. Sign the Product Form Once and follow the processes of Table 5.5. If the resource requires, a new licence agreement will be requested and will follow the processes as mentioned in Table 5.6.	ERM
<b>Step 2</b>	Receive a request to cancel a database. ERM librarian checks the licence agreement for the cancellation notification period and perpetual access and informs the publisher / vendor.	ERM
<b>Step 3</b>	Change the order record status to “z” and insert a note in the note field about the reason for cancellation. Suppress the order record for five years (following the finance policy). Unsubscribe from KB.	ERM
<b>Step 4</b>	Create an ERM load sheet with instructions for the cancellation of the database. Forward the load sheet to SEALS with all the information requirements.	ERM
<b>Step 5</b>	Check the information on the global update is correct. Bulk- delete all records. Delete the resource from the coverage. Delete the bib records that have no holdings attached. Inform the ERM department when the cancellations are done.	SEALS
<b>Step 6</b>	Inform cataloguing to remove from Records Manager in OCLC WorldShare.	Cataloguing
<b>Step 7</b>	Inform Information and Training and ask the Web Administrator to remove the link from the Library Portal.	ERM

#### **5.2.4 Data presentation and findings of Phase 3 interviews**

Phase 3 related to research question 5 (see Section 1.2.2). The selected participants were asked to identify lean waste in the current processes and workflows in their areas of work. In these activities, the verified current processes and workflows were examined and lean waste identified. The participants were given a key symbol guide (see Table 4.2) with examples of lean waste customised for a library environment. Once each participant had identified the lean waste, they had to highlight the specific key. Instead of highlighting, most of the participants either circled, ticked or made a cross on the keys they thought were possible lean wastes. Tables 5.10 to 5.17 reflect the lean waste responses.

**Table 5.10: Lean waste activity: processes and workflow of a single title perpetual access e-book**

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM						Receive online or e-mail request from faculty / branch / senior librarian or academic staff.
Step 2	ERM						Check the author, title, edition, ISBN and EISBN. Check the availability of the e-book title with the publisher and vendors and thereafter select a provider. Check pricing and access models. Check the availability of funds. Choose the supplier and the required access models. Complete an online request to purchase by the selected vendor / publisher or access management platform. Check on Sierra whether there is an existing bib record; if not, forward the title, ISBN, EISBN, publisher, edition and author details to cataloguing department to download a new bib record.
Step 3	Cataloguing						<p>Before downloading a bib record, cataloguers check first on Sierra for an existing bib record. If existing record is available, check the info; if needs be, amend record to the SEALS standards and add the location code as well as to the Records Manager in OCLC WorldShare.</p> <p>If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well. Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc. and stripping unwanted fields. Insert field 090 – ONLINE Adapt the record according to the standards. Check in KB for the SSJ number and add it to the bib record. Email ERM with the bib record and SSJ numbers.</p>

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 4	ERM	○	→	□	⊠	▽	<p>Create an order on Sierra and soft link the related order to the resource record. Request the URL from the supplier, add the WAM to the URL and test the link. Request invoice from supplier and process on both Sierra and ITS.</p> <p>Complete an ERM load form that is in an Excel format. Details to include on the ERM load form are resource and bibliographic record numbers, title, ISBN, EISBN, SSJ number and URL.</p> <p>If a resource record exists, forward the ERM load form to LISDA for coverage editing (Step 5).</p> <p>If the requested title does not have an existing resource record, create a contact, resource record and follow steps 3, 4 and 6.</p> <p>Complete the ERM load sheet with the correct information and forward it to LISDA for quality control. Indicate in the e-mail whether the title requires a SAN certificate.</p>
Step 5	LISDA	○	→	□	◇	▽	<p>Do quality control of the information on the ERM Excel load form before the titles are loaded manually by LISDA or as a batch by the SEALS office.</p> <p>If more than 10 titles at a time, after quality control forward the form to SEALS office to batch-load. If fewer than 10 titles add the new title, ISBN, SSJ number, and WAM URL to the relevant database in Coverage Edit.</p> <p>Then in the Catalog function, on the bib record of the new title, create a check-in record, which is based on the information entered in the Coverage Edit.</p> <p>Test the link via the Library Portal and check the platform -- whether the e-book is accessible and whether the title is correctly that which was requested.</p>

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 6	SEALS	○	⇒	□	◇	▽	<p>Check the info on the spreadsheet and check whether no other institution subscribes to the same resource.</p> <p>If new, add or edit the data to the coverage spreadsheet conversion rules. Create an Excel load file and import the file through the coverage load functionality on Sierra.</p>
Step 7	ERM	○	⇒	□	⊗	▽	<p>Profile the e-book in the Knowledge Base. ERM process invoice on Sierra and ITS. Inform the Faculty Librarian, requestor / lecturer of the e-book's availability.</p>

Figure 5.10 represents the verified processes and workflows of an e-book single title perpetual access. Participants were asked to highlight areas where they thought were possible lean wastes. For the e-book processes and workflows, participants highlighted the **start**, **movement**, **action** and **waiting** stages as potential lean waste. This is represented in Table 5.10 and explained below.

According to P3, a new e-book request is received at the acquisition department in one of three ways: *“The first way is when a librarian physically writes the order card when they’re gonna request the book and then physically hands it to the assistant librarian, who is responsible for the ordering of the library items. That’s the first part. The second part is when the requestor actually e-mails the request to the assistant librarian to order the item with all the information that is needed to order that item. Thirdly is when the requestor uses the online request form on the Library Webpage to order or request an item. The movement starts there; from the ordering on the Library Webpage there is an imbalance or there is a need to streamline the process – hence I am saying the start of receiving the request is a problem.”*

P3: *“There are different spreadsheets which the assistant librarian works through when they get to receive that order form from the requestor. This spreadsheet is uploaded to SharePoint. It was a decision made when COVID-19 hit us. We needed a central point to work interrelatedly. Now that is a waste of time and a duplication of the activity.”*

*“We need to seek better ways of working, because she must input details of the item onto the spreadsheet, then send the spreadsheet to another section, namely the cataloguing section. The cataloguing section would retrieve the bib record number for the order to be processed on our library system. Now the waiting period – between sending them the information or the spreadsheet or waiting for cataloguing side to download the bib record, complete the spreadsheet and return the information to the acquisition section – is time wasted.”*

Highlighting “action” as a possible lean waste, P9 elaborated: the online request first goes to the faculty librarian to check the information on the request form and the current collection development. Only then will the faculty librarian forward the form to the acquisitions librarian. Often an e-mail would be received from a lecturer, inquiring about the book that he or she ordered. In most cases, upon investigation, the request was never received. “Action” was therefore highlighted so that the acquisitions department could find a way of mitigating this problem.

In terms of Step 2, P2 indicated that to place e-book orders, the library assistant visits various platforms and publisher websites to see where the item is available, access model required and price checking and felt that it is time-consuming. With the increase in online requests, it has become necessary to *“streamline the workflow in terms of an ordering system, where the librarian can just type in an ISBN number and we will be able to retrieve what vendors of publishers are offering.”*

P2 continued: *“To mitigate these current practices, I am in the process of investigating other ways of streamlining these processes and workflows, to make them simpler, with less steps. The idea is to automate the processes of ordering within our institution and to find the best product that can ensure that we streamline our workflow.”*

P6 highlighted “movement”, “action” and “waiting” as lean wastes in step 3. The respondent felt it is unnecessary to request a bib record by e-mail and SharePoint. Secondly, it was preferable to send the URL as well, because with the URL one can access the book and download the correct bib record. It would be as if one had a printed copy of the book – which would also save time and eliminate errors.

P9 highlighted “decision” and “waiting” in step 4. Sometimes there is a delay in receiving URL links from certain publishers, sometimes up to three or four days. Additionally, there is the delay in receiving invoices as well as profiling e-books on 360Core. According to P9, one book could at times take as much as 15 minutes.

P4 commented on step 5, pointing out the amount of time spent on the spreadsheet, and felt that line managers must do a quality control check before the spreadsheet leaves the section. Often it was necessary to rectify information because the information must be correct for the item to be accessible. Correct information would also eliminate the sending of e-mails up and down to confirm certain details.

P9 explained why profiling of e-books should be done in step 7 and not step 4: *“to change the workflow to include profiling in step 7 just before processing the invoices, because then the item went through all the access checking and it will have a smoother workflow.”*



**Table 5.11: Lean waste activity: processes and workflow of a single title e-journal subscription**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM	○	□	□	◇	▽	Receive requests for e-journals by e-mail from Faculty Librarian.
Step 2	ERM	○	□	□	◇	▽	<p>Check the details of the e-journal subscription and verify the publisher, ISSN number and e-journal title. Check for overlapping titles in the current collection. Check whether it is a direct subscription; otherwise use a vendor.</p> <p>Forward e-journal request to publisher or vendor to include a quotation, coverage dates, embargoes and perpetual access. Additionally, check whether the e-journal request requires a licence agreement.</p> <p>Inform the Faculty Librarian of the availability and cost to subscribe.</p> <p>On confirmation from the Faculty Librarian to subscribe, ERM creates a contact and resource record if not there is not an existing resource record on Sierra.</p> <p>Forward details to cataloguing to download bibliographic records if there is no existing bibliographic record on Sierra.</p>

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 3	Cataloguing	○	■	■	◇	▽	<p>Before downloading a bib record, check for existing bib records. Check the info and amend the record according to SEALS standards.</p> <p>If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well.</p> <p>Once the record is in Sierra, check the bib, format according to the SEALS standards and strip unwanted fields.</p> <p>Determine whether a new record is needed based on CONSER, RDA and NMU's cataloguing manuals. Insert field 090 – ONLINE.</p> <p>Check in KB for the SSJ number and add it to the bib record. E-mail ERM with bib record and SSJ numbers.</p>
Step 4	ERM	○	⇒	■	◇	▽	<p>Create an order record and add it as a related order on the resource record. Check if the URL requires a SAN certificate. Profile the e-journal in the KB.</p> <p>Complete the ERM Excel load sheet, to include the SSJ number, bibliographic record, provider, title, ISSN, EISSN, coverage dates, URL and publication date.</p> <p>If there is an existing resource, forward the ERM load sheet to LISDA.</p>
Step 5	LISDA	○	■	□	◇	▽	<p>Check and do quality control of information on the ERM Excel load form.</p> <p>If more than 10 titles at a time, after quality control forward the form to SEALS office to bulk-load.</p> <p>If fewer than 10 titles, add the new title, ISSN, SSJ number and WAM URL to the relevant database in Coverage Edit.</p> <p>Create a check-in record. Test the link via the Library Portal.</p>

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 6	SEALS	○	⇒	□	◇	▽	Check the info on the spreadsheet and check whether no other institution subscribes to the same resource. If new, add or edit the data according to the coverage spreadsheet conversion rules. Create an Excel load file and import the file through coverage load functionality on Sierra.
Step 7	ERM	○	⇒	□	◇	▽	Capture invoices on Sierra and ITS and register on the publisher website for usage stats if required.
Step 8	ERM (Renewal)	○	⇒	□	◇	▽	The Faculty Librarian indicates (after consulting with the Faculty) whether the e-journal should be renewed or not.  For renewal, ERM librarian informs the publisher or vendor, receives the invoice and processes the invoice on Sierra and ITS.
Step 9	ERM (Cancellation)	○	⇒	□	◇	▽	ERM librarian informs the publisher and vendor. Unsubscribe the e-journal on the KB, change the order record to status "z" and inform SEALS, LISDA and Faculty Librarian.
Step 10	LISDA	○	⇒	□	◇	▽	Remove title entry from coverage edit. Delete check-in record on Sierra if no perpetual access to the title. Remove bib record if no other institutional holdings or any other kind of access. Inform ERM when done.
Step 11	Cataloguing	○	⇒	□	◇	▽	Remove holding from the Records Manager in OCLC WorldShare.

Figure 5.11 represents the verified processes and workflows of an e-journal single title subscription. Participants were asked to highlighted areas where they thought were possible lean waste. For the e-journal processes and workflows, participants highlighted the **start, movement, action, decision** and **waiting** stages as possible

lean waste. This is represented in Table 5.11 and explained below. Noticeably, steps 1, 3, 5 and 7 explanations were the same as with the e-books in Table 5.10 and are not repeated in this section.

In addition to what was said in step 1 of Table 5.10, P12 said that the e-journal requests are received by e-mail. In the respondent's view, e-journal requests could be handled the same way as the e-books by using the Online Request Form. This would assist in the delay if the librarian responsible were on leave or busy on a project; the line manager could then assign the task to someone who is available.

Regarding step 2, P12 said: *"Nine out of ten times, the information I received is incorrect and (the staff) have to go back to the faculty librarian to ask for more information – for example, the correct title, the publisher's name or ISSN number. Then they must go back to the department to obtain the information I require. This is an unnecessary waiting and delay on my side."*

Step 4, P12 also mentioned, *"is another delay when requesting a bib record."*

P12: *"Sometimes the cataloguing staff are busy, especially during exhibition time or cleaning of metadata projects. Also, once you receive the price for the subscription, you must forward that to the faculty librarian to advise you whether you can go ahead with the subscription. I highlighted the 'action' symbol because I have access to create a resource and contact record, but I was never taught how to create a contact or resource record. Then I have to wait for the line manager to do that process before I can carry on with the order record."*

The researcher reflected that steps 8 and 9 were highlighted as "action" lean waste because sometimes faculties e-mail the ERM department at the last minute to make changes to their packages. This normally causes contractual agreement complications – especially with cancellations because publishers stipulate the time-frame for cancellations in the licence agreements. In addition, steps 8 and 9 could merge – thereby eliminating one step.

Due to unforeseen circumstances, the researcher was unable to complete the responses to include the lean waste activities from the SEALS department concerning the steps the department is responsible for. Noticeably most of the processes of the acquisition of a new database resides the SEALS unit. This affected Tables 5.12 to 5.17 in terms of the six-phase life-cycle of a newly acquired database.

As referred to earlier, due to both ERM librarian posts being vacant, the responses regarding the ERM department were elicited from the acquisition librarians assisting in the ERM department. Despite these challenges, the researcher was still able to gather rich data from the participants concerning their duties.

**Table 5.12: Lean waste activity: processes and workflow of the trial phase of a database**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM	○	⇒	□	◇	▽	Receive notification for a trial request.
Step 2	ERM	○	⇒	□	◇	▽	Negotiate conditions of trial with the publisher.
Step 3	ERM	○	⇒	□	◇	▽	Supply publisher with IP Ranges or SAML ID if required. Request URL link from the publisher.
Step 4	ERM	○	⇒	□	◇	▽	Create a resource record and add a URL to resource record. Add the WAM to the URL for off-campus access. Profile resource in 360Core.
Step 5	Cataloguing	○	■	□	◇	▽	If there is an existing bib record, amend record according to the SEALS standards on Sierra. Add location code as well as to Records Manager in OCLC WorldShare. If no bib record, download a bib record from Records Manager in OCLC WorldShare. Check URL whether the correct record has been downloaded. Once the record is in Sierra format, record according to standards, add LOC, MAT TYPE, etc. Strip all unwanted fields. Forward bib record and SSJ number to ERM dept.

<b>Step 6</b>	ERM	○	⇒	□	◇	▽	At the end of the trial period, prepare a title overlap report. Forward this report, the usage statistic report and quotation to Information & Training Department to evaluate and for a recommendation whether to proceed with the subscription or not. Suppress trial resource records until confirmation is received. If no subscription, inform LISDA to cancel the bib record. Delete resource record.
<b>Step 7</b>	ERM	○	⇒	□	◇	▽	Suppress trial resource records until confirmation is received. If no subscription, inform SEALS and reverse the process. Delete resource record. If subscription is approved, proceed with the ordering phase (Table 5.5)

The lean waste in step 3 above was the same response from P6 as in Table 5.10.

**Table 5.13: Lean waste activity: processes and workflow of the ordering phase of a database**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
<b>Step 1</b>	ERM	○	⇒	□	◇	▽	Check budget availability. Place an order with the vendor / publisher.
<b>Step 2</b>	ERM	○	⇒	□	◇	▽	Request Licence / Terms & Conditions Agreement documents from the publisher / vendor.
<b>Step 3</b>	ERM	○	⇒	□	◇	▽	Unsuppress the trial resource record and update fields of resource record to an active resource record.  Delete trial dates and update activation and registration dates.
<b>Step 4</b>	ERM	○	⇒	□	◇	▽	Create an order record and soft-link the order record as a related order to the resource record. Process invoices on Sierra and ITS.
<b>Step 5</b>	ERM	○	⇒	□	◇	▽	Inform SEALS database is active and no longer in trial.

**Table 5.14: Lean waste activity: processes and workflow of the licensing phase of a database**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM	○	⇒	□	◇	▽	Receive the Licence Agreement or Terms & Conditions Agreement from the publisher or vendor.  Verify contents of Agreement and the Order Form.
Step 2	ERM	○	⇒	■	◇	▽	Complete an NMU Licence Agreement Approval Form and e-mail the form for approval signatories to the Senior Librarian: ERM and the Library Director.
Step 3	ERM	○	⇒	■	◇	▽	Upon receipt of these signed documents, attach a copy of the invoice and forward these documents to the Legal and Finance Departments to co-approve and co-sign.
Step 4	ERM	○	⇒	■	◇	▽	The co-approved and co-signed documents are received back in the ERM department.
Step 5	ERM	○	⇒	□	◇	▽	The co-signed Licence Agreement is sent to the publisher / vendor to obtain countersignatures.
Step 6	ERM	○	⇒	■	◇	▽	The countersigned Licence Agreements or Terms & Conditions Agreements, co-signed Approval Form and copy of the invoice are scanned and uploaded to the SharePoint server for record-keeping.  A copy of the countersigned documents is forwarded to Legal upload on the Records Management System.
Step 7	ERM	○	⇒	□	◇	▽	Create a Licence Agreement record on Sierra

P2 commented on the processes of the licence (US license) agreement phase as a “very tedious phase.”

P2: “Before COVID-19, we had to run around to get the licences signed, because there were three different departments involved – two signatures from the library, two signatures from the finance department and two

*signatures from legal services took almost two months before the licence was sent to the publisher to countersign. There were lots of movements. During COVID, an e-mail system was used. This was just as cumbersome; many e-mails fell through the cracks. The senior librarian initiated the automation project. This was warmly accepted and, as an interim solution, AdobeSign is used. Ultimately, the OnBase Document Management System will replace AdobeSign as a fully-fledged automated system, from start to finish.”*

The seven-step licence agreement process will thereby reduce to three steps, eliminating steps 2, 3, 4 and 6.



**Table 5.15: Lean waste activity: processes and workflow of the activation and user access phase of a database**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	SEALS	○	⇒	□	◇	▽	Check whether the resource profile is on the Data on Demand on 360 Core and whether the number of titles matches the number of titles in OCLC WorldShare Collection Manager. If it is a good match, subscribe to OCLC WorldShare Collection Manager. Check whether the Resource ID matches load file.
Step 2	SEALS	○	⇒	□	◇	▽	If a new database, MARC records are imported from OCLC WorldShare; title IDs should be added for a successful load and attach check-in records for access.
Step 3	SEALS	○	⇒	□	◇	▽	Check for incorrect and incomplete bib data on SIERRA as it will cause errors and block access to resources. Prep the load file.
Step 4	SEALS	○	⇒	□	◇	▽	Extract data appropriate to the resource being loaded from the subscription data file and create a load file. Check and match bib records with the subscription load file, also checking for bib records with correct title IDs.
Step 5	SEALS	○	⇒	□	◇	▽	SEALS will inform cataloguing department if they need to preload MARC records for holdings. Each case is evaluated according to the number of titles in the database, the number of full and fixed records on SIERRA, as well as the number of short bib records that need updating.

**Table 5.16: Lean waste activity: processes and workflow of implementation, administration & support phase of a database**

Step	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	SEALS	○	⇒	□	◇	▽	Load file into the ERM system to create check-in records with links for access; if no bib record matches, a short bib record is created.
Step 2	SEALS	○	⇒	□	◇	▽	Check the load report for errors and fix multiple matches and errors appropriate to the file loaded. Forward load report to ERM librarian for information.
Step 3	ERM	○	⇒	□	◇	▽	Check information and access from all access points on various systems.
Step 4	ERM	○	⇒	□	◇	▽	Register on the database platform as an administrator to retrieve usage statistics.
Step 5	ERM	○	⇒	□	◇	▽	Forward database information, the URL and marketing material to the Web Administrator and Faculty Librarian regarding the availability and inform users of the new resource.

**Table 5.17: Lean waste activities: processes and workflow of renewal and cancellation phase of a database**

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
Step 1	ERM	○	⇨	□	◇	▽	For the renewal request, the ERM librarian informs the publishers.  Sign the Product Form and follow the processes of Table 5.4 – 5.9.  If the resource requires, a new licence agreement will be requested, following the processes as set out in Table 5.6.
Step 2	ERM	○	⇨	□	◇	▽	Receiving a request to cancel a database: ERM librarian checks the licence agreement for cancellation notification period and perpetual access and informs publisher / vendor.
Step 3	ERM	○	⇨	□	◇	▽	Change the order record status to “z” and insert a note in the note field. Suppress the order record for five years (according to finance policy). Unsubscribe from the KB.
Step 4	ERM	○	⇨	□	◇	▽	Create an ERM load sheet with instructions to cancel the database. Forward load sheet to SEALS with all required information.
Step 5	SEALS	○	⇨	□	◇	▽	Check information on the global update. Bulk-delete all records. Delete resource from coverage. Delete bib records that have no holdings attached. Inform ERM dept. when done.
Step 6	Cataloguing	○	⇨	□	◇	▽	Inform cataloguing to remove holdings from Records Manager in OCLC WorldShare.
Step 7	ERM	○	⇨	□	◇	▽	Inform Web Administrator to remove the link from the Online Database

### **5.3 CHAPTER SUMMARY**

The data generated in this research study were analytically structured around the key themes relating to the research questions. The data aimed at highlighting how the core concepts of lean principles could enhance access to e-resources at NMULIS. It also showed the invaluable role staff members play in achieving effectiveness and efficiency in an organisation. The final chapter, Chapter Six, presents further interpretation of the findings and the conclusion of the study, as well as recommendations for future research.

## CHAPTER SIX

### DISCUSSION, RECOMMENDATIONS AND CONCLUSION

#### 6.1 INTRODUCTION

The previous chapter presented a descriptive overview of the main themes emerging from the empirical primary data and how these related to the research questions. This chapter elevates content analysis to the essential level of overall interpreting to what extent the research reached its aim. Analytical perspectives also include relating what the data reveal when compared to the initial theoretical exploration of the conceptual framework, as well as the work of seminal authors reported on in the literature review. This research journey provided many opportunities to reflect on the value this study could add toward further development of the implementation of lean principles in the e-library environment. The research questions are revisited for further interpretation of the findings of this case study.

The statement of the research problem in Chapter One (Section 1.2) generated three main concepts: (1) staff and resources, (2) processes and workflows, and (3) lean principles. These concepts formed the foundation of the researcher's conceptual framework (see Figure 3.1). A rigorous process of reflexive thematic analysis, supported by ATLAS.ti 22 generated five themes, namely:

- A perceived gap in knowledge and skills for librarians to function effectively in an online environment.
- Disparate views regarding the systems and tools facilitating access to e-resources at NMULIS.
- Disparate views on the importance of documented processes and workflows in creating and managing access to e-resources.
- A perceived gap in leadership from a strategic perspective.
- A perceived acceptance and utilisation of lean principles in enhancing access to e-resources at NMULIS.

## **6.2 DISCUSSION OF THE FINDINGS EMERGING FROM THE DATA**

The data answered all the research questions as stated in Chapter 1 (see Sub-sections 1.2.1 and 1.2.2). There were aspects where the researcher extended the research question to include elements that required further probing. Research sub-question 1 is an example of this. As soon as it became apparent that the majority of participants did not obtain their knowledge conventionally, the questioning was extended by asking the participants how they obtained their knowledge to work in an online environment.

Particular data stood out – though not part of the emerging themes, these aspects reflected the research purpose. For example, the identification of lean waste by the participants during the Phase 3 exercise: the data pointed to a clear link between the themes, literature review and conceptual framework. The five emerging themes are discussed and reflected on individually below, incorporating the findings from interview phases 2 and 3.

### **6.2.1 Theme 1: *A perceived gap in knowledge and skills for librarians to function effectively in an online environment***

Knowledge and skills form the elements that determine how competent an individual is in a specific field of work. Most literature refers to the 21<sup>st</sup>-century ICT skills requirements for academic librarians (Davis 2015; Dukashe 2021; Hamad, Al-Fadel & Fakhouri 2021; Moonasar & Underwood 2018; Patel 2018; Raju 2014). Chiware (2007) mentions he noticed African academic libraries experience challenges in terms of skills and knowledge to implement digital and electronic services. The primary data reflects that librarians are not receiving the digital education needed to work in an online environment at NMULIS. The assumption is that the lack of a transformation strategy which gives clear guidelines and instruction regarding staff development and capacitation has compounded the situation.

The data collected highlighted that the majority of the participants had a postgraduate qualification in Library Science. However, this qualification does not equip them to work in an online environment. The current South African curriculum in Library Science still predominantly concentrates on the traditional ways of working and lacks the critical component of the online working environment. Some institutions do offer certificate-

bearing courses aimed at library professionals who wish to supplement their knowledge, skills and expertise. However, these courses do not include capacitating librarians in acquiring, creating, disseminating and managing e-resources.

In stark contrast, at the University of Kentucky, the School of Information Science offers a six-month formal course on Electronic Resource Development, with learning outcomes such as (1) familiarity with technologies and standards used to manage electronic resources, (2) understanding and developing professional skills needed to manage electronic resources, (3) the skills to evaluate and negotiate electronic resource licences, and (4) to appreciate the impact that electronic resources have on end users (Syllabi, LIS690-201, University of Kentucky 2021).

The ever-evolving landscape seeks a fast and flexible solution whereby staff proficiency and expertise can stay relevant and current. The librarians at NMU can greatly benefit should institutions offer short courses that are library specific that caters for online conditions. West (2015) warns that as technology become increasingly sophisticated, it will have a significant impact on the workforce, especially operations level. The current study established that the participant interviewed acknowledged that the print processes and workflows assisted the incumbent when having to work in the online environment.

Literature is indicative of the importance of human capital in the workforce (Elsharnouby & Elbanna 2021). The transition from print to electronic media has created an environment in which certain academic libraries struggle to retain their technical staff, thereby raising immense HR and staffing problems, especially if these librarians are good at their job. The practice of upskilling and reskilling existing staff is cost-effective, less time-consuming and more sustainable (Becker 2002; Salim 2018; Wright & McMahan 2011). Sithole and Buchana (2020) state that the employment growth has been negatively affected by innovation, hence, library management could use this method for capacity-building.

The data definitely resonate with the literature review on the topic of the transitional role of the librarian. Although data indicated that staff are grounded in their traditional role, they are open-minded and willing to learn the new e-skills and the requirements to adapt to the technological role and improve on their ability to meet responsibilities. Obegi and Nyamboga (2011) allude that the adoption of ICT in the advancement of

LIS is immeasurable. Data revealed that some participants acknowledged outright that they found it difficult to work in an online environment. Others stated that they managed but required training to upskill their IT and ICT knowledge, while some shifted the blame to other staff members as being incompetent.

Data also revealed that during the transition period, and with the lack of management intervention, participants were still expected to deliver a service to the users. As a result, staff developed coping mechanisms, such as on-the-job learning, independent reading and learning, in-house training and the “trial and error” method on their own. For some, what also helped was the wealth of experience built by years of hard work and the various positions they held in libraries. Dukashe (2021) cautions about the effect technologies have on employment and that management must take heed of the implications thereof. Magwentshu *et al.* (2019) dispute this statement arguing that technologies could bring about the change, unlocking new opportunities to build meaningful and rewarding careers.

Adebisi (2016) alludes that systems librarians should take responsibility for the ILS as well as possess training skills to train module-specific staff. This is happening at NMULIS, however, what was evident in the data is that the only training staff ever received and still receive is systems training – the processes of how to create records, cleaning bibliographic records, profiling e-resources in the KB, allocating payments on order records, creating access on all platforms and drawing review files, to name a few functions. The online environment does not only exist of systems and tools, but staff also struggled with the theoretical part of the transition, where theory and practice come together, that core training, is the missing link.

For instance, *“the systems librarian and SEALS would tell them to add a WAM link to a URL or a SAN certificate to a URL, but nobody explained to them what WAM is, what the function of the WAM is or what error messages will you get if users try to access the link off-campus.”* Although the systems and SEALS librarians are the most knowledgeable in terms of the systems and tools employed, they were never trained to be trainers. Yet they assist the librarians by sharing their knowledge and their understanding of the systems and tools within NMULIS. Yusuf (2014) concurs that systems librarians have the responsibilities of managing the information library systems, technologies and digital knowledge base.



Another example, data also revealed that the participants who struggled the most working in an online environment were those staff members who assisted frontline staff with users, lecturers and staff queries. It was this extended knowledge, the knowledge beyond their traditionally used systems and tools, that they mostly struggled with. This brought a whole new dimension to the lack of knowledge some participants experienced, because one participant commented: *“You need to know network issues, broadband width, cleaning of the browser history and cookies, and why some platforms can only be accessed through Chrome or Edge and not Internet Explorer. Then you have users accessing remotely, that is another ball game; then it becomes tricky because now I cannot ask ICT to assist me because the problem can also be on the user’s side.”* Quadri and Garaba (2019) recommend that library management assist staff either by employing IT personnel or providing relevant and current IT training to assist librarians in solving ICT issues that may hinder knowledge-sharing practices.

The second part of the research question related to the skills needed to work in an online environment. The development of the Internet, combined with the introduction of ILS and recently LPS, has greatly changed and expanded the knowledge, skills and abilities of technical and systems librarians (Majumdar & Singh 2004; Obuh 2019; Rhino 2013). To test the skills requirements of the staff at NMULIS, the researcher selected three authors and asked the participants whether they agree with the authors regarding the skills needed by academic librarians in a 21<sup>st</sup>-century environment (Raju 2014; Sawant & Yadav 2020; Yusuf 2014). Everyone agreed with the authors; however, some felt that there were important skills the authors omitted that are imperative when working within the challenging, multi-faceted complexities of the e-resource and online environments.

The researcher reflected, though, the combination of traditional and techno-savvy librarians yields many benefits – one important benefit being the transfer of shared knowledge. Some participants felt that some skills are important but never mentioned in literature such as financial management, supply chain management, budget management, negotiations, knowledge and evaluations on licence agreements as these are important skills to have in managing e-resources and because e-resources are expensive to subscribe too, it carries the largest expense of the library budget.

Other skills needed, as mentioned by the participants, were emotional intelligence, knowledge-sharing, technical know-how, staff taking responsibility for their actions on the system, digitisation, linked data and motivation. One of the participants believes that *“if a staff member is motivated, he / she will see things through and not leave them halfway for someone else to fix it later.”*

The researcher reflects that in an evolving landscape, skills will never be static. An example by Sutton (2011) mentioned in her doctoral study in which she mentioned and listed the skills required by ERM librarians and six years later (Sutton & Collinge 2018) conducted a comparative study and concluded that their findings should be supplemented by additional skills to include leadership and management, technology and applications, library services platforms and communication. Who knows whether the next comparative study would include additional skills as mentioned by the NMULIS librarians.

Although a lack of knowledge and skills existed, findings revealed that the participants had the dedication, commitment and passion to serve NMULIS users without fear or favour. There was no evidence of complaints to indicate that the participants' self-reliance skills were lacking. A dominant theme from the literature review was the importance of training within the changing working environment as a fundamental investment in the future. The researcher agrees that organisational change is the concern, but it is more than that – it is an investment in human capital to help staff cope with the change.

### **6.2.2 Theme 2: *Disparate views regarding the systems and tools facilitating access to e-resources at NMULIS***

In a digital environment, one of the core components to ensure e-resources are accessible and discoverable is through effective and efficient systems and tools (Sejane 2017). Data findings revealed that since 1987, the NMU library has used Innovative Interfaces, Inc. (III) products – equating to more than three decades with the same company. In 1987, the library used Innopac and thereafter moved over to Millennium in 1997. In May 2011, Innovative announced its new Sierra library services platform and the library still uses Sierra as its library system. Participants were asked to rate how effective and efficient the systems and tools were and were provided with a list of systems and tools employed by NMULIS. The data was compiled in Table 5.1.

Table 5.1 gives a clear indication of the disparate views regarding the system and tools employed at NMULIS. The researcher assumed it was correct to ask for an overall score rating the resources. Later on, the researcher realised that the participants' ratings were based on the system and tools they use, which gave a skewed or incorrect perception of the effectiveness and efficiencies of the systems and tools as a collective. Some participants only work on Sierra and 360Core, so their score was based on two of the eight products, whereas the person working on six or seven products gave an overall score on most of the products. This was confirmed when the researcher asked the participants to elaborate on their scores.

Nevertheless, the unanimous voice clarified that four core resources were ineffective and inefficient, namely: Sierra, Vital, Summons and the knowledge base 360Core. According to the participants, Vital (as an institutional repository) is not searchable on the library OPAC – and, when searching using the name, surname or topic, the search results “take you all over the place.” Those participants who do profiling complained about the slowness and said that at times it took more than fifteen minutes to profile one e-book. The discovery tool Summons is also seen as ineffective and inefficient, involving “too many clicks.” Noticeably, one participant responded from a user perspective, pointing out that there is a disconnect between the library system and the tools and that it does not even include the systems of the university. According to the participant, *“the ILS and tools are not integrated as they are supposed to be.”* This response was based on the experience as a former student at two other universities versus the user experience when using the NMULIS OPAC or discovery platform.

A leadership participant commented that *“recently I found out the discovery tool, Summons, was an Ex-Libris prototype that evolved into Primo.”* On enquiry, it was discovered that the Summons discovery platform was used by the Durban University of Technology library in 2010 / 2011. The participant felt that *“some of the systems and tools employed in the library are outdated, they are patchworked, and do not serve the users as they should – comparing the library systems and tools to that of first-world countries and closer to home, for example, the University of Cape Town, the University of Pretoria and the University of Jo’burg.”* In the participant’s view: *“We are always at the back, latecomers always five steps behind. It is time we explore the new trends and see what is out there to give our users the service they deserve.”*

Contrary to the statements above, one participant claimed that it is not Sierra that cannot link to other systems, but rather it is the interoperability of the Integrated Tertiary System (ITS) that is the problem. According to the participant: *“Sierra has the plug-in to integrate. Adapt IT, the software developer of ITS, needed to develop an Application Programming Interface (API). The cost was the main reason why there is no integration between Sierra and ITS to date.”* Of the other participants who also scored high, two felt that the system was doing what it is supposed to do. However, from a user perspective, one mentioned: *“A user might score differently, because they are the ones who forever are searching.”* Another participant said that *“it was the librarians that do not know what they are doing.”*

Many academic libraries have substituted their integrated library systems to library service platforms (Patra 2017). Freeman (2009) advice that libraries should identify systems and tools that would best suit to serve users' information needs. Voicing well-considered concern in this regard, a respondent stated: *“I think the Sierra system as an ILS system for academic libraries has overstayed its welcome. It is time we move to cloud-based systems.”* Freeman (2009) explains that libraries need to be careful when selecting a library system to serve their user information needs. Sejane (2017) concurs that libraries experience many challenges when sourcing systems and tools compatible with their existing hardware and software to maintain access and cost-effectiveness.

Managing e-resources is complex and compounded by the rapid advances in technology (Verminski & Blanchat 2017). The researcher observed that NMULIS supplements its traditional ILS with multiple additional software products such as link resolvers, proxy servers and knowledge bases. Marshall (2016) asserts that many academic libraries transition to LMS systems as opposed to ILS systems because LMS systems provide a comprehensive set of tools that has the capabilities to manage library information resources in multiple formats.

As a measurement of success in supporting ERM processes and workflows, the researcher reflects that NMULIS should strive to eliminate the patchwork of systems and workarounds that have plagued e-resources librarians for many years. It may be that the knowledge required to assess what systems and tools are best to serve the users of NMU is beyond the knowledge capacity of librarians. The researcher noted

particularly a comment from a leadership participant: *“There is a profound need to strengthen the partnership and collaboration between ICT and the library.”*

### **6.2.3 Theme 3: *Disparate views on the importance of documented processes and workflows in creating and managing access to e-resources***

Yee and Thompson (2017) state that by conceptualising a concept, people can follow instructions or be specific in what they are talking about or grasp the idea in a transferable way to understand something in its entirety. Thus, it was important to determine whether the participants had a common understanding of the terms processes and workflows as these the terms processes and workflows are often used interchangeably.

This was evident in the data collected, participants had different understandings of what processes and workflows were. The researcher noted that one participant struggled to describe the terms, processes or workflows, but instead explained their understanding by means of the sequence of activities they follow when performing a task. A commonality of understanding is core, whether it be a strategic plan, a vision, a project plan, processes, workflows or anything where there is a common goal or objective to be reached. This common understanding brings about a nuance of importance and distinction to a certain task; it strengthens interrelationships and interdependencies when working in teams.

The importance of processes and workflows in business operations can never be overemphasised (Hess 2018; Eby 2016; Von Scheel, von Rosing, Fonseca, Hove & Foldager 2015). More importantly when managing e-resources in academic libraries, it relies on the application of distinct processes and workflows. At NMULIS the workflows of creating and managing access to e-resources involves three sections (acquisitions, ERM and classification & cataloguing) within one department, a department outside the department (LISDA) and an external department outside the library (SEALS). Brisbin, Storova and Enoch (2020) caution that if processes and workflows are not followed in a specific order or sequence, access can be hampered.

Another aspect is the importance of the documentation of processes and workflows must be documented and easily accessible to all (Dilts & Sun 2021). The importance of this cannot be over-emphasised. Data revealed that quite a few participants have

personal manuals. Keeping personal notes is acceptable, but they should not substitute the official manuals. Each department or section should have official manuals in which all processes and workflows are documented and updated regularly. One participant indicated that, in their department, *“documenting all the processes and workflows would be impossible because of the vastness of the processes and workflows, and the environment is not static.”* It is exactly for these reasons that documenting processes and workflows is important. The vastness and the rapidly changing landscape make it all the more important to have documented processes and workflows.

The researcher fully realised the importance of documenting processes and workflows during this study. During Phase 2, participants were very particular about the way the processes were written or formulated and made many changes. They commented and advised that *“the processes be written in such a way that it serves as a training tool.”* To this purpose, most of the processes required added steps to highlight the flow and to eliminate confusion.

One participant mentioned: *“We work on many platforms, systems and tools, as well as between four different departments. It is important to state clearly from which department to which department, the name of the system, platform or tool that has reference (to) that specific step.”* The researcher observed that often it is taken for granted that everyone within a department is supposed to know certain things. However, the research revealed how differently people understand and conceptualise or make sense of something. Minor aspects that are sometimes overlooked can have a negative result if not done correctly.

Gepp, Steinmann, Vollmar and Voigt (2012) assert that standardisation is a common method to manage complexities in operations. Data unequivocally agreed with these authors that processes and workflows must be standardised, updated and easily accessible. The researcher observed that when the question in this regard was asked, there was a sense of enthusiasm from the participants, almost as if they were waiting for someone to raise this topic. Most responses suggested that this practice will bring about uniformity, consistency, transparency and efficiency. Participants indicated that they believe that keeping the processes and workflows current and updated is the responsibility of line managers in collaboration with their respective staff. Furthermore,

documented processes and workflows would serve as a blueprint of operational activities, as an instructional tool and as a succession plan, and gives insight into the activities of the other departments within the value chain.

The researcher, as a newly appointed librarian in the ERM department, reflected on how this research study came about when the country went into lockdown in 2020, Foremost she observed how the lack of documented processes and workflows brought the department almost to a standstill, causing anxiety and a sense of loss in serving the user. Proficiency in managing e-resources optimally will always be a work in progress; however, the basics need to be in place and progress can continue from there. The researcher regards documented processes and workflows as one of the basics, because it is a method that captures all the information necessary to execute the core business process within the library. The visual presentation of documented processes and workflows also cannot be over-emphasised. It gives prominence and highlights areas that need adaptation, taking into account the younger generation, and it is easier to maintain standards and consistency.

From the above statements and comments, it is clear that the research objective regarding the processes and workflows has been achieved. It has also been established that there is acceptance of lean principles and that processes and workflows must be documented and current in order to implement the principles. Documentation is instrumental in achieving a consistent, standardised, effective and efficient service – and thereby playing a pivotal role in the access to e-resources.

#### **6.2.4 Theme 4: *Perceived gap in leadership from a strategic perspective***

Leadership from a strategic perspective was never considered an objective of this research study. However, the theme emerged from the data analysis as a strong component to the purpose of this study and therefore needed to be highlighted. This research defines leaders as those persons in the academic institution who hold the position of directorship and who have the responsibility to lead and direct staff, comprising everyone employed in NMULIS.

The researcher was aware that in this case study both participants in a leading role were not part of the directorate at the time of the transition period but were employed in the library as senior librarians. The gap in leadership as observed by the researcher

is based on the results that indicated that, during the transition period, the library leadership was in a vacuum. Together with this, Covid-19 plunged all the library staff into the deep end. Those in management positions were tasked with preparing the workforce as well as themselves for the challenges that were presented by working online. This observation was confirmed by one of the participants: *“Management was not prepared for the transition because management themselves were in a learning phase.”* Data revealed further that the current leadership has also been experiencing many problems, for example, the buy-in of all staff members on the adoption of the NMULIS Reorganisational Plan and the NMULIS Strategic Plan 2021 – 2025.

Another concern highlighted by participants was that, during the time of the transition, purchase decisions were largely influenced by publishing marketing houses. In the absence of a transformation plan from leadership during the transition period, librarians depended on the assistance publishers and vendors offered and they formed strong relations. Thus, the power of publishing houses is still somewhat balanced by librarians countering sales pressure – those who over time have built relationships have influence as well. During the pandemic, when the library was ill-equipped to serve its users online, these publishing houses came to the fore to assist. There were many academic disciplines that did not have online content and with one phone call or an e-mail, these publishers opened up their platforms to all our requests, irrespective whether it was core content or not.

It is important to encourage librarians to maintain and strengthen their relationships with publishing houses for future engagement and, with the support of management, librarians should capitalise on these collaborations. Going forward, the researcher would like to highlight the importance of transformational agreements and open access to be successful in serving our users. It is paramount that the library directorate leads with prudence – especially now that NMULIS is embarking on the reorganisation phase.

Possibly the most significant and most telling point of interpretation emerging from the study is the resilience displayed by the NMULIS librarians. Despite the innumerable challenges librarians faced daily, participants used coping mechanisms of self-reading, self-learning and on-the-job learning to become self-reliant. A participant who fulfilled a leading role mentioned that the 2021 strategic plan contained a skills analysis



strategy to determine the skills gap of all employees. These would have formed part of the staff training and development plans. However, due to a situation beyond his control, this strategic plan will now form part of 2023 outputs.

Both participants in leading roles recognised the need for change, the need for new ways of working and the value of putting the user first. Data indicated that leadership was willing to consider the concept of lean principles as a new strategic directive. Furthermore, instead of only concentrating on enhancing access, they would like to see how the library could gain exposure and benefit from this initiative as an entity, from management right down to the operational teams. Participants stated that if the implementation of lean principles is successful and enhances the user experience, it will not only benefit the students and researchers, but will also be beneficial to the library, the institution and the consortium as a whole.

#### **6.2.5 Theme 5: *Apparent acceptance and utilisation of lean principles in enhancing access to e-resources at NMULIS***

Lean implementation success hinges upon workers actively participating in problem-solving and process improvement efforts for the sake of reducing waste, increasing productivity and flexibility, and enhancing quality (Bhasin & Burcher, 2006). Research questions 4 and 5 related to the conceptualisation of lean principles and to determine whether the current processes and workflows could be adapted to a leaner process in the future. The research question was explored by means of lean waste exercises (see Tables 5.10 to 5.17). There are five lean principles as developed by (Womack & Jones 1996), namely, (1) the value from a user perspective, (2) the value stream, (3) creating a flow, (4) the principle of pull, and (5) perfection. An interesting discovery was that although the lean waste exercises were not fully inclusive of the six-phase database life-cycle, the researcher could still obtain rich data from the single title e-book and the e-journal single subscription to successfully meet the objective of lean principles. The participants could clearly identify the lean principles of value stream, flow and pull. There were many of these instances, a few of which are mentioned below. Noticeably much of the lean waste mentioned for e-books was also applicable to the e-journal single-title subscriptions.

All the participants indicated that they have never heard of lean principles before, yet they showed genuine interest once they read the introduction to the topic that accompanied the invitation to participate. One of the participants mentioned that after reading a research article on lean principles, the participant could immediately relate the concept and how it benefitted their business financially; customer satisfaction also increased because they introduced a scheduled delivery date and time. This is a typical example of the lean principle of value stream.

Data indicated that all new orders placed with publishers or vendors were requests the ERM department received from lecturers or heads of department. This is indicative of the lean principle of pull, where the information needs are procured at the right time and in the right quantities, based on actual need. Another example of the principle of creating flow was when a participant mentioned that the first step of a single-titled e-book request needed to be streamlined. According to the respondent, there were unnecessary delays in waiting related to new requests received from the faculty librarians. The lecturers use the online request form on the NMU library portal to order or place requests for new e-books. The online request form is on SharePoint. As a website-based collaboration system, the web administrator at NMULIS oversees and manages the SharePoint system.

The acquisitions team has on many occasions experienced non-receipt of online requests when lecturers query the status of their requests. The participant felt that a new script should be written for SharePoint regarding placing of orders to create a better flow that is transparent and streamlined to include all the stakeholders in the value chain. The participant is currently in the process of setting up meetings with NMU ICT in this regard.

Another example of the lean principles of value stream and creating flow could be found in Step 2 of the processes and workflows of a single-title perpetual access e-book. Step 2 relates to the ordering of the e-resource. A participant felt that checking with the various publishers, vendors and access management platforms for availability, pricing and access models was time-consuming. The participant mentioned that there is currently an investigation underway seeking alternate ways of managing the acquisition process. Moreover, *“the idea is to automate the ordering process in collaboration with NMU ICT to find the best product within the institution.”*

A participant from the cataloguing department mentioned that step 3 is indicative of lean waste movement and action. The participant mentioned receiving e-mail requests to download bibliographic records. However, since COVID-19 and one of the new ways of working remotely, spreadsheets were introduced and placed on SharePoint. The participant felt it was unnecessary to send an e-mail if the information required is also on the spreadsheet, centrally extractable from the SharePoint portal. What the participant would prefer is that the request is rather accompanied by the URL of the e-resource. This would allow the cataloguer to open the link on the e-resource and view the title page – ensuring that the correct bibliographic record is downloaded, thereby saving time and eliminating unnecessary errors. In step 4, lean waste decision and waiting were highlighted. One participant mentioned that some publishers delay access by sending URLs only three to four days after the order was placed. Library management must also review the 360Core discovery platform because it is very slow; sometimes it takes 15 minutes to profile one e-book, the response elaborated. Both steps 3 and 4 were examples of the lean principle of value stream.

Apart from the similarities of the processes and workflows of single-titled, e-books and e-journals as previously stated, a participant mentioned that e-journal requests are only received by e-mail. The participant felt that requests for e-journals should also be made online using the request form, because in most cases the information in the e-mail is either incorrect, insufficient or incomplete. This complication results in e-mails going back and forth until the information required is correct and sufficient to forward the request to the publisher or vendor. *“This way of doing things is not right – it delays the process and access for the user. Going forward, I think single-title e-journals should follow the same route as the e-books, using the online form on the library website. This will eliminate the lean waste of unnecessary movements and waiting.”*

Another instance of lean waste a participant pointed out was the waste of action. The participant mentioned that the lack of training on how to create contact and resource records is a waste and could be eliminated if the permissions to do these tasks had been granted. The participant stated: *“I know I am only assisting in the ERM department, but I have now been helping in the department for a while and I would like to take the process from start to finish.”* The participant felt that understanding the complete process would contribute towards staff development.

Another clear indication arising from the data was the lean waste involved in the licensing phase of a database. The process of obtaining approvals and signatories to licence agreements was done manually. The number of product signatories required for the approval and sign-off on the licence agreements amounted to six, sometimes seven, depending on the cost involved. During COVID-19, e-mails were used as a mode of routing documents between stakeholders. This method was time-consuming, work-intensive and had no alert system or track and trace capabilities. A project was initiated by the ERM department for a more sustainable method, which resulted in an interim solution of using AdobeSign. In 2023, a new automated Document Management System will be installed by NMU ICT. This system will have end-to-end capabilities in facilitating the workflow and allow for trusted digital embedded signatures and a central storage of the licence agreements within the digital environment. Through automating the licensing process, the steps of the processes and workflows will be reduced from seven to three, thus eliminating four steps from the original plan.

During the lean waste exercises, data revealed that everyone could identify areas of improvement across all the various lean waste key guides. Furthermore, the implementation of lean principles is not a once-off process – processes and workflows require continuous improvement and being updated to stay current and relevant – thereby reaching the fifth lean principle of perfect. In turn, once perfection has been reached, the first lean principle of customer value is realised. The intention of the five lean principles would then be achieved through the elimination of waste.

Roslin, Ahmed, Ahamat, Bahrom and Ibrahim (2019) stress that employees play a pivotal role in the implementation of lean principles. For the implementation to be successful, Van Assen (2021b) emphasises the importance of staff empowerment and involvement. Hines *et al.* (2011) state that as a prerequisite for lean implementation to be successful, dedicated and willing staff are required. Data findings indicated that the culture of the staff, and their willingness and perseverance in delivering an online library service without professional training, speak volumes about the calibre of the NMULIS staff. They are acutely aware of what their roles require from them as custodians to integrate the know-how and skills to implement ICT. They could point

out exactly where lean waste occurs, the actions causing the waste and, in most instances, supply solutions as to how it could be mitigated.

Unfortunately, due to the vacancies in the ERM and the non-participation of the SEALS departments, the researcher believes that more lean waste could have been identified. Nonetheless, the fact that lean wastes of start, waiting, action, movement / motion and decision have been identified (see Tables 5.10, 5.11 and 5.14), as well as solutions such as automation and optimisation tendered, the research results lead to the firm conclusion that, without a doubt, the implementation of lean principles can enhance access to e-resources.

### **6.3 CONTRIBUTION TO NEW KNOWLEDGE**

The lean principle concept has been widely used in academic libraries outside South Africa. However, there is no scholarly communication on lean principles in academic libraries in a South African context. This research study will fill the existing gap as emergent theory and contribute to the available knowledge shared within South Africa.

The provision of information is the core function of academic libraries, relying heavily on accessibility to and discoverability of e-resources. Although there is much scholarly literature to be found on the successful implementation of lean principles outside South Africa across the various functions within academic libraries, no research could be found on the implementation of lean principles in the processes and workflows in creating access to e-resources globally. This the research findings from which contribute positively to this innovative initiative towards optimising the mission-critical efficiency of an academic library in the digital era in South Africa.

The infiltration of ICT into traditional libraries has brought about many challenges and changes in how libraries currently operate. It has also opened up doors to explore new ways of working. For present study purposes, the researcher constructed a conceptual model integrating theoretical knowledge from two disciplines, namely: Humanities and Social Sciences, and Business Management and Economic Sciences. The overlap between these two disciplines to reach a common goal can be considered as an interdisciplinary design. Choi and Pak (2006) state that interdisciplinarity synthesise

two or more disciplines, thereby establishing a new level of discourse of integrated knowledge between two disciplines.

The two vacancies which existed in the ERM office during the course of the research have been filled. Recently two candidates were appointed, both young and vibrant. The appointment of technical staff poses many challenges, the most common challenge being salary. Both candidates have very little ERM experience; however, one has systems experience and the other IT experience in a cooperative environment within a shared office. The motivation was to explore shared knowledge between these two candidates, as opposed to the traditional training modules of the library. This example of where two staff members, with their specific technological know-how, find themselves as co-workers sharing an office, underscores that interdisciplinarity is fruitful and effective. Having an IT person in the library, especially with knowledge beyond systems and tools, undeniably has advantages.

## **6.4 RECOMMENDATIONS**

### **6.4.1 Staff training**

This study recommends suitable training for all librarians to work in an online environment. People learn differently and the pace at which they learn varies. Some can grasp the theory and implement it, whilst others may need more practice. This factor speaks to the learning styles at the levels of the different employees. This is not a unique situation; it is applicable to many training room environments. Often this elementary fact is ignored by training tailored as a “one size fits all.” The researcher recommends rectifying this with a better-suited individually tailored teaching – a learning approach making use of coaching. Individual coaching was how training was done in the early days of the transition, with the ICT staff and vendor training coming to the library and assisting staff by answering their questions and showing them what to do, again and again, until they felt comfortable in doing it themselves.

### **6.4.2 Organisational development**

The researcher also recommends a particular improvement at the institutional level which would benefit all parties concerned. The library needs to collaborate with other departments within the institution, such as the School of Computer Science and

Human Resources, to develop library-specific training to assist librarians in bridging the gap of the transition from print to electronic media.

### **6.4.3 User point of view**

User information needs differ from institution to institution. The implementation of lean principles will never be entirely successful without first identifying what the user information needs are. Thus, the researcher recommends the library conduct a survey that is inclusive of all users. This user needs survey may include the collection development, systems and tools, as well the accession of preference. The data analysis from the user needs survey will assist the circulation, information and training, acquisition and ERM departments. This will ensure a rich and responsive collection development, a budget well spent and a satisfied customer. Additionally, the user information needs should be determined often, especially in an online environment, to deliver an optimal user-centric service.

### **6.4.4 Interrelationship with institutional departments**

The researcher would also reiterate a core observation that the inter-relationship with NMU ICT support is crucial and that the current separation from the ICT staff presents a mission-critical gap. As seen in the empirical data, it takes regular meetings between ICT and library staff to be able to learn and master solving problems and managing glitches. The recommendation is to develop a communication strategy with time allocation for this in the role description for all concerned to address IT learning, IT support and troubleshooting that is time-consuming in resolving issues. Moreover, the ICT department has a better overview of the systems and tools and the integration with the institutional systems and tools. It would therefore also be beneficial that the library collaborates with ICT to determine which systems and tools on the market are currently the best, considering all the specifications necessary to benefit the user.

A further suggestion is for the SEALS unit to conduct a comprehensive study on systems and tools so that those selected by the SEALS Trust are sustainable, cost-effective, interoperable, have systems support and have an infrastructure with a single interface. It is also recommended that each library within the SEALS consortium compile a needs analysis report for the SEALS management. Further recommendation

is that the comprehensive study be completed before the next renewal period of the consortium's current systems and tools.

#### **6.4.5 Employee engagement**

Participants in this research study indicated that in the past they were never asked for input when library management introduced new systems and tools. Numerous sources of literature emphasise employee engagement as a critical component in maintaining an organisation's prosperity, customer satisfaction and employee productivity. The researcher recommends that library management engages with operational staff across departments when exploring new systems and tools; some staff have the necessary experience and knowledge working with electronic resources, while other colleagues have worked at other institutions and experience of other systems and tools who could also provide input.

The researcher suggests, based on the findings of this study, that management prioritises a strategic upskilling plan for the existing NMULIS staff. This plan must be reviewed annually, especially in a digital environment, as upskilling has become imperative to maintain relevance in the market. This course of action should be accelerated before the reorganisation project is concluded so that existing employees have the required skills needed in the new library structure.

#### **6.4.6 Reorganisation project as window of opportunity**

The reorganisation project and the new 2023 – 2025 strategic plan will give the current library management team a new slate to work from. Library staff need proficient, proactive leaders who are able to empower, direct and lead them. NMULIS management now has the opportunity to reset the start button, reboot the system and not let the past define them. The leadership of the library must continually affirm to the university community that the library has a fundamental role to play within the institution and should clearly demonstrate its relevance, value and impact as a key partner within the university community.



## **6.5 SUGGESTIONS FOR FURTHER RESEARCH**

Academic librarians struggle to deliver effective and efficient services in an online environment. A suggestion for further research is to establish the impact on service delivery by academic librarians who do not have ICT knowledge.

A further suggestion for research is for South African universities to look into developing certificate-bearing short courses, similar to that of the University of Kentucky. Such innovation would be of immense benefit to many librarians, especially librarians from the print era who already have the foundation and knowledge of the operations and will comfortably be able to make the connections in an e-environment.

In this regard, the researcher expresses concern about the current South African Information and Library Science curriculum that is exclusive of the online environment practices. This outmoded qualification must be re-curriculated to be current, relevant and fit for the purpose. This recommendation is extended to all higher institutions offering undergraduate and post-graduate Information and Library Science programmes to reconceptualise their courses to incorporate, if not prioritise, librarianship in the electronic environment.

The current research was conducted as a single case study. NMULIS is part of a consortium that shares systems, tools and bibliographic records. A suggestion for further research is for members of the various South African consortia to conduct a similar study. Such data would be more holistic as the sample population would be greater. In respect of the present study, there were instances when data were collected from a single source because there is only one person in that department. Within the consortium, there would then be at least four different views on a particular work function. Furthermore, the user needs would also be different. A particularly relevant direction for further research would be: Does sharing the same system and tools affect service delivery if the user needs are different?

The ICT landscape has in itself opened up even more avenues for research. Furthermore, ICT now offers many new innovative ways that the library can take advantage of. As part of their contribution to service excellence as well as self-empowerment, library staff can explore business improvement initiatives such as 5s, Six Sigma, Kaizen, Total Quality Management (TQM) and Lean Six Sigma. Library

management should encourage staff to explore new possibilities or new ways of performing functions which would benefit the library, the institution and library fraternity as a whole.

The scope of what is needed to build an e-NMULIS versus the staff complement is a question that needs to be addressed as well. The researcher is concerned about the limited number of librarians to service the large institution. The constraints of the library information resource budget are also problematic. These concerns raised are not investigated within the present study and thus open the door to further exploration.

## **6.6 LIMITATIONS OF THE STUDY**

In spite of the contributions of the study under review, there were a number of limitations worth noting. Firstly, as indicated in Chapter One, there is no literature on the application of business improvement initiatives in South African academic libraries. In Sub-section 3.6.4, Nelson (2016) indicates that research in academic resource environments concentrated more on library systems and technical services. However, implementing lean principles has a wider application in operations throughout the whole library. Therefore, the researcher found that there is a gap in this particular regard that needed to be addressed.

The absence of an existing instrument to measure the phenomenon of lean waste posed another limitation. This resulted in the development of a self-constructed flowchart. Whilst reliability and validity were main considerations, its accuracy cannot be guaranteed.

Databases are core to the NMULIS collection development. The non-availability of the SEALS team and ERM staff meant that those particular lean waste activities could not be performed optimally, which undoubtedly would have contributed even greater depth to the outcomes of this study.

## **6.7 FINAL CONCLUSION**

The purpose to explore how lean principles could enhance the processes and workflows to streamline access to e-resources at NMULIS has been reached in this research study. In keeping with the nature of qualitative research, there were aspects

which emerged beyond the emerging themes but were relevant in answering the research questions. One of these aspects is the aspect of lean waste – which, however, formed part of the contextual framework of the study. Supported by the empirical data from the lean waste exercises, the study affirmed that there is great potential for reducing lean waste in creating and managing access to e-resources at NMULIS. This was highlighted by the lean waste exercises, with substantial instances of lean waste being identified.

From the primary research results, it was clear that knowledgeable and skilled staff are capable of contributing positively to the success of implementing lean principles within NMULIS – and, by implication, academic libraries elsewhere. The NMULIS staff responsible for the creation and management of access to e-resources showcased the type of worker they are. During the transition period and without formal training or capacitation, they were dedicated, willing and resourceful to overcome their challenges. The researcher believes the participants will be a perfect fit should library management decide to implement the recommendations from this study.

Conversely, the selection of the systems and tools in facilitating access to e-resources has a direct effect on the effectiveness and efficiencies in implementing these principles. Lean principles are considered tools and, as with any other tool, it works with what is available. However, in the case of NMULIS, if the systems and tools are not effective and efficient, it will not produce the desired results – and that is the first principle of customer value. So, even if there is no direct link between lean principles and systems and tools, it could have a negative impact on the result.

The establishment of current documented processes and workflows are necessary for positive results in lean implementation for consistency, effectiveness and efficiency in managing electronic resources in academic libraries. Lean principles can work in virtually any situation which involves actions that require reducing waste or any non-adding value to the end product or service (Nicholas 2011). The researcher observed participants' enthusiasm during the lean waste exercises. The fact that the participants could identify in each step, in both the acquisition of a single-title e-book and e-journal's processes and workflows, not just one but as many as four areas of lean waste, illustrated just how powerful the lean principle tool is.

This study showed that the NMULIS staff were eager to participate in the study and were eager to voice their opinions. The study also showed that the library staff were hungry for change and indicated that if lean principles were to be implemented in the processes and workflows when creating and managing e-resources, it would definitely enhance access at NMULIS.

This study also confirms that there is a relationship between the three constructs of the conceptual framework, namely: staff and resources, processes and workflows and lean principles. The primary research objectives have been satisfied and the resultant relationship established between the constructs could be applied to inform implementation strategies.

The researcher is of the view that if this tool was adopted across all the processes and workflows, in every department, section and branch within the library, from top to bottom, the NMULIS will benefit substantially from the implementation of lean. If the concept is successfully implemented, the library, all staff members, all stakeholders and, most importantly, the institution are sure to gain from taking the initiative to propose a concept that is sustainable, cost-effective and life-changing. Therefore, this concept is beneficial to the collective. NMULIS might well then become a catalyst and lead the change among other academic libraries – not only within the consortium, but nationally as well as globally.

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## APPENDIX A: PHASE 1 – SEMI-STRUCTURED INTERVIEW QUESTION GUIDE

REFERENCE NUMBER 35548231\_CRECHS\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant code .....

Objectives	Questions
<p>To determine the skills and resources needed for participants to do their work.</p>	<ol style="list-style-type: none"> <li>1. Please tell me more about the knowledge you attained to do your job.</li> <li>2. According to Prof Raju (UCT), Yusuf (2014), and Sarwant and Yadav (2020) the 21<sup>st</sup>-century academic librarian needs the following skills to be effective and efficient: <ul style="list-style-type: none"> <li>• <b>Personal skills</b> such as analytical, creative, flexible, reflective, adaptable, proactive, responsive, and self-motivation skills.</li> <li>• <b>Generic skills</b>, such as communication, ethical and social responsibility, teamwork, critical thinking, problem-solving, leadership, research, and building partnerships/relationships.</li> <li>• <b>IT skills</b> such as system administration, computer hardware, software configuration, internet knowledge, networking knowledge, email management, computer security, metadata creation and management, mobile applications, digital preservation and access, information architecture, data interoperability, content management, web technology, database management, web applications, and specific IT library skills.</li> </ul> <p><b>Do you agree with these authors?</b></p> </li> <li>3. Apart from the skills mentioned by the authors, in your opinion what other skills are deemed necessary for a 21<sup>st</sup>-century academic librarian and why?</li> <li>4. To create and manage access to e-resources librarians require the necessary systems and tools that assist in facilitating access. In your opinion, how effective and efficient are the resources of NMULIS (see Table 2.5) below?</li> <li>5. On a scale of 1 - 10 (1 being very unsatisfactory and 10 very satisfactory), how would you rate NMULIS resources?</li> <li>6. Please elaborate on why you say so.</li> </ol>
<p>To assess how the participants conceptualise processes and workflows.</p>	<ol style="list-style-type: none"> <li>1. Please explain to me how you understand the concepts of processes and workflows.</li> <li>2. On a scale of 1-10, (with 1 being very little and 10 most of it) how knowledgeable are you of the processes and workflows in your section in creating and managing access to e-resources at NMULIS?</li> <li>3. Are there any processes and workflows of your job that you would still want to know/learn about that will make you more effective and efficient?</li> </ol>

	<p>4. The processes and workflows in your section, are they all documented in a manual and easily accessible for you to consult or refer to when needed?</p> <p>5. Do you think it is important for processes and workflows to be kept updated?</p> <p>6. Do you agree with me that standardising the processes and workflows creates uniformity and consistency?</p>
To ascertain how the participants, understand lean principles.	<p>1. Have you ever heard or read of business improvement initiatives that companies, institutions, or organisations implement to improve their business operations?</p> <p>2. In your opinion, how would you describe the lean principle concept</p>

**Table 2.5**

Name	System / Tool	Function
Authentication And Access	Internet Protocol (IP)	Every computer on the institution's network has a unique IP address. The library provides publishers, access management platforms, and vendors with their IP addresses to allow users to access requests coming from these addresses. In other words, it is a form of the security method.
	WAM Authentication	Web Access Management (WAM) forwards requests to a remote server by having all requests routed through the Innovative Web server. By using WAM, the Innovative server acts as an intermediary host and forwards the requests to the remote server as specified in the forwarding table.
	SAN Authentication	Subject Alternative Name (SAN) SSL Certificate allows multiple server or domain names using the same secure SSL. Many electronic vendors require HTTPS for access to their products. If the institution offers access through WAM to a database requiring HTTPS, either a SAN certificate or wildcard certificate can be used.
	SAML Authentication	Security Assertion Markup Language (SAML) is an XML-based open standard for single sign-on. SAML works by exchanging user information, such as logins, authentication state, identifiers, and other relevant attributes between the identity and service provider. As a result, it simplifies and secures the authentication process as the user only needs to log in once with a single set of authentication credentials. Simply put, SAML allows secure access by checking against the staff and student registry at the University. So, it is the university login that they use.

SIERRA	Library Integrated System (ILS)	The ILS is a software package that manages, integrates, and centralises multiple core functions and services. It assists libraries to increase operational efficiency, providing access to the library's collection and provide access to external resources (Kochtanek & Matthews 2002).
Discovery Layer	Summon	The function of the discovery layer is to enable library users to search seamlessly across a wide range of information content, which includes all subscribed resources and digital repositories, to title and article level as well as the Online Catalogue (OPAC).
Link Resolver	360 Link	Assist libraries in providing a manageable approach to linking from citations to the full text or other services to make articles available to library users. These products can provide context-sensitive linking to the full text on the server of the publisher to which the library subscribes.
Knowledge Base (KB)	360 Core (ExLibris)	The KB contains metadata of subscribed or purchased databases or single online titles (e-journals, e-books, and multimedia) on the title level. The metadata includes the coverage dates, URL, print and electronic ISBN and ISSN number, provider, database name, title, and publisher name.
A-Z Listing	Library Online Catalogue 360 e-journals Portal	A-Z listings and other finding aids are always associated with link resolvers based on subscribed e-resources in the knowledge base.
Peripheral	Third Iron Suite <ul style="list-style-type: none"> <li>• BrowZine</li> <li>• LibKey link</li> <li>• LibKey Nomad</li> </ul>	BrowZine is a journal engagement platform.  LibKey link is a landing page connecting library users to library subscriptions and open-access articles using DOI or PMID.  LibKey Nomad is a browser extension.
Digital Repositories	VITAL  Figshare	Vital is Innovative Interfaces Inc. (IIL) digital object repository and management system designed for universities, libraries, museums, archives, and information centres. Designed to provide seamless online search and retrieval of information for administrative staff, contributing faculty, and end-users.  Fundamentally Figshare supports research. Researchers decide what datasets they want to store, who they want to share them with, and if they choose to publish them to support their research. Figshare allows researchers to retain control of their datasets throughout the research data lifecycle.

## APPENDIX: B PHASE 2 - SEMI-STRUCTURED INTERVIEW QUESTION GUIDE

REFERENCE NUMBER 35548231\_CRECH\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant code .....

Phase 2 semi-structured interviews relate to research question three of this study. The participants were provided with copies of the researcher's illustrations which were captured during the observation data collection (Figures 4.2 – 4.4 as well as Tables 4.4 – 4.9). The selected participants were asked to verify or amend the processes and workflows to be a true reflection of the current processes and workflows in the various departments. The verified information were captured (see Figures 5.10 – 5.12 and Tables 5.4 – 5.9).

Objectives	Questions
To assess the current processes and workflows of creating and managing e-resources at NMULIS.	1. This semi-structured interview is to verify the information the researcher captured during the observation data technique. Please tell me the steps you follow when you do your function in your specific area of specialisation. We will do it format by format, please.

## APPENDIX C: PHASE 3 - SEMI-STRUCTURED INTERVIEW QUESTION GUIDE

REFERENCE NUMBER 35548231\_CRECH\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant code .....

Research objectives	Questions
To establish how processes and workflows can be adapted towards a leaner process.	1. During the Phase 2 semi-structured interviews consisted of the verification of the observation data collection. The verified information were captured (see Figures 5.10 – 5.12 and Tables 5.4 – 5.9). This phase, Phase 3 is a lean waste activity. The lean waste activity sheets consisted of the verified processes and workflows of all three formats. Please identify any activities that do not add value to the end product, also known as lean waste. The Use the Key Symbol Guide 4.12 and complete the Lean Waste Activities on Appendices E - L, by colouring, circling, or highlighting the key symbol of possible lean waste, and during our interview explain why you think it to be a waste and any possible solutions to be welcomed.

**Table 4.12 Key Symbol Guide**

KEY SYMBOL	KEY	EXAMPLES OF LEAN WASTE IN A LIBRARY ENVIRONMENT
○	<b>Start</b>	This symbol indicates the start of a process.
▽	<b>Waiting</b>	Waiting. This symbol is used for delays in any activity you regard as an unnecessary delay, for example, long delays in response time, receiving of orders, receiving and executing of license agreements, obtaining URLs, creating access to e-resources, waiting for resources to be catalogued, waiting for approvals, postponed meetings, load-shedding, systems, equipment, tools, etc.
⇒	<b>Movement / Motion</b>	Any unnecessary movements or motions due to the layout of equipment, printers, or office desk. Movement of picking up and dropping off documents, unnecessary workflows, duplication of effort, repetitive work, double entry of work, unnecessary searches, searching for files on the computer, and too many clicks to access resources.
□	<b>Action</b>	This symbol indicates tasks or processes. Examples are completing repetitive tasks, documenting the same information in multiple places, unnecessary printing, e-mailing, or making copies. Ordering stock more than what's needed, generating unnecessary reports, duplication of processes, using unnecessary complex and complicated processes, incorrect processes, anything that does not meet the customer's expectation, data error entries, loss of files and records, incorrect information on files and records, and documents that are incomplete or incorrect.
◇	<b>Decision</b>	Deliver what the customer wants, how much they want, and when they want it; how responsive is the purchasing process to the demands of the customer? Insufficient training and development, no employee feedback, improper tools, systems, and equipment to work with, lack of challenges for employees, no succession plan, no incentives, and lack of or no performance management tool.

## APPENDIX D: PHASE 4 - SEMI-STRUCTURED INTERVIEW QUESTION GUIDE

REFERENCE NUMBER 35548231\_CRECHS\_2022(UNISA)  
 REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant code .....

No.	Research questions	Questions
1.	What skills and resources are needed for participants to do their work?	1. Are there any strategic development plans for upskilling staff to work effectively in an electronic environment? 2. Have staff reported that they need some resources to be effective in their work processes? If yes, any response to their requests?
4.	How do participants understand lean principles?	1. What is your understanding of lean principles? 2. How would you see lean principles working for our systems?
5.	How can the current processes and workflows be adapted to a leaner process in the future?	1. As part of the library leadership, how can you influence the adoption of lean processes and workflows of e-resources to enhance accessibility?

## APPENDIX E: PROCESSES AND WORKFLOW OF AN E-BOOK SINGLE TITLE PERPETUAL ACCESS

REFERENCE NUMBER 35548231\_CREC\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant code .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Receive online or email requests from faculty/branch/senior librarian or Academic staff.
2	ERM	○	⇒	□	◇	▽	Check the author, title, edition, ISBN, and EISBN. Check the availability of the e-book title with the publisher and vendors thereafter select a provider. Check pricing and access models. Check the availability of funds. Choose the supplier and the required access models. Complete an online request purchase by the selected vendor/publisher/access management platform. Forward the title, ISBN, EISBN publisher, edition, and author details to cataloguing to download a new bib record.
3	Cataloguing	○	⇒	□	◇	▽	Before downloading a bib record, cataloguers check first for existing bib records. If an existing record is available, check the info, and if needs be, amend the record to the SEALS standards, and add the location code as well to the Records Manager in OCLC WorldShare. If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well. Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc., and stripping of unwanted fields. Insert field 090 – ONLINE Insert field 866 – NMU registered user to access. Adapt the record according to the standards. Check the KB for the SSJ number and add it to the bib record. Email ERM with the bib record and SSJ numbers.



4	ERM	○	⇒	□	◇	▽	<p>Create an order on Sierra and soft link the related order to the resource record. Request the URL from the supplier, add the WAM to the URL and test the link. Request invoice from supplier and process on both Sierra and ITS. Profile title in the Knowledge Base (KB). Completes an ERM load form that is in an Excel format. Details to include on the ERM load form are resource and bibliographic record numbers, title, ISBN, EISBN, SSJ number, and URL. If a resource record exists, forward the ERM load form to LISDA for coverage editing (Step 5). If the requested title does not have an existing resource record, create a contact, and resource record and follow steps 3, 4, and 6. Complete the ERM load sheet and forward it to the SEALS office. Inform SEALS if the title requires a SAN certificate.</p>
5	LISDA	○	⇒	□	◇	▽	<p>Checks and does quality control of information on the ERM excel load form. If more than 10 titles at a time, after quality control forward the form to the SEALS office to bulk load. If less than 10 titles add the new title, ISBNs, SSJ number, and WAM URL to the relevant database in Coverage Edit. Then in the Catalog function, on the bib record of the new title, creates a checkin record, which is based on the information entered in the Coverage Edit. Test the link via the Library Portal and check the platform, if the e-book is accessible, and if the title is the correct one that was requested.</p>
6	SEALS	○	⇒	□	◇	▽	<p>Check the info on the spreadsheet and check if no other institution subscribes to the same resource. If new, add or edit the data to the coverage spreadsheet conversion rules. Create an excel load file and import the file through the coverage load functionality on Sierra.</p>
7	ERM	○	⇒	□	◇	▽	<p>ERM process invoice on ITS. Inform the faculty librarian of the availability of e-books.</p>

## APPENDIX F: PROCESSES AND WORKFLOW OF A SINGLE TITLE E-JOURNAL SUBSCRIPTION

REFERENCE NUMBER 35548231\_CRECHS\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Receive an email request for a new e-journal single subscription from the faculty/branch/senior librarian.
2	ERM	○	⇒	□	◇	▽	Check the details of the e-journal subscription and verify the publisher, ISSN number, and e-journal title. Check for overlapping titles in the current collection. Check if it is a direct subscription, otherwise use a vendor. Forward e-journal request to publisher or vendor to include a quotation, coverage dates, embargos, and perpetual access. In addition, check if the e-journal request requires a license agreement. Inform the Faculty Librarian of the availability and cost to subscribe. On confirmation from the faculty librarian to subscribe, ERM creates a contact and resource record if not there is not an existing resource record on Sierra. Forward details to cataloguing to download bibliographic records if there is no existing bibliographic record on Sierra.
3	Cataloguing	○	⇒	□	◇	▽	Before downloading a bib record, cataloguers check for existing bib records. If the record is available, check the info, and if necessary, amend the record according to SEALS standards, add the location code as well as to the Records Manager in OCLC WorldShare. If no bib record exists, download a bib record from the Records Manager in OCLC WorldShare and add holdings to the Records Manager as well. Once the record is on Sierra, check the bib record, format the bib record according to the SEALS standards, add LOC, MAT TYPE, etc., and stripping of unwanted fields. Determine

							whether a new record is needed based on CONSER, RDA, and NMU's cataloging manuals. Cataloguing giving attention to all details and specific fields. Insert field 090 – ONLINE and field 866 NMU registered user to access. Check in the KB for the SSJ number and add it to the bib record. Email ERM with the bib record and SSJ numbers.
4	ERM	○	⇒	□	◇	▽	On receipt of the bibliographic record, create an order record and add it as a related order on the resource record. Check the URL received from the publisher or vendor to ensure whether the URL requires a SAN certificate. Profile the e-journal in the KB. Complete the ERM excel load sheet, to include SSJ number, bibliographic record, provider, title, ISSN, EISSN, coverage dates, URL, and publication date. If there is an existing resource, email the systems librarian at LISDA and follow Step 5. If the requested title does not have a resource record, follow STEP 6, and forward via email to SEALS. NB SSJ or ssib numbers are after the 10 <sup>th</sup> of each month. Please note to inform SEALS if a SAN certificate is required.
5	LISDA	○	⇒	□	◇	▽	Checks and does quality control of information on the ERM excel load form. If more than 10 titles at a time, after quality control forward the form to the SEALS office to bulk load. If less than 10 titles add the new title, ISSN, SSJ number, and WAM URL to the relevant database in Coverage Edit. Then in the Catalog function, on the bib record of the new title, creates a checkin record, which is based on the information entered in the Coverage Edit. Test the link via the Library Portal and check the platform, if the e-book is accessible, and if the title is the correct one that was requested.
6	SEALS	○	⇒	□	◇	▽	Check the info on the spreadsheet and check if no other institution subscribes to the same resource. If new, add or edit the data to the

							coverage spreadsheet conversion rules. Create an excel load file and import the file through the coverage load functionality on Sierra.
7	ERM	○	⇒	□	◇	▽	Capture invoices on Sierra and ITS and register on the Publisher website for usage stats if required. The payment is also captured on the E-Resources spreadsheet that is on SharePoint.
8	ERM (Renewal)	○	⇒	□	◇	▽	All single-title e-journal subscriptions must be renewed annually for the continuation of the subscription. Receive a request from the faculty librarian to either renew or cancel the subscription. For renewal, the ERM librarian informs the publisher or vendor, receives the invoice, and processes the invoice on Sierra and ITS.
9	ERM (Cancellation)	○	⇒	□	◇	▽	ERM librarian informs the publisher or vendor. Unsubscribe from the e-journal in the KB, change the order record to status "z" in Sierra, and inform SEALS, LISDA, and the Faculty Librarian.
10	LISDA	○	⇒	□	◇	▽	Remove title entry from coverage edit. Delete checkin record on Sierra if no perpetual access to the title. Remove the bib record if no other institutional holdings or any other kind of access. Inform ERM when done.
11	SEALS	○	⇒	□	◇	▽	Delete resource from Coverage  Delete the bib record that has no holdings attached. Inform ERM when done.
12	Cataloguing	○	⇒	□	◇	▽	Remove holding from Records Manager in OCLC WorldShare

## APPENDIX G: PROCESSES AND WORKFLOW OF THE TRIAL PHASE OF A DATABASE

REFERENCE NUMBER 35548231\_CREC\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Receive notification for a trial request.
2	ERM	○	⇒	□	◇	▽	Negotiate trial conditions with the publisher.
3	ERM	○	⇒	□	◇	▽	Supply publisher with IP Ranges. Request URL link from the publisher.
4	ERM	○	⇒	□	◇	▽	Create a resource record and add a URL to the resource record. Add the WAM to the URL for off-campus access.
5	ERM	○	⇒	□	◇	▽	At the end of the trial period, prepare a title overlap, usage statistics, and quotation for the Info and Training Dept to evaluate the database for a decision to subscribe or not.
6	ERM	○	⇒	□	◇	▽	Suppress trial resources until confirmation is received.

## APPENDIX H: PROCESSES AND WORKFLOW OF THE ORDERING PHASE OF A DATABASE

REFERENCE NUMBER 35548231\_CREG\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Receive a request to place an order from Info & Training.
2	ERM	○	⇒	□	◇	▽	Check budget availability. Place an order with the vendor.
3	ERM	○	⇒	□	◇	▽	Request License Agreement documents from the Publisher or Vendor. Request bib record.
4	Cataloguing	○	⇒	□	◇	▽	If an existing bib record exists within the consortium, forward details to cataloguing to verify and update the record.
5	ERM	○	⇒	□	◇	▽	If it is a new database, create a contact record and e-resource record.
6	ERM	○	⇒	□	◇	▽	Profile new resources on the KB.
7	ERM	○	⇒	□	◇	▽	Process invoice on SIERRA and ITS
8	ERM	○	⇒	□	◇	▽	Complete the load sheet with the new database name, URL, and e-resource record details. Inform SEALS if the resource has been profiled or not.

## APPENDIX I: PROCESSES AND WORKFLOW OF THE LICENSE AGREEMENT PHASE OF A DATABASE

REFERENCE NUMBER 35548231\_CREC\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Receive a License Agreement (L/A) or Terms & Conditions (T&C) Agreement from the Publisher or Vendor.
2	ERM	○	⇒	□	◇	▽	Verify the contents of the L/A and the Order Form of the Terms & Conditions
3	ERM	○	⇒	□	◇	▽	Complete an NMU L/A Approval Form. Forward the L/A with the Approval Form to be signed off by the Senior Librarian: ERM and Library Director.
4	ERM	○	⇒	□	◇	▽	On receipt of these signed documents, attached a copy of the invoice or quotation and forward the L/A to Legal and Finance to co-approve and co-sign.
5	ERM	○	⇒	□	◇	▽	Once, the L/A is co-approved and co-signed, the Legal Department forward these L/A back to the ERM department.
6	ERM	○	⇒	□	◇	▽	A copy of the co-signed L/A is sent to the Publisher or Vendor to obtain countersignatures from the Publisher.
7	ERM	○	⇒	□	◇	▽	The countersigned L/A or T&C, co-signed Approval Form, and copy of the invoice is scanned and uploaded to the SharePoint server for record-keeping.
8	ERM	○	⇒	□	◇	▽	A copy of the countersigned document is forwarded to the Legal Department to store in the Institutional Document Management System.

## APPENDIX J: PROCESSES AND WORKFLOW OF THE ACTIVATION AND USER ACCESS PHASE OF A DATABASE

REFERENCE NUMBER 35548231\_CREG\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	Forward database details, and records files to SEALS.
2	SEALS	○	⇒	□	◇	▽	SEALS office check if the Resource ID matches the load file.
3	ERM & Cataloguing	○	⇒	□	◇	▽	ERM and cataloguing check if any bib records on SIERRA do not have title IDs and update bib records accordingly preload.
4	Cataloguing & LISDA	○	⇒	□	◇	▽	If new MARC records are imported, title IDs should be added for a successful load and attached checkin records for access.
5	ERM, Cataloguing & LISDA	○	⇒	□	◇	▽	Check for incorrect and incomplete bib data on SIERRA as it will cause errors and access to resources.
6	SEALS	○	⇒	□	◇	▽	After the 10 <sup>th</sup> of each month SEALS downloads the subscription data file from 360Core.
7	SEALS	○	⇒	□	◇	▽	Extract data appropriate to the resource being loaded from the subscription data file and create a load file.
8	SEALS	○	⇒	□	◇	▽	Check and match bib records with the subscription load file, checking for bib records with correct title IDs.
9	SEALS & Cataloguing	○	⇒	□	◇	▽	SEALS usually inform the cataloguing department if they need to preload MARC records for holdings. Each case is evaluated according to the number of titles in the database, the number of full and fixed records on SIERRA, and the number of short bib records that need to be updated.



## APPENDIX K: PROCESSES AND WORKFLOW OF A DATABASE IMPLEMENTATION, ADMINISTRATION & SUPPORT PHASE

REFERENCE NUMBER 35548231\_CREC\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	SEALS	○	⇒	□	◇	▽	Load file into the ERM system to create checkin records with links for access and if no bib record matches, a short bib record is created.
2	SEALS	○	⇒	□	◇	▽	Check the load report for errors, and fix multiple matches and errors appropriate to the file loaded.
3	SEALS	○	⇒	□	◇	▽	Forward load report to ERM librarian for information.
4	ERM	○	⇒	□	◇	▽	Check information and access from all access points on various systems
5	LISDA	○	⇒	□	◇	▽	If full-text journals are available, forward them to LISDA to add a link resolver.
6	ERM	○	⇒	□	◇	▽	Register on the database platform as an administrator to retrieve usage statistics
7	ERM	○	⇒	□	◇	▽	Forward database information, the URL, and marketing material to the Web Administrator and Faculty Librarian regarding the availability and inform users of the new resource.

## APPENDIX L: PROCESSES AND WORKFLOW OF THE RENEWAL AND CANCELLATION PHASE OF A DATABASE

REFERENCE NUMBER 35548231\_CREG\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

Participant .....

Steps	Department	Start	Movement	Action	Decision	Waiting	Process details
1	ERM	○	⇒	□	◇	▽	To renew ERM will receive the request from the Faculty Librarian and inform the publisher or vendor accordingly. The process will then only include the payment on ITS and SIERRA. If there are any changes to the packages or expiry of license agreements – will follow Phase 3 and Phase 7 of the processes.
2	ERM	○	⇒	□	◇	▽	If the database is requested to be cancelled – ERM checks for any breach in the license agreement regarding cancellation and the time frame of the termination date and perpetual access clauses.
3	ERM	○	⇒	□	◇	▽	Inform the Publisher and Vendor Change the Order record status to “z.” Add a note for the reason why the database has been cancelled for any queries later on.
4	ERM	○	⇒	□	◇	▽	Unsubscribe the resource from the KB.
5	ERM	○	⇒	□	◇	▽	Create a list and include the bib and checkin records and forward it to SEALS to cancel.
6	SEALS	○	⇒	□	◇	▽	Check the information on Global Update to if correct and Bulk Delete all the records.
7	SEALS	○	⇒	□	◇	▽	Delete the resource record from Coverage.
8	SEALS	○	⇒	□	◇	▽	Delete bib records that have no holdings attached. Inform ERM when all activities are done.
9	ERM	○	⇒	□	◇	▽	Inform Info & Training and request the Web Administrator to remove the URL link from the Library Portal.

## APPENDIX M: ETHICS APPROVAL

REFERENCE NUMBER 35548231\_CRECHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)



### COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

04 March 2022

Dear Rafiekah Abrahams

**Decision:**  
**Ethics Approval from 04 March 2022**  
**to 04 March 2025**

NHREC Registration #:  
Rec-240816-052  
CREC Reference #:  
35548231\_CRECHS\_2022

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**Researcher(s): Name: Rafiekah Abrahams**  
**Contact details: [35548231@mylife.unisa.ac.za](mailto:35548231@mylife.unisa.ac.za)**  
**Supervisor(s): Name: Prof P Ngulube**  
**Contact details: [082 8527612](tel:082-8527612)**

**Title: Utilisation of lean principles to enhance processes and workflows of electronic resources at an academic library in South Africa**

**Degree Purpose: Masters**

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Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for three years.

confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

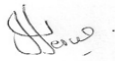
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No fieldwork activities may continue after the expiry date (**04 March 2025**). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*

*The reference number 35548231\_CREC\_CHS\_2022 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature: pp



Prof. KB Khan  
CHS Research Ethics Committee Chairperson  
Email: khankb@unisa.ac.za  
Tel: (012) 429 8210

Signature: PP



Prof K. Masemola  
Exécutive|Dean: CHS  
E-mail: masemk@unisa.ac.za  
Tel: (012) 429 2298

The **low risk application** was reviewed by College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the



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# APPENDIX N: REQUEST FOR ACCESS TO NELSON MANDELA UNIVERSITY STAFF AND/OR STUDENTS

REFERENCE NUMBER 35548231\_CREC\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)



## REQUEST FOR ACCESS TO NELSON MANDELA UNIVERSITY STAFF AND/OR STUDENTS

NELSON MANDELA UNIVERSITY RESEARCH ETHICS COMMITTEE (HUMAN)

<b>FOR OFFICIAL USE ONLY</b>									
This serves as notification of (non)approval for access to Nelson Mandela University staff and/or students for research purposes.									
<b>Application reference code:</b>	<b>H</b> HUMAN	..... YEAR	..... FACULTY	..... DEPARTMENT	<b>EAP</b>	..... NUMBER			
<input type="checkbox"/> Approved									
<input type="checkbox"/> Not approved      Refer to comments section below									
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">NAME (CHAIR:REC-H)</td> <td style="width: 30%; border: none;">SIGNATURE</td> <td style="width: 20%; border: none;">Date</td> </tr> </table>							NAME (CHAIR:REC-H)	SIGNATURE	Date
NAME (CHAIR:REC-H)	SIGNATURE	Date							
<b>COMMENTS to PRP/PI from the REC-H</b>									

1. GENERAL PARTICULARS
<b>TITLE OF STUDY</b>
<p>a) Concise descriptive title of approved study: <b>UTILISATION OF LEAN PRINCIPLES TO ENHANCE PROCESSES AND WORKFLOWS OF ELECTRONIC RESOURCES AT AN ACADEMIC LIBRARY IN SOUTH AFRICA</b></p>
<p>b) This application focusses specifically on the <u>procedure in which Nelson Mandela University staff and/or students will be participating</u> (and not on any other procedures of the study nor necessarily on the study as a whole). Describe the placement of <u>this application for ONLY the data collection from human participants</u> in the context of the above-mentioned study (see 1a) above), i.e., describe the contribution of the data collection from human participants to the overall study. The data collection technique will be semi-structured interviews and document analysis. The participants that will be invited to voluntary participate in the data collection techniques are the NMULIS librarians that are responsible for creating and managing of the discoverability and accessibility of e-resources, their line managers and the two staff members of SEALS &amp; Trust Office. The researcher wants to explore the real-life experiences of the participants, how they feel, their thoughts, their perceptions; <u>in order for</u> that to happen, the researcher must study them in their context to understand and give meaning in the how they operate. The participants selected for this research study are recognised as specialists in their field, their expertise and years of experience will validate the current documented processes and workflows. Human-behaviour, thoughts and feelings are partly determined by their context.</p>
<b>RESEARCHERS:</b> <i>Please note - The Protection of Personal Information Act, 2013 (POPI Act) has been promulgated and implemented on 1 July 2020. All personal identifiable information provided by you shall be treated in accordance with this statute and only used for research</i>

ethics application and/or reporting processes, as indicated in the University's Privacy Policy. By providing your information, you are giving your consent for the use of <u>all</u> of your personal identifiable information, provided to the University, for the aforesaid purposes.	
<b>PRIMARY RESPONSIBLE PERSON (PRP)</b>	
c) PRP identification and affiliation details: Type PRP name here      Type PRP name here      Type PRP office address here Institution Specify name of home institution here Faculty Specify name of Faculty here if home institution is a university Department (or equivalent): Type department name here, if applicable If visiting researcher, give nationality and passport number Specify nationality and passport number, if applicable	
<b>PRINCIPLE INVESTIGATORS AND CO-WORKERS</b>	
d) PI (may be same as PRP) identification and affiliation details: 72081 Rafiekah Abrahams rafiekah.abrahams@mandela.ac.za Institution Nelson Mandela University Faculty Specify name of Faculty here if home institution is a university Department (or equivalent): Library and Information Services If visiting researcher, give nationality and passport number Specify nationality and passport number, if applicable	
e) Name(s) and affiliation(s) of all co-workers (e.g., co-investigator/assistant researchers/supervisor/co-supervisor/promoter/co-promoter/participant recruiter, etc). If names are not yet known, state the affiliations of the groups from which they will be drawn, e.g., Interns/M-students, etc. and the number of persons involved: Supervisor - Prof P Ngulube: Acting Executive Dean in the Department of Interdisciplinary Research and Graduate Studies, University of South Africa	
f) Name of Human Ethics Committee where ethics application served and was approved (copy of approval letter to be attached): College of Human Sciences Research Ethics Review Committee	
g) Affiliation of applicant(s) (PRP and PI) with Human Ethics Committee given in f) above: None	
h) Ethics approval valid until 2025/03/04	
i) Briefly describe the target population for your study (i.e., what <u>particular grouping</u> of Nelson Mandela University staff and/or students will you be recruiting). The participants that will be invited to voluntarily participate in the data collection techniques are those librarians that are responsible for the creation and management of the discoverability and accessibility of e-resources at NMULIS. The participants include SEALS Trust & Systems Manager, SEALS Trust Principal Systems Librarian, the Senior Librarians of Technical Services and Library and Information Systems and Digital Applications, the librarians, assistant librarians, and the permanent half day librarian of Technical Services. In addition, the Library Director, and the Deputy Director: Technical Services will also be invited because they are the line managers of the departments and sub-department responsible for the creation and management of the access of e-resources at NMULIS.	
<b>2. ETHICAL AND LEGAL ASPECTS</b>	
I would like the REC-H to take note of the following additional information: None	
<b>3. DECLARATION</b>	
I am aware that data collection will only commence once final approval for the study has been granted and I am in receipt of an approval letter to this effect. Retrospective approval is not permitted.	
I <b>am not</b> aware of potential conflict(s) of interest which should be considered by the Committee. If affirmative, specify: Not applicable	
09 January 2023	
SIGNATURE: Rafiekah Abrahams (Primary Responsible Person)	Date
09 January 2023	
SIGNATURE: Rafiekah Abrahams (Principal Investigator/Researcher)	Date

## APPENDIX O: NELSON MANDELA UNIVERSITY – ETHICAL CLEARANCE

REFERENCE NUMBER 35548231\_CRECH\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

### NELSON MANDELA UNIVERSITY – ETHICAL CLEARANCE

REFERENCE NUMBER	H22-SCI-CSS-EAP-001
TITLE	UTILISATION OF LEAN PRINCIPLES TO ENHANCE THE PROCESSES AND WORKFLOWS OF ELECTRONIC RESOURCES AT NELSON MANDELA UNIVERSITY LIBRARY AND INFORMATION SERVICES IN SOUTH AFRICA
DEGREE	MASTERS [UNISA]
PRP	MR L REID
PI	MR R ABRAHAMS
RECH MEETING DATE	20 APRIL 2022
DATE OF COMMENCEMENT	2021
DATE OF COMPLETION	2022
RECOMMENDATION	APPROVED WITH MINOR MODIFICATIONS
RECH RESOLUTION	
<p>1 That protocol [H22-SCI-CSS-EAP-001] be <u>granted ethics approval</u> on condition that the recommendations below be addressed and implemented.</p> <p>2 That <b>DR P MENSAH</b> (Research Development) be available for consultation with the PRP/PI in order to advise regarding the implementation of the recommendations.</p> <p>3 That, once amendments had been made to the satisfaction of the RECH representative, the amended signed electronic application be submitted to RD (Mr I Khan) and the RECH Secretariat (Ms U Spies).</p> <p><i>It is the responsibility of the PRP/PI to make contact with the designated RECH representative should he/she require further assistance when attending to the recommendations made by the RECH. The PRP/PI would be given a period of three calendar months from the date of forwarding the RECH resolution by the RECH Secretariat within which to resubmit amendments to the protocol for final ethics approval to the designated RECH representative. Should the submission not be submitted within the said period, the PRP/PI would need to resubmit their application to RECH.</i></p>	
<b>RECH APPLICATION FORM (approval of study is subject to the recommendations below being addressed and implemented)</b>	
1	<b>GENERAL PARTICULARS</b>
	<b>TITLE OF STUDY</b>
1(a)	<p>A more nuanced title is recommended that does not mention Nelson Mandela University given the risk to the institution if the outcome of the study is not favourable.</p> <p>I am changing my title to read as follows: <b>UTILISATION OF LEAN PRINCIPLES TO ENHANCE PROCESSES AND WORKFLOWS OF ELECTRONIC RESOURCES AT AN ACADEMIC LIBRARY IN SOUTH AFRICA</b></p>
1(b)	<p>The PI is a Master student at UNISA and the PRP is a staff member at Mandela. Ethics approval was granted by the College of Human Sciences Research Ethics Review Committee on 4 March 2022 and is valid until 4 March 2025.</p> <p>Participants will be librarians at Mandela and members of the SEALS Trust Office (where SEALS stands for Southeast Academic Libraries System). The library Director and Deputy Director: Technical services will also be invited to participate since they are relevant line managers.</p> <p>The semi-structured interview questions are aimed at exploring how lean principles that govern how machines and organisations work can enhance processes and workflows of e-resources. Interviews will be conducted virtually due to the pandemic.</p>
	<b>PRINCIPLE INVESTIGATORS (PI) AND CO-WORKERS</b>
1(h)	The PI should be reminded that NMU approval is only granted for a year (valid until 2025/03/04).
2	<b>ETHICAL AND LEGAL ASPECTS</b>
	Informed consent, power dynamics, confidentiality, anonymity, and data storage are addressed in the proposal.
A1	<b>RESEARCH PROPOSAL (approved, mandatory)</b>
	<p>Although the PI will attempt to establish a researcher-participant boundary, will this truly be possible with the PI being the senior librarian? Could an intermediary conduct the interviews?</p> <p>None of the participants report directly to me, they are all my peers and thus the ethical concern is minimised. In addition, this research study is an exploratory study. The success of this study will be dependent on my experience and insights, which I will draw on during the semi-structured interviews, hence it is important that I conduct the interviews myself.</p>
A2	<b>ETHICS COMMITTEE LETTER OF APPROVAL (mandatory)</b>
	College of Human Sciences Research Ethics Review Committee gave ethics approval for three years on 4 March 2022 until 4 March 2025.
A3	<b>DATA COLLECTION INSTRUMENTS (mandatory)</b>
	Interviews with the 16 NMU librarians and line managers and SEAL staff working with e-resources via Zoom. Interview guides will be used.

A4	<b>WRITTEN AND/OR ORAL INFORMATION GIVEN TO HUMAN SUBJECT ON RECRUITMENT (mandatory)</b>
	<p>The information letter indicates the purpose of the study, the nature of participation, benefits of participation, potential inconvenience and that the participants can withdraw from the study. Confidentiality and anonymity will be ensured by using a code. Participants can request a copy of the results. Data will be stored for five years in a locked cupboard and electronic information on a password-protected computer. Hard copies will be shredded, and electronic copies will be deleted permanently off the hard drive.</p> <p>The PI should state <b>how</b> applicants might withdraw.</p> <p>On the information letter I will indicate that should a participant wishes to withdraw from the study, the participant can either email or message me on Whatsup. Any data collected will be confiscated and will not be included in the study.</p>
A6	<b>INFORMED CONSENT FORM(S) (mandatory)</b>
	Consent will be done via email. Voluntary participation is indicated and that participants may withdraw at any point.
A7	<b>DRAFT LETTER ADDRESSED TO DVC: RESEARCH, INNOVATION AND INTERNATIONALISATION FOR PERMISSION TO ACCESS NELSON MANDELA UNIVERSITY STAFF AND/OR STUDENTS (mandatory)</b>
	<p>The draft gatekeeper letter is dated 20 March 2022. Please note that ethics approval from REC-H at Mandela University cannot be given retrospectively, and that the date should therefore be changed after approval is obtained.</p> <p><b>Noted</b></p> <p><i>“The document analysis will be done on the current processes and workflows that are currently on SharePoint.” – Since you will be using it as an “external party” – include a request for access to these documents for research purposes as part of the letter.</i></p> <p>There is a slight change in the data collection procedures. The document analysis will no longer form part of the data collection techniques, instead the researcher will include non-participative observation. The researcher will include four sets of semi-structured interviews with the librarians responsible for creating and managing the access to e-resources at NMULIS.</p> <p>Please see the amended research proposal attached.</p>



## APPENDIX P: CONSENT TO PARTICIPATE IN THIS STUDY

REFERENCE NUMBER 35548231\_CRECH\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)

### CONSENT TO PARTICIPATE IN THIS STUDY

I, \_\_\_\_\_, confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read and understood the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree with the recording of the semi-structured interviews and the use of MS Teams software and Microsoft 365. I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature..... Date.....

Researcher's Name & Surname..... (please print)

Researcher's signature..... Date.....

## APPENDIX Q: TURNITIN REPORT

REFERENCE NUMBER 35548231\_CRECH\_CHS\_2022(UNISA)  
REFERENCE NUMBER H22-SCI-CSS-EAP-001(NMU)



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UTILISATION OF LEAN PRINCIPLES TO ENHANCE PROCESSES AND  
WORKFLOWS OF ELECTRONIC RESOURCES AT AN ACADEMIC LIBRARY IN  
SOUTH AFRICA

by

RAFIEKAH ABRAHAMS  
STUDENT NUMBER 35548231

Submitted in accordance with the requirements for the degree of

MASTER OF INFORMATION SCIENCE

of the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF F MALLIBE