Original Research

Efficacy of Knowledge Management Tools in Support of University Library Operations

Rexwhite Tega Enakrire
PostDoc Fellow, Department of Informatics,
School of Information Technology,
University of Pretoria, South Africa.
Corresponding Author: rexwhite.enakrire80@gmail.com
ORCID iD: https://orcid.org/0000-0001-6523-5669

Hanlie Smuts
Professor, Department of Informatics,
School of Information Technology,
University of Pretoria, South Africa.
hanlie.smuts@up.ac.za
ORCID iD: https://orcid.org/0000-0001-7120-7787

Abstract

Knowledge Management tools (KMTs) play a vital role in facilitating the daily operations of university libraries, acting as the engine oil that lubricates the various library operations carried out daily in university libraries. Librarians heavily rely on KMTs and the application of tacit knowledge to carry out their diverse tasks. However, concerns have arisen due to the limited availability of KMTs that support library operations and the need for librarians to possess the necessary know-how. As information and knowledge grow in various formats and library routines become more complex, librarians face increased demands beyond their initial expectations. Therefore, the integration of KMTs in university library operations is essential. This study examines the effectiveness of KMTs in supporting university library operations, focusing on evidence from Nigeria and South Africa. The research approach employed in this study was quantitative, utilizing a survey research design. A sample of 132 librarians, consisting of 77 from Nigeria and 55 from South Africa, was selected from university libraries in both countries using purposive sampling techniques. The study findings revealed that various KMTs, including search engines, semantic web, and information retrieval tools, were available and employed to support information service delivery and manage databases//institutional repositories in the selected university libraries in Nigeria and South Africa. Further, both countries' university libraries implemented several strategies to enhance service delivery. Based on the results, the study recommends the acquisition of additional KMTs, such as artificial intelligence and simulation tools, to address specific operational needs and emphasizes the importance of reskilling librarians using these tools.

Keywords: Efficacy, Knowledge Management Tools, University Libraries, Nigeria, South Africa.

Introduction

University libraries are typically established to facilitate teaching, learning, research, and community engagement (Enakrire & Ocholla, 2017). These activities involve lecturers engaging in rigorous teaching, learning, and research by continuously searching for diverse information resources and applying their knowledge and skills (Enakrire & Smuts, 2022). To

develop their lecture notes and write research papers for conferences, workshops, and seminars, lecturers rely on the abundant information resources provided by university libraries. However, the successful execution of these activities would not be possible without the support of specific knowledge management tools (KMTs). In this context, KMTs refer to the software that enables the resolution of complex problems (Junior, Periotto, Bernardelli & Urpia, 2021). KMTs can also be considered district tools coded with software applications and embedded operations (Ghani, 2009).

The software enables KMTs to function as intended, facilitating the storing and retrieving of information and knowledge from various web portals and institutional repositories (Tang, Avgeriou, Jansen, Capilla & Babar, 2010). This process involves utilizing KMT software, downloading, retrieving, sharing, and reusing information designed for decision-making within contemporary university libraries. KMTs are pivotal in enhancing productivity and work performance among librarians within and beyond the university library environment. Various KMTs have been adopted by university libraries worldwide to manage their operations effectively (Poonkothai, 2016; Asogwa, 2012; Wen, 2005).

KMTs that are believed to support library operations in university libraries encompass a range of tools and systems. These include database management systems, web portals, innovation management tools, groupware, artificial intelligence, the Semantic Web, information retrieval tools, mapping tools, electronic document management, data warehouse, workflow management systems, machine learning, simulation tools, and content management systems (Junior et al., 2021; Dalkir, 2011; Ghani, 2009; Rao, 2005). KMTs play a crucial role in various workspaces, particularly university libraries, where they are employed to support electronic/digital information resources. Adopting these technologies has become integral to ensuring effective organization, storage, and retrieval of information resources in paperless library environments. The significance of KMTs in enhancing library operations, especially in paperless libraries, should not be underestimated. Another example of KMTs in business is using business intelligence (BIU). With university libraries, the most used KMTs are data warehouses, data mining (extract-transform-loads, ETL), and online analytical processing (OLAP) (Moscoso-Zea, Castro, Paredes-Gualtor & Lujan-Mora, 2019).

Many university libraries can benefit from adopting KMTs employed by business managers today. By integrating these tools, libraries can enhance service delivery to users/customers. The rationale behind implementing such devices lies in aligning library and information services with business-oriented approaches. To ensure high-quality service provision, librarians should possess fundamental knowledge of KM and the tools utilized in continuous knowledge management practices (KMPs). Among librarians, structured processes like cataloging and classification, when diligently followed along with their respective procedures and tools, are recognized as KMPs. When a customer requires specific products or services from an organization, the employees go the extra mile to meet the customers' needs.

KMTs have been shown to facilitate the processing, storage, and retrieval of information and knowledge in the library environment (Sharif, Lodhi, Munir & Yasmin, 2021). The services provided by KMTs range from specific to generic operations in university libraries. These services stimulate the processing, storing, preserving, and retrieving of information and knowledge, making it easy for users and librarians to access stored and preserved information across various databases and cloud platforms in university libraries. KMTs also perform additional activities in the university library environment, such as adapting to environmental

changes, facilitating comprehension and learning interfaces among librarians, and curating and repackaging information and knowledge for effective service delivery to users (Ghani, 2009; Massingham, 2014). This study is grounded in activity theory (AT) to explain how KMTs support university library operations. The focus of AT revolves around the analysis of the three key variables: the subject, object, and tools. These variables serve as a theoretical lens through which the subconscious state of librarians is guided using KMTs to meet diverse users' information needs.

According to Hashim and Jones (2007), the fundamental principles underlying the diverse machinery of the system, subject, and objects are rooted in the conceptual framework that motivates people to accomplish tasks. The ability to act is facilitated by certain factors, which

The act of doing things is enabled by specific factors, which Hashim and Jones (2007) refer to as systems, subjects, and objects (Roos, 2012). The driving force behind this initiative was the limited support provided by KMTs for library operations and the lack of expertise among librarians in operating them. Additionally, it is important to consider the influx of information and knowledge in various formats, leading to an increasing number of users each year. This, in turn, results in many tasks for librarians, necessitating more work to be done within a limited time frame. Furthermore, university library databases have inadequate facilities for organizing information and knowledge. Given the dynamic nature of current trends and best practices in library operations, librarians are now compelled to utilize KMTs to manage university library operations effectively. This paper's authors thoroughly searched various online databases, including Google Scholar and Web of Science. They discovered that only a few researchers or scholars have explored similar studies on an international level, but not specifically in the context of Africa, particularly Nigeria and South Africa. This indicates a significant knowledge gap in research concerning the effectiveness of KMTs in supporting university library operations in developing nations. Based on this observation, the study investigated the efficacy of KMTs in supporting university library operations. The study will address a knowledge gap related to KMTs in current library and organizational practices, methodological approaches, theoretical frameworks, and contextual factors.

Purpose of the study

The study aimed to investigate the efficacy of KMTs in support of university library operations. In line with this, the following four research objectives were used to guide the study:

- Identify the KMTs and areas of application in support of university library operations.
- Determine the functions/uses of KMTs for management operations in university libraries.
- Examine the extent of accessibility of KMTs in support of university library operations.
- Compare accessibility and use of KMTs in support of university library operations.

Literature Review

Previous studies by Ruggles (1997a; 1997b), Jantz (2001), Tiwana (2002), Tyndale (2002), Lindvall and Rus (2002), Rollet (2003), Rao (2005), Ghani (2009), Dalkir (2011) and Massingham, 2014) gave a different analogy to the meaning and purpose for which KMTs are used in the university library and other organizations. KMTs are considered intriguing, especially when tied to what they could do for university libraries in this era of digital technologies. The authors' understanding indicated that KMTs have a considerable role in

university library operations when classified by tools, technologies, databases, techniques, and strategies. Old and new types of KMTs are used for various job descriptions. The job descriptions cut across knowledge formation, organization, dissemination, codifications, transmission, communication, cooperation, content design, administration, alteration, interaction, principles control, hardware management, and use (Nedelko & Jevšenak, 2019; Massingham, 2014; Dalkir, 2011; Ghani, 2009; Rao, 2005; Rollet, 2003; Lindvall & Rus 2002; Tiwana, 2002; Tyndale, 2002; Jantz, 2001; Ruggles, 1997a; 1997b). Although some KMTs were not initially found and used in academic libraries, they were used in the software (Tyndale, 2002) and business industry (Rao, 2005). However, their associated benefits and transformation led to them being applied in the sustainability of academic library activities, hence the author's interest in the support that KMTs could offer university libraries in Nigeria and South Africa, given the immense tasks librarians face daily.

A study by Lamporoulis (2007) emphasized that the workforce should consider technology valuable in advancing service delivery in academic libraries. This would bring a quick and easier way of retrieving information and knowledge. This is a crucial point for the creative staff since they found that the amount of work continuously increases along with the customers' demands for high-quality work. Therefore, due to the speed and capabilities that technology offers the user, it occupies more and more of the time and the intellectual skills of employees within the organization used in the case study. Technology is a tool for staff to visualize an idea. The research results underline that technology is used to visualize an idea, and employees tend to use it after having an excellent view of what they want to achieve. Technology is used for developing and searching for new ideas (Lamporoulis, 2007). Following the previous findings, an important conclusion derived from the data is that technology is used for developing and searching for ideas and not as the main way of perceiving a new idea (ibid). Cultural space and technology enhance the knowledge process.

Becerra-Fernandez (2000) presents an alternative example of a people-finder system. Software based on expert or knowledge-based systems and artificial intelligence (AI) supports knowledge management (KM). Ghani (2009) states that KMTs have become valuable systems for managing complicated work operations and practices without mental and physical tools. The system software is essential for managing information and knowledge in university library institutional repositories. The system, subject, and objects are characteristic of library and information services, which assist librarians in their day-to-day activities/operations. Therefore, these three factors are considered for enhanced university library operations to fulfill the organizational goals of teaching, learning, research, and community engagement (which is why the library was established). The assumption is that university library services are a characteristic practice in librarianship that cannot be performed in a vacuum. Instead, it requires the support of the subject (librarian), who must strategically apply basic systems (KMTs) to manipulate the object (activities) in library practices of meeting different users' information needs and supporting the goals of the institutions.

According to Raja (2016), Dalkir (2011), Ghani (2009) and Rao (2005), Kayisire and Wei (2016), and Munyengabe, Yiyi, Haiyan and Hitimana (2017), the use of any technological tools or systems depend mainly on the software that drives its application for quality service delivery. Librarians perform different operations and services, such as web-based information technology, learning systems, expert systems, communication and collaboration systems, teleconferencing, video-conferencing, chat, information management (IM), forum, Listserv,

groupware, workflow management system, decision support system, documents management system, management of electronic documents, knowledge mapping tools, social network analysis, face-to-face facilitation, data warehouse, groupware, and knowledge portals, among many others (Ghani, 2009; Massingham, 2014). KMTs are system software that helps to download, retrieve, repackage, and digitize information and knowledge for diverse purposes in university libraries because not all library activities/operations are the same, as some require the extra effort, knowledge, skills, and tools to create, codify and harness ways of best practices. Based on the analogy above, the author felt that applying KMTs in university libraries' practices is essential. The current trend of operations in most organizations today requires information technology (IT) (Ghani, 2009). Therefore, the need for the availability and use of KMTs to support and strengthen university library operations becomes crucial. The authors of this study aspired to make university libraries a corridor of excellence in KM.

Managing library operations of traditional and online services has become more complex due to diverse users' information needs and the proliferation of information on the internet. This has now enforced the use of different KMTs in university libraries to avert the impression that university libraries are ineffective. The traditional and online services, which include cataloging and classification, reference services, bibliographic search, storage, preservation, and retrieval of information and knowledge, require better quality processes, skills, and tools for better service delivery (Jantz, 2001). The competencies policy that would guide users in coping with using KMTs in university libraries is fundamental. The competencies of librarians cannot be isolated when there are no KMTs available, accessible, and used in university libraries. The processes involved in managing information and knowledge in university libraries take on different formats of cataloging and classification before they are preserved in databases or institutional repositories. Over the years, ICT tools have been used in management operations in university libraries. However, KMTs are gradually becoming ICT tools in application and operations in university libraries. This could be because, unlike KMTs, some of the ICT tools, such as printers, computers, telephones, scanners, modems, and CD-ROMs (Enakrire & Ocholla 2017) are responsible for generic operations.

The application process and operations require system and application software to harness and retrieve certain information from the university library databases. Therefore, the need to understand KM, where KMTs are embedded, brought, and continues this debate, as different schools of thought addressed different perspectives of subject background and what they intend to achieve (Ghani, 2009; Massingham, 2014). As the authors of this paper understand the principles surrounding the processing and management patterns of information and knowledge in university libraries, they believe that with all the attributes associated with KMTs, its availability and accessibility in university libraries would not only transform library products and services but would also make its management operations/functions proactive and stable with the available and accessible system software in place.

Ghani (2009) argues that when the wind of KM was first heard and later introduced in corporate organizations in the 1970s/1980s, the concern was based on the convergence of several factors. First, it was based on intellectual and practical innovation that could lead to securing life performance. This became rooted in corporate organizations to address managerial operations of data and information collated for decision-making and planning for the organizational goals (Ghani, 2009). Studies by Massingham (2014), Andreeva and Kianto (2012), and Massingham (2014) suggested that since KM has the strategies and potential to

capture, create, retain, store, share, and manage information and knowledge to a great extent, its application to organizational processes becomes necessary. The goal was to achieve results and performance among colleagues in the organization. Ghani (2009) reflects on using KM to manage the capability or assets/resources of land, capital, and labor needed for organizational growth. The emphasis made by Ghani (2009) was that, since KM has this kind of potential, it would be interesting to see if university libraries could embrace its application to the management of many volumes of information acquired daily, especially in Africa (Asogwa, 2012).

Studies by Koloniari and Fassoulis (2017), Mavodza and Ngulube (2011), Folorunso, Bamidele and Adegbilero-Iwari (2015) and Wen (2005) emphasized the importance of KM in making university libraries' work performance more effective through the opportunities it offers. These opportunities are associated with how KMTs manage explicit (books/print documents) and tacit knowledge of the librarians to ensure that users' information needs are met. Since KM has helped to coordinate and manage every operation in university libraries today, as stipulated by authors, the use of KMTs, as interior peripheral/system software of KM becomes essential. Based on the earlier debate on KMTs, Massingham (2014) alludes to why its relevance cannot be underestimated as system software. They help to download, retrieve, store, preserve, protect, and retrieve information and knowledge stored in databases or institutional repositories. Dalkir (2011) refers to KMTs as essential components that reduce the time and cost of development in organizational performance.

Most organizational systems have used KMTs to capture staff members' profiles as metadata, which can be harvested when needed. The initiatives or ideas surrounding using KMTs are tailored toward the application and system design of program software. This could not have been feasible without tacit knowledge initiation and application. Based on this immense analogy, the author of this paper envisages that carrying out research of this nature becomes essential, as the use of KMTs in the university library environment supports data, information, and knowledge repackaging in the institutional repository. The onus is on librarians to determine if the KMTs are available, accessible, and can be used for proactive discharging of organizational work performance.

KMTs, as used for different operations and services in university libraries, resulted in the application of certain strategies of tacit knowledge. The authors apply this through codification and personalization of the processes and technologies of ICTs (Hovland, 2003). Fombad (2018) notes that KM strategies are important to organizations for various reasons. The KM strategies support converting data and information from their current state to where they can be stored and retrieved for organizational objectives. Fombad (2018) further notes that the codification and personalization process includes how the data and information must be appropriately classified. Such data and information are personalized to users or individuals as key features of KM strategies in the university libraries system. The authors of this paper established that, through the sharing of knowledge, librarians can actualize the management of data and information through KMTs available and accessible in university libraries. The availability and use of KMTs are not satisfactory if librarians who must carry out the operations are still unprepared. Therefore, librarians must attempt a diverse exposition of knowledge acquisition and skills training to create such an environment to incorporate it into university libraries.

Materials and Methods

This study adopted the quantitative and qualitative research approach and applied the survey design. Kumar (2005) alludes that the quantitative and qualitative research approaches are important in any research investigation. Most importantly, qualitative content analysis is fundamental in collecting valuable information as the information is the primary source in research practices. This allows the researchers to be well-guided when searching for relevant information supporting the phenomenon under investigation. In this study, the quantitative approach used a survey design guided by a questionnaire to collect data from respondents from the selected university libraries in Nigeria and South Africa. The qualitative approach used interpretive document analysis harvested from different online databases to support the quantitative data collected from respondents. The population of the study comprised 132 librarians, 77 from Nigeria and 55 from South Africa, across the selected libraries of the University of Ibadan, the University of KwaZulu-Natal, the Federal University of Technology Akure, Durban University of Technology in Durban, Delta State University in Abraka, and University of Zululand in Kwadlangezwa. The small population led to the author using the entire population as a sample.

The purposive sampling technique was used to select these institutional libraries for certain reasons, while the author selected the various institutional libraries. First, it was noticed that the University of Ibadan and the University of KwaZulu-Natal were among the early-generation institutions. Secondly, the Federal University of Technology and the Durban University of Technology are both technology-based universities. Third, Delta State University and the University of Zululand are rural-based institutions. The study also considered specific and generic work operations of librarians, which necessitate the use of KMTs in managing information and data in their various institutional repositories and databases. These were among the first set of libraries established in southern Nigeria and KwaZulu-Natal, where the study was done. These libraries support the education and training of different calibers of individuals who want to venture into diverse careers or professions; therefore, practical contribution to quality service delivery in these libraries becomes essential. The research growth in terms of visibility and outputs of the institutions is well known in South Africa. These institutional libraries promote the use of diverse KMTs in their job specifications to meet global trends. They are supported by their parent bodies and the South African government with adequate.

With the available staff population, the researchers applied the descriptive design for this study. In the descriptive design, a questionnaire relating to the identified objectives was developed to guide questions raised in the questionnaire for respondents. The questions raised related to KMTs and areas of application in university libraries, functions/uses of KM tools for management operations in university libraries, the extent of accessibility of KMTs in university libraries, and a comparison of accessibility and use of KMTs in university libraries. These were what informed the construct of the study. The Likert scale of percentage was used in this study, and they were data personally collected by one of the researchers who traveled to the sampled university libraries to meet with librarians. Before these visits, respondent consent was acquired by sending a permission letter to sample institution university libraries. After obtaining approval, the researchers identified a day suitable to reach the respondents before embarking on the research trip. The collection of data from respondents took three to four weeks. The collected data were coded and tabulated through descriptive and inferential statistics. Results obtained in the analysis are presented in the tables below.

Results

This section deals with the results of the four objectives mentioned in the research paper.

The results in Table 1 indicate that there were more librarians in the Nigerian university libraries sampled (University of Ibadan library (29: 44.1%), Federal University of Technology library (16: 24.4%), and Delta State University library (32: 58.5%) –when the study was carried out than in its counterparts in South Africa (University of KwaZulu-Natal library (28: 42.4%), Durban University of Technology library (18: 37.2%) and University of Zululand library (9: 13.5%). This could be because more Nigerian librarians participated in this study, possibly because some were on leave and others were unwilling to participate in the survey in the sampled university libraries. Having lived in both countries, the researchers applied an observatory method, which indicated that Nigeria had more universities, thus leading to more university libraries and librarians to cater to users' information needs.

Table 1
Librarian's Profile in University Libraries in Nigeria and South Africa N=132

Demographic data in university libraries in Nigeria and South Africa												
Countries Nigeria (77) South Africa (55)	University of Ibadan Library		Federal University of Technology Library		Delta State University Library		University of KwaZulu-Natal Library		Durban University of Technology Library		University of Zululand Library	
	F	%	F	%	F	%	F	%	F	%	F	%
Librarians	29	44.1	16	24.4	32	58.5	28	42.4	18	37.2	9	13.5
Total	29	44.1	16	24.4	32	58.5	28	42.4	18	37.2	9	13.5

Data from two countries' university libraries

KMTs and areas of application in support of university library operations

In this section, respondents were asked to indicate the KMTs and areas of application in support of university library operations. Findings presented in Table 2 suggest that various KMTs such as decision support systems (65%, Nigeria), (SA, 59%); Word processors (89%, Nigeria), (SA, 75%); search engines (84%, Nigeria), (SA, 93%); semantic web (68%, Nigeria) (SA, 69%), information retrieval tools (83% Nigeria), (SA, 96%) among others were applied in university library operations. It can be deduced from the findings that indexing and abstracting, Barcode readers, Web portals, information retrieval tools, search engines, and word processors were among the top KMTs mostly applied in different areas of online databases, bibliographical search, information services, research, and development, in-house service and training, seminar/workshop and conferences, teaching to newly admitted users.

Table 2
Kmts and Areas of Application in University Libraries

Knowledge management tools	Nigeria (%)	South Africa (%)
Decision support systems	65	59
Word processor	89	75
Search engine	84	93
Semantic web	69	69
Artificial intelligence tools	60	78
Simulation tools	67	78
Data mining	58	65
Information retrieval tools	83	96
Electronic data management systems	74	78
Database management systems	77	82
Data warehouse	76	62
Content management systems	67	78
Management information systems	75	80
Web portals	94	90
Site maps	69	29
Barcode reader	78	78
Indexing and abstracting	80	93

NB: Table values are the percentage of the sample for each university or country

❖ **Researchers' analysis**

This study corroborates Enakrire's (2017) KMTs application in university libraries. The areas of KMT application differ from one university library's operations to another. Most KMTs found in existing literature cut across search engines, the Semantic Web, information retrieval tools, electronic data management systems, database management systems, content management systems, barcode readers, web portals, and indexing and abstracting. The need to use KMTs arose based on the support of service delivery carried out at the circulation desk, in serials, and the technical service division, known as behind-the-scenes activities. The KMTs supported the preservation of theses and dissertations stored in institutional repositories and other databases used in online public access cataloging, among others. The service delivery was meant to manage specific and general university library operations. Therefore, planning to acquire KMTs becomes crucial for university libraries, especially in this era of digital technologies and the fourth industrial revolution.

The authors felt the need to create awareness of the various services KMTs offer, especially to university libraries that have yet to embrace its use. Certain factors, such as availability of funds, technical expertise, and policy, could be attributed to its functionality in any context. Nevertheless, it is believed that when budgetary allocation is improved for university libraries, especially in Africa, consideration to acquire KMTs in university libraries becomes a norm. The authors suggest that, due to the evolving nature of library operations in this digital technology era, developing system software of KMTs becomes fundamental. Based on the analogy above, the authors suggested that technological growth, development, and costs could be the reason some of the KMTs are not available in the university libraries mentioned, especially in Nigerian university libraries. Newer technologies of artificial intelligence,

robotics, nanotechnology, smart boards, tablets, smartphones, and Windows 10 have also overtaken old ones in the facilitation of the management of library operations in university libraries. Rao (2005) refers to the KMTs of web portals, knowledge-based engineering, the World Wide Web, data mining, OLAP, document management systems, retrieval systems, and search engines as fundamental in operational service delivery among librarians.

The set of KMTs is already operational in the developed world. However, many African university libraries still struggle to acquire them due to limited budgetary allocation and diversion of funds to irrelevant things. The value placed on university libraries based on transforming procedures, data, information, and knowledge resulted in the use of KMTs in the developed world. The value of KMTs in managing data, information, and other records in university libraries was vested in capturing and re-using information and knowledge through different research techniques (Dalkir, 2011). The usefulness of KMTs also allowed various institutions, such as those operating in the health, genomics, proteomics, pharmaceutical, and biotech industries, among others, to understand how the tools can be used to discover initiatives and capture data in the development and implementation of workable systems (ibid).

Functions/uses of KMTs for management operations in university libraries

In this segment, respondents were asked to mention the functions/uses of KMTs for management operations in university libraries. Findings in Table 3, which reflect on the functions/uses of KMTs for management operations in university libraries, vary from one job description to another. It was revealed that KMTs can be used for management operations in diverse ways: (i) configurations of library operations where the new mechanism is proffered (80% (Nigeria) and 90% (SA), (ii) advancement of policy-making and succession planning in university libraries (86% (Nigeria) and 75% (SA), (iii) maintenance of web-based information and university library sites (88% (Nigeria) and 91% (SA), (iv) managing of electronic documents stored in the university library databases and institutional repositories (81% (Nigeria) and 79% (SA), (v) social networking among colleagues (75% (Nigeria) and 70% (SA), (vi) collaboration and support for teaching, learning and research (87% (Nigeria) and 79% (SA), (vii), systems analysis; monitoring of documents, and solve problems (80% (Nigeria) and 81% (SA). These findings corroborate the study by (Enakrire, 2017) where issues of ICTs and KMTs were discussed. It can be noticed from the above that, without a functional university library with adequate information and other resources to include KMTs, the library cannot support its parent body's primary objectives. Considering the multifarious information and knowledge, the modern digital era's KMTs have become peculiar.

Table 3
Function/Uses of Kmts for Management Operations in University Libraries

Function/uses of KMTs for management operations	Nigeria (%)	South Africa (%)
Configurations of library operations where new mechanisms are proffered	80	90
Advancement of policymaking and succession planning in university libraries	86	75
Maintenance of web-based information and university library sites	88	91
Managing electronic documents stored in the university library databases and institutional repositories	81	79
Social networking among colleagues	75	70
Collaboration and support for teaching, learning, and research	84	79
Systems analysis, monitoring of documents, and solving problems	80	81

NB: Table values are the percentage of the sample for each university or country

❖ **Researcher's analysis**

Ghani (2009) and Massingham (2014) mentioned other forms of activities with which KMTs could support university libraries, which include adapting to environmental changes, comprehension and learning interface among librarians, and curation and repackaging of information and knowledge for service delivery to users. Based on the author's exposition and experience regarding library practices, the issue of knowledge and skills of librarians becomes imperative, as without librarians with the necessary technical expertise, operating the KMTs could pose a challenge to users' information needs (Ghani, 2009). To grasp the use or functions of KMTs, librarians nowadays must be trained in as many technological tools as possible. Due to the compatibility of KMTs, applying them is a considerable challenge. For instance, based on the personal experience of the author, when he bought a new Apple tablet, it took a while to learn some of the features in the system, unlike the former Windows 7, 8, and 10 that he used for over ten years. Therefore, while considering using KMTs to manage specific to generic operations in university libraries, it must be regarded as training information professionals/librarians.

Continuous use of KMTs is also essential; if librarians use KMTs and leave them for a while, they forget how to use some of the applications and techniques involved. The librarians should always teach new users information literacy skills on searching and harvesting literature/documents from the library systems (Enakrire, 2017). This would assist users whenever they need to help themselves in another context. KMTs have become crucial in managing electronic information resources due to the nature of the software used in its application. The authors established that KMTs are now used globally in different university libraries and other corporate organizations to store, retrieve, and manage information and knowledge for decision-making and planning. The justification for using the KMTs is to improve research and development in university libraries such that improved knowledge sharing among colleagues is enforced. Professional librarians must share their knowledge daily to serve users' information needs better.

KMTs could also help librarians support academic staff in preparing their lecture notes. This would assist lecturers in teaching, learning, research, and community development by downloading lecture materials from online databases. KMTs such as word processors, search

engines, the Semantic Web, and information retrieval tools could support both librarians and academics in their research paper writing when harvesting data and literature from different databases such as Scopus and Web of Science. KMTs could enhance the nature of services rendered by university libraries, especially when users' information needs become complex and challenging to handle. The KMTs could be used to improve search strategies due to their usefulness, for example, using a thesaurus. The services of KMTs could stimulate how users and librarians could access stored and preserved information and knowledge in clouds and different databases in the university libraries (Massingham, 2014). For instance, when newly admitted students start their studies, they are expected to undergo an orientation program using the university library and its information resources. Still, without prior knowledge of any of the KMTs like search engines, web portals, the World Wide Web, data mining, OLAP, document management systems, and retrieval systems, users would continue to struggle to make use of the library and its information resources (Muhammad, Ibrahim, Bhatti & Waqas, 2014); hence, the orientation programs are necessary. A PowerPoint presentation on the various operations and activities of the program is offered to the students, which could expose the students to something new. Through KMTs, information and knowledge in databases, web portals, and institutional repositories can be downloaded, retrieved, shared, and re-used by students and academic information needs.

Meeting the users' information needs in university libraries becomes crucial since the students and academic staff are unsure where and how to go about their study needs. Librarians could also gather literature from online sources in pursuit of future self-development. Muhammad et al. (2014) established that KMTs are business intelligence operation tools. They are strategically utilized to inform the organization's tactical, strategic, and operational decision-making. Based on earlier discourse on KMTs, these authors emphasized that tacit (human brain/mind) knowledge in managing explicit (books, articles, and documents) knowledge is also essential. The tacit knowledge of the librarians relates more to use than even the KMTs, as without basic understanding of the knowledge applications, using KMTs in university libraries can be an unrealistic initiative. The author, therefore, suggests that while university libraries try to acquire KMTs, it is essential for professionals to develop the necessary skills and knowledge for its application.

The extent of KMTs accessibility in support of university library operations

The findings regarding the extent of KMTs' accessibility for management operations in the university libraries indicate that KMTs such as word processors, search engines, the Semantic Web, information retrieval tools, electronic data management systems, database management systems, web portals, barcode readers, and indexing and abstracting were more accessible in university libraries in South Africa than in Nigeria. KMTs were more accessible in the libraries of the University of Zululand, Durban University of Technology, and the University of KwaZulu-Natal (Enakrire, 2017). Widespread variance is believed to exist where KMTs are available. Importantly, what is unavailable cannot be accessed, as stipulated by the author. The analogy in this text was based on the authors' exposition and experiences working in the university environment. The authors emphasized that the possibility of KMTs' availability is dependent on the basis that it could expedite a stress-free environment for access to both librarians' and users' diverse information needs. Actions that should have taken librarians long to complete are made easy through the effort of system software embedded in KMTs.

For instance, if users were to come to the university library for any assistance through the support of KMTs, librarians could easily download and retrieve the relevant information and quickly attend to any of the users' needs, even if the user is not physically present. The author suggests that, in this era of digital technologies, users do not always have to visit the physical library building, as requests to the library can be made through different social media sites such as Facebook, email, WhatsApp, Twitter, LinkedIn, and others, and the services can be shared with them through their preferred medium. The university library could also support its users even if the required information resources are unavailable – it could be obtained from another university library through collaboration and cooperation of interlibrary loan services. In the fourth industrial revolution, university libraries could not function without the constant use of KMTs for quality service delivery. Laleye (2015) asserts that certain KMTs are more specific for certain work operations and educational training than others. Therefore, having access to them becomes inevitable in functional library systems.

Comparing accessibility and use of KMTs in support of university library operations
In this section, respondents were asked to compare the accessibility and use of KMTs in support of university library operations. The finding in Table 4 indicates that the comparison of accessibility and use of KMTs in the sampled university libraries cannot be undermined. The result revealed in Table 3 of the inter-country comparison of accessibility and use of KMTs in university libraries is that the use of KMTs was higher in South Africa (97%) than in Nigeria (76%). This implies that KMTs can be accessed and used more in university libraries in the South than in Nigeria. This could be attributed to the provision of funds to acquire KMTs by the different institutional bodies in South Africa; hence, its accessibility and use in management operations in their various university libraries are high. The most-accessed and most-used KMTs in both countries were: word processors: 86% (Nigeria), search engines: 96% (SA), semantic web: 68% (SA), information retrieval tools: 91% (SA), electronic data management systems: 76% (SA), database management systems: 77% (SA), data warehouse: 67% (Nigeria) 65% (SA), content management systems: 66% (Nigeria) and 74% (SA), management information systems: 75% (Nigeria) and 81% (SA), web portals 79% (Nigeria) and 79% (SA), site maps: 66% (Nigeria) and 69% (SA), barcode reader: 75% (Nigeria) and 87% (SA), indexing and abstracting: 83% (Nigeria) and 79% (SA).

Table 4
Inter-Country Comparison of Accessibility and Use of Kmts

Types of knowledge management practices	Nigeria (%)	South Africa (%)
Decision support systems	60	49
Word processor	86	60
Search engine	86	96
Semantic web	66	68
Artificial intelligence tools	50	53
Simulation tools	46	50
Data mining	50	60
Information retrieval tools	87	91
Electronic data management systems	70	76
Database management systems	75	77
Data warehouse	67	65
Content management systems	66	74

Management information systems	75	81
Web portals	79	79
Site maps	66	69
Barcode reader	75	87
Indexing and abstracting	83	79

NB: Table values are the percentage of the sample for each university or country

❖ **Researcher's analysis**

Interestingly, at 86%, word processors came out top in Nigeria. One wonders why this is the case, as a word processor is accessed and used worldwide. Likely, Nigeria's population, which is over 200 million people (National University Commission, NUC[1], 2020) could be a factor necessitating the use of word processors in their various organizations. South Africa has a population of about 58 million (SA Statistics[2], 2020), which would account for the lower use of word processors. However, the use of other KMTs, which appear more in South Africa, could be attributed to South Africa being a country with an influx of digital technologies provision in all institutional libraries. The provision was based on policy implementation relating to budgetary allocation to higher education institutions in South Africa, which was not the case in Nigeria. The justification was based on an observation by the authors having studied, worked, and lived in both countries for over eight years (South Africa) and Nigeria for over thirty-five (35) years (since birth). It can be noticed that, in comparison, the KMTs were meant to serve different types of service delivery from the curation of data to downloading of materials; storing information, theses, and dissertations in databases and the university institutional repository; maintenance of the university websites; training of staff and students, to mention but a few.

Discussion

This study considered the large and diverse nature of services rendered to users in university libraries globally. No university library can survive without the support of KMTs in the present information and knowledge economy. The infusion of KMTs is becoming more intriguing due to the expansion and transfiguration of diverse general and specific information services; librarians are confronted within most university libraries globally. The infusion of KMTs into service delivery of acquisition, processing, and storing is a necessity considering the increasing daily information needs of users in university libraries, especially in developing countries. KMTs are fundamental in present-day university library practices, especially if such a library wants to remain active (Dalkir, 2011). KMTs help advance and validate the actualization of management operations in most library practices worldwide (Enakrire & Ocholla, 2017).

The dependency on management operations is largely attached to the tacit knowledge application of information professionals. Tacit knowledge is that knowledge resident in librarians' intellect, which should be applied for better workflows in the library environment (Schrijver, 2021). Literature sourced in this study established that there are no university libraries in the world that can function adequately without KMTs because some regions of operations, such as downloading, retrieval, sharing, and re-use of data and information stored in databases, web portals, and institutional repositories need KMTs to take place. These platforms require certain KMTs before they can be operated. The demand in this area of work operations and practices is difficult to manage if the appropriate tools, techniques, and knowledge are not applied; hence, KMTs become the solution. In some situations, critical thinking application of skills and expertise of librarians becomes pivotal in managing daily

routines within the library environment.

This study is imperative because availability is subject to use, and what is not available cannot be accessible. The study identified word processors, search engines, the Semantic Web, information retrieval tools, electronic data management systems, database management systems, content management systems, barcode readers, web portals, and indexing and abstracting as KMTs in both countries' university libraries sampled. It became clear that the varied KMTs supported the distinct tasks of coding, advancement in policymaking, succession in the library, maintenance of web-based information and university library sites, and many others. The authors opine that these were the collaboration of librarians' efforts to maintain quality service delivery. The accessibility of KMTs in university libraries is based on provisions in terms of budgetary allocation. This provision surrounds policy implementation and staff training in how the tools can best render quality services. It can be observed through inter-country library comparison that were more KMTs available at the Universities in South Africa than in Nigerian university libraries (Enakrire, 2017).

The study implies that KMTs have become a panacea through which information and knowledge are preserved in university libraries. The correlation between accessibility and use of KMTs continues to evolve, where without accessibility, use is unexpected. Information service delivery is based on the availability and use of resources (materials and humans). Therefore, in comparing South African and Nigerian university libraries, the provision of financial resources to acquire every facility needed to carry out their job specifications was feasible from the South African government, compared to Nigeria, where most of the budgetary allocations were diverted and policy not implemented. The expectation of users and librarians across both countries' university libraries is that service delivery is measured on resource provision/availability and use. Therefore, without adequate availability and use of KMTs, satisfaction by librarians and users cannot be attained. KMTs have positioned university library operations so that electronic information resources are safeguarded from external users who do not have permission to do so. This attribute to the software used in protecting the information resources during the preservation phase. Nevertheless, applying knowledge and skills is fundamental in using KMTs in the present digital era.

While evaluating the results obtained from this study, the authors reaffirm the metacognitive ability of librarians/information professionals always to apply their tacit knowledge, as that is key to using any KMTs, irrespective of the library they find themselves in. The metacognitive ability of librarians borders on their willingness to do self-development in acquiring more knowledge and skills due to the ever-changing world they find themselves in; otherwise, time will overtake them. There are several information professionals today who are not willing to advance from their present situation to a context in which users' information needs have become more diverse and complex, requiring the application of their metacognitive ability to think out of the box to evaluate what needs to be done in responding to the present needs of their organizations. The issue of policy affirmation is also significant, even though specific resources are available and can be used in university libraries. This was the author's experience in most organizations he has worked in. What does the policy in the specific organization say and how has it been carried out? The policies about certain issues merely exist but are not affirmed. Without this affirmation, Africa as a continent would not be where it is today. This also applies to many university libraries the author has worked in and visited.

Conclusion

It can be deduced from this study that the availability and use of technological tools are of the highest concern in organizational growth and sustainability. This is subject to budgetary allocation and policy implementation. However, several instances have shown that in Africa, priority is not given to funding organizations, resulting in a lack of facilities and resources for quality service delivery. The fact that more KMTs were available and used in university libraries in South Africa than in Nigeria indicates that policy was maintained. With the availability and use of KMTs, library operations would improve in both countries' university libraries. It was predicted that university libraries would be readily accessible to users' information needs when the provision of funds, qualified personnel, and technological tools were aligned with organizational goals.

This was based on the authors' exposition and experiences in facilitating the processing, storage, and retrieval of information and knowledge through the effort of librarians' tacit (human brain/mind) knowledge. The study contributes to filling the knowledge gap in KMTs in the context of both countries' university libraries. There is a need for reskilling in the application to use recent KMTs among young professionals who have just entered the library profession. Benchmarking in the application of KMTs in other libraries is essential to maintain local and global practices of library operations and quality service delivery. The findings of this study could further be expanded to the efficacy of KMTs in storing and preserving information and data in higher education institutions because of their usefulness in managing information in an institutional repository. On this note, the study recommends the acquisition of more KMTs, such as artificial intelligence and simulation tools, which could address specific operations for service delivery and reskilling of librarians in how to use these tools.

Endnotes

1. https://www.nuc.edu.ng/wp-content/uploads/2020/08/MB-17th-Aug-2020.pdf
2. https://www.statssa.gov.za

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