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Digitization for libraries in Kenya

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DIGITIZATION FOR LIBRARIES IN KENYA

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Contents

Abstract 4
Introduction 5
Key concepts in digitization 5
Status of Digitization in Africa 7
Relevance of digitization for libraries 9
Libraries in Kenya 10
The status of digitization endeavors in Kenya. 11
Digitization for libraries in Kenya 13
Challenges faced by individual libraries 16
Cost 17
Skills and Training 18
Users 18
Time 19
Content 19
Describing collections and adding metadata 21
Handling documents 21
Copyrights 21
Fast changing technologies 21
Staff Retention 21
Way forward 22
Collaboration 22
Standardisation 22
Copyright 22
User orientation 23
Training 23
Creating the information infrastructure at government and institutional level. 23
Continuity of digital collection. 24
Conclusion 24
References 25
Appendix 27
Survey Questionnaire 27

List of Figures

Figure 1: Library cluster represented in the survey. 15

Figure 2: Types of online material found in the sampled libraries 16
Figure 3: Category of users in 20 libraries from the sample group 11
Figure 4: Type of digital material in the sampled libraries 20

List of Tables

Table 1: Problems encountered in the establishment of IR 17
Table 2: Library management support of IR in 26 KLISC member libraries 18

Abstract

It is now over 10 years since the first online library service was introduced and much has happened to make digital collections a norm, not an exception. Libraries and archives have had to embrace ICT to keep abreast of user expectations, habits and global trends.

Setting up of digital collections in Kenya has generally progressed more slowly than in other countries in Africa and the rest of the world. The progress made to date might be good, but the pace is not impressive. This is particularly worrying if measured against the developments of other libraries globally. Initiatives for library digitization are patchy, with academic and research institution libraries showing greatest advances.

The status of digital libraries and the challenges that digitization presents, based on the literature and findings of a study, are mentioned. A proposal for the way forward, despite the hurdles, is presented at the end.

Introduction

Online library services which began with online catalogues in the 1990s were not web-based and therefore required the catalogue software to run interactively across the Internet using various protocols. World Wide Web and hypertext-based catalogues became available by 2000 and it was then that libraries began to include in their catalogues digital resources held within and outside of their collections. Singh, Mittal & Ahmad (2007) point out that universities and other institutions started to build discipline-based collections of information resources in digital form. Access to these collections was provided through local and wide area networks. The emergence and development of the Web allowed developers to provide universal access to digital libraries.

Digitization of libraries in Africa has over the years been mostly associated with academic institutions, which are known for producing documentation as a result of research and studies conducted as a requirement of the academic process. The progression to other sectors which have information stored or generated as records that should be conserved for future reference or safe keeping, has seen more stakeholders getting involved in the development of policies and guidelines for effective information management. Digitization of information materials is therefore a subject that has attracted interest and much discussion from information professionals from all sectors. Libraries, archives and record centres in Africa have to contend with new technologies and trends for effective management of information.

Before we proceed, it is important that we understand what digitization is to the library and the concepts associated with digital libraries. Some of these may be applicable to archives, museums, record centres or information repositories.

Key concepts in digitization

Digitization

Some materials in a digital library are "born digital", that is to say they were created, and are always used, in digital form. But much digital library content has to be created by a process of digitization. Digitization is converting print-on-paper resources to digital form, usually by scanning.

Digital libraries

Digital libraries have also been referred to as electronic or virtual libraries. They are libraries without walls since they do not exist in physical form and information in the digital library is not found on print. According to the United Nations Food and Agriculture Organization (FAO 2010), the digital library is "a managed and organised collection of information resources, preserved for a long time, with associated user services, where the information is stored in digital format, and accessed over a computer network".

The National Library of Australia defines it as "an electronic information access system that offers the user a coherent view of an organized, selected and managed body of information. It is an environment that brings together collections, services and people in support of the

full life cycle of creation, dissemination, use and preservation of data, information and knowledge"(FAO, 2010).

Another definition, selected from three definitions given at a seminar held in Humboldt University, Berlin for students, is that it is "an electronic product of software that contains both primary data and manually created or manually proofed metadata. The primary data can be either thematic or collections-based and must constantly be maintained. A digital library also includes the three main functions of a traditional library: cataloging, long-term archiving, and access" (Seadle & Greifeneder, 2007).

Borgman (1999) summarises the definition well. She defines digital libraries as "a set of electronic resources and associated technical capabilities for creating, searching and using information."

The components common to most of these definitions that describe the digital library are:

- organized information collections;
- electronic or digital form;
- preserved information; and
- online access.

Most libraries today are hybrid libraries. They have both physical and digital collections, and provide services both digitally and in a physical library place.

Library portal

This concept is sometimes confused with the digital library. A portal is an interface to all the digital information resources available in the library to the users. It is a "gateway" that gives access to the library's own digital collections and to material from other library collections, or web search engines.

Digital repository vs. institutional repository

A digital repository is an organised store of digital information items whereas an Institutional Repository has more specific features. This is a specialised form of digital library, managed by an organisation to make all its own digital materials available. For example, a university library might run a repository for all the articles and reports written by professors at the university. Because the materials in this kind of repository are freely available to anyone, they are sometimes called "open access archives".

Digital Library Management System

A digital library management system (DLMS) is a software system which provides the functions of creating and managing a digital library collection, and providing services for its users. These systems usually allow specialized software to be added to meet particular needs.

Such systems may be sold by commercial suppliers, or may be built around standard repository software such as Greenstone, DSpace, EPrints, Fedora or WebAGRIS. These five

are free open source systems for managing digital libraries and repositories. It takes some programming knowledge to set and customize most of these open source systems. The library can buy a commercial software package, if funds are available, and if there is a reason to do so; for example, if other cooperating libraries use it, and for the sake of consistency. CONTENTdm digital library software and ExLibris DigiTool commercial repository software are two examples.

The other alternative is to write or develop own software, tailor-made for the library. This is a major task that may not be worthwhile, since free and open source systems can be modified to suit a library's specifications.

Adobe Acrobat Reader, which is freely available software, and Windows-based MicroSoft Access and Excel, have been used in creating and managing digital collections.

Digital preservation

Digital preservation involves all the activities undertaken to ensure that digital information is maintained for as long as it is needed. Digital information should remain available in its original form for the stipulated time.

Access rights

In the digital library, contents are usually licensed and different users may have access to the same materials. There is need for controls to monitor usage and counter misuse so that there is fair use of authors' intellectual output. Librarians need to ensure that users have access to information which they are entitled to and no more.

Metadata

Metadata is data about data. It is the information about information resources. This includes:

- description of the item, i.e. physical description (format, size) and subject or topic;
- author, title, publisher, date of publication;
- preservation or archiving information; and
- access information and copyright.

Metadata standards and guidelines are commonly sought when planning digitization projects. Common metadata standards used to date in libraries are Dublin Core, Resource Description Framework (RDF), Encoded Archival Description (EAD), Text Encoding Initiative (TEI), and Standard Generalized Mark-Up Language (SGML) and its descendents Extensible Mark-Up Language (XML) and HTML. The MARC standard has been used as the standard interchange format in representing catalog records electronically.

Status of digitization in Africa

Digitization is a topic that is on the agenda of most forums for librarians and archivists, as a tool for enhancing the capture, dissemination, retrieval, storage and preservation of information. Digital libraries in Africa have been in existence since 2000. They fall into two

categories, those built for Africa, i.e., with African content or intended for Africa scholars, and digital libraries established by African institutions.

Digitization for Africa

There are many examples of digital libraries that have been built with African content, both full-text and metadata or databases, not solely by African institutions or libraries. The eGranary Digital Library which is based at the University of Iowa and founded in 2001 is one example. Its objective is to provide e-resources offline via intranets to African institutions lacking fast Internet access. The eGranary is installed in more than 300 educational institutions in developing countries and in Africa over 15 countries, including Kenya, have subscribed to eGranary (University of Iowa, n.d.).

Another example is the African Online Digital Library which was developed with partners from Michigan State University with the aim of providing a fully accessible online repository of multilingual, multimedia materials (Limb, 2005; Matrix, n.d.).

Limb (2005) states that "journal publications have seen the most effective and popular developments" in the digitization of information materials in Africa. He cites the escalating price of scientific and technical journals, which remain the bedrock of research, as having contributed significantly to the educational crisis in Africa.

The Essential Electronic Agricultural Library (TEEAL) was developed to counter this problem. Its database was produced in CD-ROM format and made available only to developing countries. TEEAL was superseded by a portal, Access to Global Online Research in Agriculture (AGORA), which provides free access to more than 1500 journals to institutions in eligible developing countries. AGORA was launched in October 2003 under the auspices of the United Nations Food and Agriculture Organization (FAO, 2011). Its collection contains information in the fields of food, agriculture, environmental science and related social sciences.

African Journals Online (AJOL), a not for profit organization based initially, from May 1998, at the International Network for the Availability of Scientific Publications (INASP) in Oxford, but relocated to South Africa in 2005, has successfully promoted African journals and helped develop technological skills through management and training workshops on digitization (AJOL, n.d.).

Digitization by Africa

Due to limited financial resources, emerging models of digital-based learning combine commercial and open access. Many of the established digital libraries that have been built by African institutions have been supported financially or with the necessary human capacity by donors in the developed countries. This free or low priced e-journal provision has resulted in considerable growth in use of e-journals in Africa. International bodies such as UNESCO and the International Federation of Library Associations and Institutions, IFLA, have worked with Pan-African institutions like the Council for the Development of Social Science Research (CODESRIA) and the Association of African Universities, to help digitize journals for wider

access and preservation. INASP was set up by the International Council of Scientific Unions (ICSU) in 1992 and has helped to facilitate access to digital scientific literature and participated in various library automation projects.

Most African digital initiatives involve cooperation. For example, the Digital Imaging Project of South Africa (DISA) is a cooperative venture among South African librarians, archivists, and scholars. Another is Kwetu.Net, which has signed up African governments and universities as partners and has developed a full-text database on East Africa. The Database of African Theses and Dissertations (DATAD) project has shared new skills among a range of African universities and invited overseas experts to participate. By developing effective national and international partnerships, based on mutual benefit, projects maximize their potential (Limb, 2005).

In addition to full-text digitization projects, various African-based online bibliographic services have also been set up. Limb (2005) refers to *The Quarterly Index of African Periodical Literature* funded by the United States and produced in Kenya, as a good example.

Relevance of digitization for libraries

Digitization promises to transform the way libraries access, store, disseminate, and preserve information. Although preservation of historical resources is a primary goal for digitizing information material, the ultimate purpose of many digital projects is to provide greater access. Academic libraries digitize their collections in order to contribute to public awareness, education, and to further research endeavours.

Digitization of libraries at a national level in Kenya will

- improve and widen access to the collections of participating libraries. Whereas one copy of a document in hard copy format can only be read by one person at any given time, the electronic version can be accessed by multiple users at the same time;
- increase longevity of information material: since the information is electronic, damage and loss is greatly reduced. According to Fabunmi, Paris & Fabunmi (2006), many libraries digitize in order to preserve. Some materials which may be considered for preservation because they may be lost in the future are: old manuscripts, research projects, photo images, analogue maps, non-live musical recordings, government official gazettes and numerous other historical records;
- encourage and facilitate resource sharing amongst libraries: digital collections can be shared or transferred over electronic networks; this saves money and time. Users do not have to move from one library to another to look for information but can access collections of different libraries from one point;
- ensure standardization and conformity amongst libraries: collaborative and accountable efforts by libraries will automatically require that mutually accepted standards and guidelines are followed in setting up the digital collections; and

- reduce duplication of work: with improved access and access to a wider library collection, researchers and scholars can effectively review work that is already carried out by most of their peers.

Libraries in Kenya

Kenya has a large number of libraries in academic, research, private and public institutions.

Libraries in Kenya are located in

- Public libraries and archival institutions: Kenya National Library Services has libraries in various towns of Kenya, and these libraries are open to the public. The Kenya National Archives and Documentation Centre and Macmillan Memorial Library are also open to the public. There are several other private libraries, including the British Council Library;
- National research institutions: some of the most current research findings are found in research libraries, for example, the Kenya Agricultural Research Institute (KARI), the Kenya Forestry Research Institute (KEFRI), the Kenya Industrial Research and Development Institute (KIRDI), the World Agroforestry Centre (ICRAF) and International Livestock Research Institute (ILRI);
- Universities: there are over 20 universities in Kenya and these have libraries containing information to support the high level of research work done by students and lecturers;
- Middle level colleges, polytechnics and institutes of technology: it is a requirement, before accreditation is granted that this category of educational institutions has a well-stocked library that will support teaching and learning;
- Primary and secondary schools: libraries in schools are still small, with many restricting their collections to textbooks only. However, there have been positive changes in some schools in the cities as a result of lobbying from librarians who are advocating their development and upgrading. Examples of schools with modern libraries are Makini, St. Mary's and Riara schools in Nairobi.

The largest category of libraries in Kenya, both in number and size, is found in the education sector. Over all, university libraries have the most extensive information collections and users. KENET (2011) reports that "the universities have the largest collection of learning resources in libraries. It is estimated that, taken together, universities hold approximately 70% of all library resources in the country." The national body that brings library professionals together is the Kenya Association of Library and Information Professionals (KLA), formerly the Kenya Library Association which was registered in 1973. One of the KLA's objectives is "to provide a forum for communication and cooperation between information professionals and institutional members, at local, national, regional and international level "(KLA, 2011).

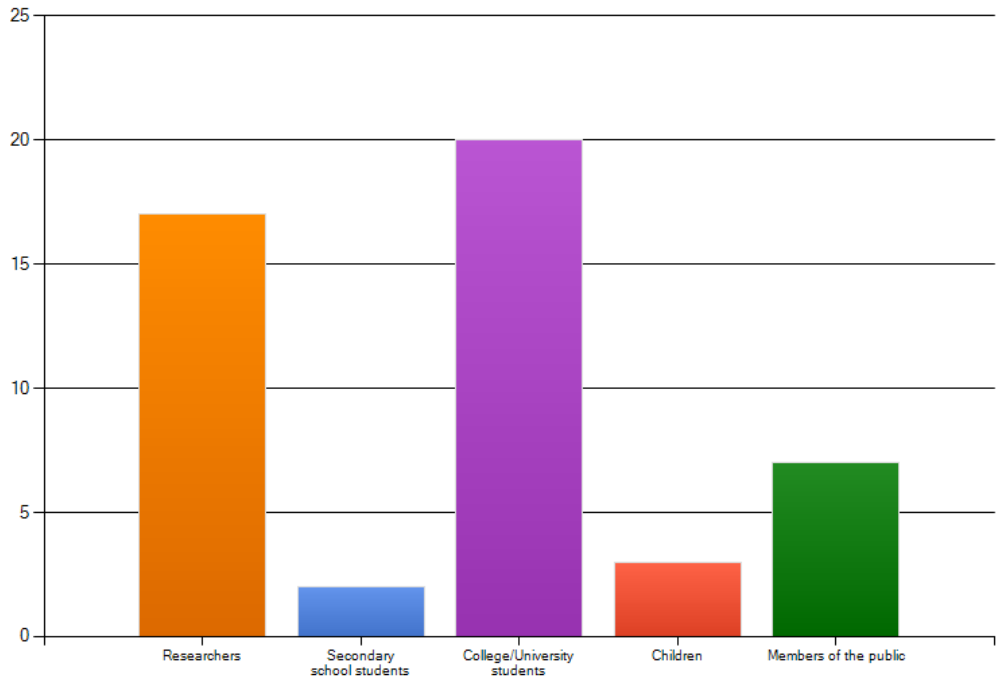


Figure 1: Category of users in 20 libraries from the sample group

Libraries from Kenya's universities and research institutions, and the public and national libraries further came together, driven by the rising cost of information resources, to form a consortium – the Kenya Library and Information Services Consortium (KLISC), whose main objective was to pursue collective subscription to electronic resources as a way of sharing and minimizing cost for individual libraries.

The status of digitization endeavours in Kenya.

In 2009, a land information management system was implemented in Kenya's Ministry of Lands. It was envisaged that many records in the ministry's custody would be computerised by the middle of the year 2010. The aim of this project was to make it easier for citizens to access information on land through the automated system without having to bribe clerks and pay brokers at the ministry. The project was sponsored in part by Sweden and was part of the centrepiece of the national land policy, which was approved by the Cabinet in June, 2009 (Mutiga, 2009). The Kenya ICT Board provided the infrastructure capacity support by funding and helping to implement a new banking hall. The ICT Board has also engaged university students in an outsourcing arrangement to prepare the lands records for imminent digitization.

To help in developing relevant local content for the education sector, the Communications Commission of Kenya (CCK) partnered with the Kenya Institute of Education (KIE) in 2008 in its programme for digitization of the Kenya Certificate of Secondary Education (KCSE) curriculum. The aim was to help enhance e-learning in the country and provide an incentive for teachers and students to access ICT services. Subsequently, the KIE digitized 11 subjects for the Form 1 class based on the Kenya Certificate of Secondary Education (KCSE) curriculum. The digitized subjects were then piloted in 20 schools in Kenya ("Digitization of

the Kenya Certificate of Secondary Education Curriculum,"n.d.). The KIE has to date managed to make great strides in developing digital content for Kenya's e-learning strategy. Workshops have been conducted with various stakeholders in curriculum digitization since 2009. The overall goal is to develop curricula for primary and secondary, teacher training colleges, technical and vocational training institutions, and adult and early childhood education.

Since Kenya's ICT sector is more active in urban areas, the government, in keeping with its Vision 2030, is tackling the regional disparity by setting up digital centres countrywide. This will ensure that more citizens will be exposed to ICT and hence help familiarize and educate the citizenry, who may not be captured as part of the education sector, on how to harness ICT to better their lives. The ICT Board through the Ministry of Information and Communication has set up pilot centres in Nairobi, Garissa, Kangundo, Meru and Malindi.

Preliminary findings from these centres are positive and this information is to be used to extend the project to other areas. It has so far been established that the centres require excellent broadband communication, technical support and effective marketing and service delivery. The Board is currently working with the Ministry of Nairobi Metropolitan Development to establish digital centres in the metropolis. So far 1000 people, in all constituencies, have been trained in entrepreneurship to prepare them to run digital access centres efficiently. The trainees will then have access to loans to facilitate them in establishing digital centres.

In 2010 the Board went further and launched *Tandaa* local digital content grants to support entrepreneurs in developing local digital content. Over 2000 people participated in the competition that ran from 3rd June – 19th July 2010. Fourteen companies and one individual emerged winners and were awarded grants to develop digital content. The grants sought to support products and services developed specifically for the Internet and mobile phones. This initiative, despite its limitations, is a positive move in encouraging the local population to develop local, relevant information. The participation of the entrepreneurs will ensure sustainability and continuity in the flow of information for the digital databases.

Another development that is part of the country's e-government initiative is the digitization exercise in the State Law Office Company registry, which resulted in the transformation, in May 2010, of 25.5 million paper records to digital format. Records from 1936 to date were scanned and the data captured, to make possible online searching of company names and information (Kenya ICT Board, 2011).

Google's ongoing global effort to bring historical and cultural heritage online has incorporated Kenya's initiative, "Open Access to Public Legal Information", into its programme. This is an initiative aimed at improving access to public information. Kenyans now have free online access to the Laws of Kenya, Judicial Opinions, debates from the Parliamentary Hansards, Legal Notices, Gazette Notices, Bills of Parliament and Treaties & International Instruments (National Council for Law Reporting, 2011). The digitization of more than 100 years of the Kenya Gazette was announced in April 2011, with free copies accessible via Google Books.

These are some of the notable achievements of the country in digitization at a national level. More companies from both the public and private sectors are moving towards electronic resources in order to keep up with trends and the competition. Despite these developments, there is still room for improvement especially where challenges arise through fear of change, negative attitudes or possible retrogressive norms and culture.

The creation, management and deployment of digital information material by different players reveal poor conformity and a lack of common standards or guidelines that would allow easy citizen access to information using current and emerging technologies. In considering the diversity of the institutions in the public legal information domain, it is felt that that there is a need to adopt a standardized technology platform that will improve data exchange, document life-cycle automation and standardized representations of data and metadata (IT News Africa, 2011). Though Article 35 of the Constitution of Kenya 2010 establishes the citizen's right of access to public information, actual access remains limited due to this and other reasons not discussed in this paper.

Standardization

Kenya's standardization body, the Kenya Bureau of Standards (KEBS) has intervened to solve the standardization problem by establishing a Technical Committee (TC) to help set standards for digitization of libraries, record centers and archives. The ISO TC46 SC11 Committee was established to set standards for digitization for libraries, record centres and the National Archives. The Information Science TC develops standards in Archives/Records Management which covers standardization of principles for the creation and management of documents, records and archives as evidence of transactions, covering all media including digital multimedia and paper, archives and records management. Other areas are Technical Interoperability, Quality -- Statistics and Performance -- and Identification and description.

According to KEBS, Standards enable new technologies to get to the market more quickly by clarifying fundamental questions of efficiency, sustainability and concerns about performance capability and reliability. Some of the standards that have been deliberated on by committee members drawn from both the public and private sector of Kenya's institutions have resulted in the *Digital records preservation - Where to start* guide. This was developed by members representing different countries worldwide within the Technical Committee's sub-group, the Implementation Guidelines for Digitization of Records Working Group. Other guidelines relevant to digitization are ISO/PRF TR 13028, *Information and documentation - Implementation guidelines for digitization of records* and ISO 13008 *Information and documentation - Digital records conversion and migration process.*

It is hoped that these standards will be implemented and the established guidelines enforced in the respective information centres so that there is uniformity and ease in conducting collaborative projects within libraries and archives. The standards will provide basic guidelines for information personnel embarking on digitization exercises.

Digitization for libraries in Kenya

Despite the zeal with which the government is supporting and implementing these ICT-related changes, the pace in digitization of libraries and national records offices and

departments still remains slow. There are various reasons for this and there is need for more action to ensure that libraries are incorporated in national digitization policies and plans.

Greenstone initiatives

When digital library software became available in the 90s, UNESCO encouraged its implementation in developing countries by making Greenstone, a digital library software package, available free of charge. According to the United Nations Public Administration Network, (2010), Greenstone was designed to raise awareness about the availability of public information that could be used to improve people's socio-economic status. The project initially generated over 1,300 documents that were intended for marginalized communities in the 10 participating countries. Links to these documents could be made from any library catalogue; some material could be downloaded and sent on CD-ROM to institutions with low bandwidth so that they could be then be hosted locally.

Initiatives for library digitization are widespread, with university libraries showing greatest progress. One major initiative was training organized by UNESCO in September, 2008, when the UNESCO Office in Nairobi facilitated a workshop on the Greenstone digital library software at the University of Nairobi. Twelve participants representing various academic libraries attended the workshop that targeted 20 participants who were to be mainly drawn from university libraries and the National Archives. The trained library staff were from Kenyatta University, University of Nairobi, Daystar University, Catholic University of Eastern Africa, African Nazareth University, United States International University, Jomo Kenyatta University of Agriculture and Technology, Nairobi Evangelical Graduate School of Theology, Kenya Information Preservation Society, International Centre of Insect Physiology and Ecology, Kenya National Library Service, Kenya National Archives and Documentation Service and Bible Translation Literacy (Dlamini, 2010).

The workshop provided basic practical skills on the techniques of developing digital libraries using the Greenstone software. It aimed also at building a network of Greenstone users among information specialists and at linking East African users to the Southern African User Support Network (UNESCO, 2008). Following this training, participating institutions came together to develop a central digital collection under the Kenya Information and Preservation Society (KIPS). KIPS has developed some digital collections that include a union list of theses and dissertations held by universities and research organizations in Kenya, which gives the bibliographic details only, and has been made available to all over the Internet and on CD-ROM. Some participating institutions, including Kenyatta University, have also digitized and posted abstracts of theses on their web sites.

In 2007 Electronic Information for Libraries (EIFL), an organization that works with libraries worldwide to enable access to digital information in developing and transition countries, teamed up with the Koha Foundation to develop expertise and to grow the network for Greenstone in South Africa. In 2009, the EIFL-Koha Foundation project was extended to involve sixteen countries including Kenya. There are three designated National Centres in Kenya which were established to play a key role organising training events and supporting

trainees who are undertaking digitisation projects or building Greenstone digital library applications.

In 2010 at an annual meeting held in Nairobi there was agreement to change the network name to the "African Digital Library Support Network", in recognition of the value of digital libraries and to signify a desire to promote the development of digital collections across all of Africa. The e-Maktaba digital library at Kabarak University in Kenya is one of the centres which contains library manuals and guides, as well as university policies (Kujenga, 2010).

To establish the extent and status of digitization in Kenya's libraries, an online questionnaire was generated and sent out to 133 recipients from 50 libraries. The libraries comprised academic, research, special and public libraries (See Figure 1). The response rate was 25%. The findings of the study revealed that 95.8% of the respondents had a digital collection. The majority (86.4%) said that their collections were acquired or purchased in digital format; 63.6% of the respondents, who mostly represented academic libraries, said that their digital content was developed by the library or parent institution. Supporting literature confirm that these are theses and dissertations written by students, staff and researchers. In addition 81.3% of the respondents said that they had installed open source software for the purposes of managing their digital collections. DSpace and Greenstone were the main software packages used by those who said that they had digital libraries. The remaining respondents, with all digital, or born-digital, subscription or internally converted digital material, gave the name of their Integrated Library System software as the software used for searching and retrieving information from the digital collection.

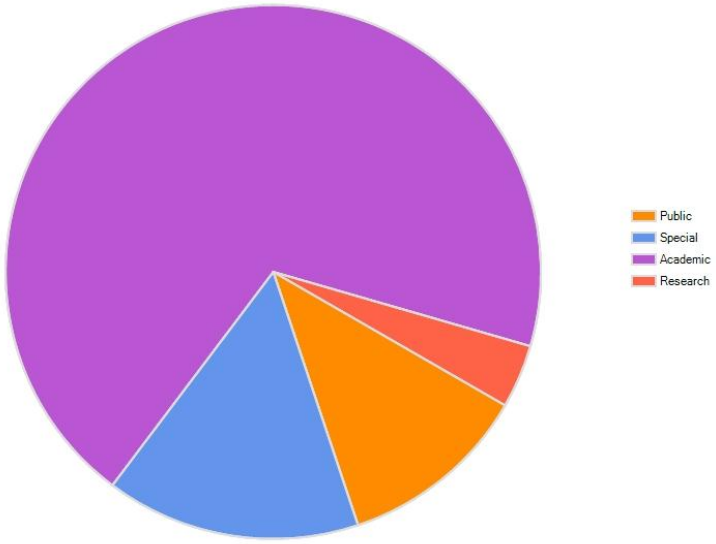


Figure 2: Library cluster represented in the survey.

The majority of respondents with online material specified the type of online material as shown in Figure 2. Many of the libraries gave their online catalogues (OPAC) and online subscriptions as the main contents of their digital libraries.

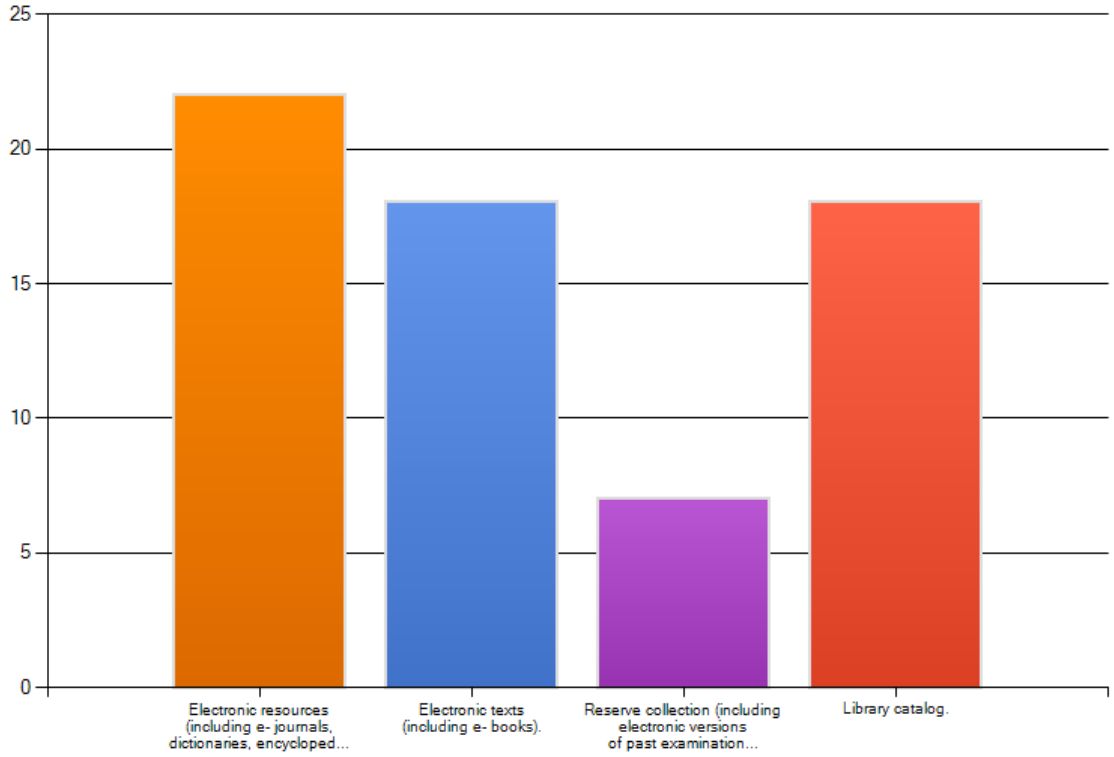


Figure 3: Types of online material found in the sampled libraries

In her study Otando (2011) found that institutions that have implemented intranet-based institutional repositories within the KLISC membership included the University of Nairobi (108 items), Kenyatta University, College of Insurance, KMFRI (400 items), Kabarak (3000 items), Aga Khan University (80 Items), Marist International (55 items), Moi University, KCA (103 items), ICIPE (21 items), Inoorero, KEMRI and KEMU. These are 12 out of the 75 members by size. Of the 34 African repositories listed, 25 (62%) are found in South Africa, and only 4 (12%) are found in Kenya.

Challenges faced by individual libraries

Every good thing includes its challenges and digital libraries are no exception; there are indeed challenges in developing and maintaining the digital collection as revealed in the study of the sampled libraries and the literature as reviewed on similar studies.

Some of the common or main obstacles militating against digitization for libraries, as gathered from the study and literature review, include lack of sufficient funds, appropriate facilities, skilled manpower or staff turnover and the right incentives. Table 1 shows some of the challenges faced by 26 university and research institution libraries sampled in a study of institutional repositories (Otando, 2011).

Challenges
Lack of facilities/infrastructure
Copyright issues
Lack of technical expertise/inadequate staffing issues related to understaffing
Lack of high level management support
Lack of understanding of the importance of the concept
Finance/proper funding
Fear of exposure of intellectual work that will be rated globally
Lack of prioritizing IR in library activities
Poor sensitization

Table 1: Problems encountered in the establishment of IR (Otando, 2011)

Some of the above and those collected from other literature, not necessarily unique to Kenya libraries, are discussed below:

Cost

It is widely recognised that budgets are perpetually stretched thin in libraries. Therefore, anything that will require a major portion of library resources is a challenge that requires extensive preparation. Digitization is expensive, particularly when unique materials are involved, and staff have to work more hours or additional staff have to be employed for this purpose. Although some may think that digitization is much like photocopying, this is not the case (Sharun, 2008). In digitization of hard copy material, there is sometimes a need to prepare the material before digitizing. The material may be fragile and need to be conserved first to minimize damage during scanning.

These costs, combined with chronic budget constraints, force the parent institutions to shelve digitization projects. Most of the libraries in the sample group that admitted to having their own digital collection may have opted to use open source software due to the high cost of commercial software. Of the respondents, 81.3%said that they had installed open source software for their digital collection. As seen in the table below, lack of adequate scanners for digitization by 16 out of 26 respondents in a study conducted on institutional repositories in Kenya, alludes to the cost of digitization. Many libraries cannot afford to digitize due to the cost and the inadequate funding.

	Excellent	Good	Fair	Poor	No Response	Total
Adequate Computer hardware	4	8	14	-	-	26
Adequate computer software	3	10	10	3	-	26
Adequate personnel for submission and digitization		11	9	6	-	26
Adequate scanners for digitization		5	5	16	-	26
Strategies to promote the service		7	12	3	4	22
Sustainability (Budget for the infrastructure)		4	7	10	5	21
Deal with licensing and copyright issues	2	3	5	13	3	23

Table 2: Library management support of IR in 26 KLISC member libraries (Otando, 2011)

Skills and Training

About 50% of the questionnaire respondents said that their digital library was either set up solely by IT department staff or consultants, or with their assistance. The majority installed and set up their systems with some help. Although they were not asked to give a reason for their answers, past studies show that there is a lack of sufficient ICT skill among the general library staff population. Jones (2001 cited in Eke, 2011) submits that digital projects require new skills and Rosenberg (2006 cited in Chiware, 2007) notes that skills in e-resources management, e-services development, full text digitization and teaching skills are lacking in African university libraries. This is unfortunate; according to Kanyengo (2006), digital library education has not been sufficiently incorporated into library and information science programmes in Africa library colleges. The few training programmes that there are, are not adequate to address the needs of African libraries. Those of the library and information science schools that do offer training in preservation, do so only at a theoretical level.

Technical knowledge about the digital elements of electronic documents is largely lacking among staff in preservation departments and the presence of preservation departments is in name only as most academic libraries concentrate on book and journal binding. This is in addition to the lack of training referred to above (Kanyengo, 2006).

Nonetheless, Chiware (2007) feels that the two avenues currently open to addressing training requirements for the digital age in African university libraries are through workshops or short courses and formal training in library and information science (LIS) and computer science programmes. He further proposes that there should be an agreement that training should be considered to be a continuing process and that librarians should be given enough opportunity to put to use their newly acquired skills. In other words, in-house training programmes must be specific and targeted at achieving certain goals (Chiware, 2007)

Users

The law of supply and demand applies in the case of digital libraries, particularly in this case. In order to effectively advocate for digital libraries at national level, the voice of the users must be heard. It is not enough for librarians to present proposals in meetings and

conferences for libraries to be included in the national planning. There has to be substantial justification from the users.

Kanyengo (2006) asserts that users of information are another obstacle in the promotion and development of digital information. She states that the real issue is that the citizenry has not yet realized the power of the digital media to demand that services and polices be made available to them online for faster and broader dissemination. The national implementing bodies or government officials may not be as worried about this state of affairs for varied reasons.

Users have not actively asked for digital libraries but they have shown preference for online information services by visiting cyber cafés and using the computers that are placed within the libraries. The majority of the users of digital collections in academic libraries comprise a small percentage of the overall target of users. For instance, digital collections in academic libraries are mainly used by final year students preparing to conduct research.

Time

Digitization is time-consuming. Most of the libraries in the sample stated that their digitization projects took from 6 to over 12 months to set up, and they were mostly referring to their subscription collections. For text that is keyed in or OCR-generated, the time taken to complete digitization of a sizeable collection would be substantial, since character accuracy is the conventional measure of quality. Character accuracy is vital if the information is to be disseminated as it is, without distorting meanings and context. Sharun (2008) points out that although some OCR software generates confidence scores that predict the likelihood of errors being present on any page, human comparison of the digitized output to the source, or manual keying in of the entire page a second time are the only reliable methods to ensure accuracy.

The process of scanning, converting to editable text and proofreading requires a great deal of time, time that the library may not easily have since other normal operations have to continue as usual. For most libraries, therefore, the length of time required to convert paper- based information to digital format may be an impediment. The exercise is labour-intensive and so may require more than the usual number of library staff to finish the work in reasonable time. Additional temporary or casual staff may have to be recruited to assist in the exercise.

Content

The digital collections of libraries that produce own content are not large. Of the respondents, largely drawn from academic libraries, 60% have digital content developed by the library or the parent institution. This content comprises theses and dissertations written by students and research staff which are submitted as a requirement for attaining the necessary accreditation or certification. These materials are therefore owned by the institution and can easily be digitized. Chiware (2007) supports this fact by stating that content in digital libraries is, in many cases, public domain or self-generated content only.

Deciding or determining what to digitize or place in the digital library may pose a challenge to the library, which has to consider what is relevant and therefore useful to users, and also must consider any legal implications in the case of items that have a copyright. It is one thing to have a digital library and another to have information in it.

Another interesting dimension to this hurdle is the fear of academics in universities about having their works published in institutional repositories, which may be due to a fear of lack of representation in internationally accredited journals and plagiarism (Chiware, 2007). This was not established during the study as a reason for the small size of collections from the universities sampled compared to those available online from universities in the West and some of the advance developing countries.

Most of the Kenyan libraries depend on published and copyrighted material which is acquired through subscription (Figure 3). There is still a large gap in developing and publishing local content that is available through open access and appreciated by the users. People are yet to accept open access information material as useful for quoting in research or for daily use.

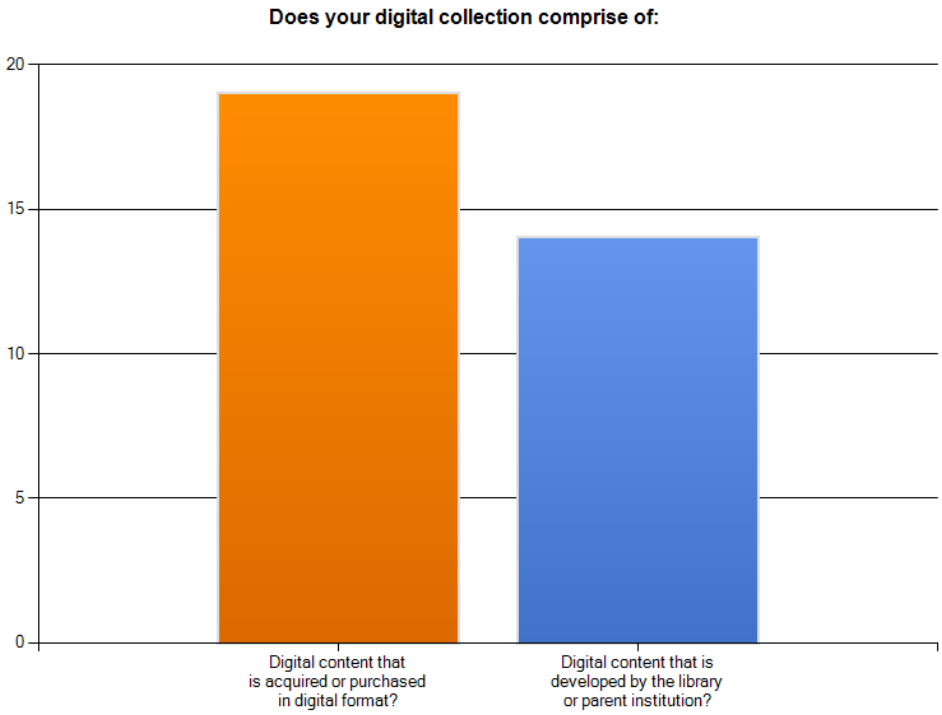


Figure 4: Type of digital material in the sampled libraries

The issue of preserving the context of information is another challenge for libraries which would like to preserve information. Sharun (2008) maintains that to effectively digitize and preserve historic events or items, the information that helps put those pieces of history in their proper context has to be protected and stored. Only then can users truly get a clear picture of their significance. Information that is captured and stored without reference to the entire body may lose its meaning and intended value.

Describing collections and adding metadata

Arranging and describing information materials for digitization to preserve their original context and increase their "searchability" can be challenging and time-consuming. To add descriptive information or metadata for each digital item or asset, the staff assigned to the task must be qualified and must follow agreed standards. The task of extracting metadata and indexing files is still largely a manual process and is very labour-intensive. However, there are intelligent indexing and active archiving tools which help to capture metadata and to index information material more efficiently. (Sharun, 2008)

Handling documents

Materials to be digitized may be delicate and therefore difficult to scan. Pages must be unfolded with great care to avoid damage. Some items have been bound in such a way that it is impossible to lay them flat for copying. Some have to be specially treated in order to harden them for copying. Others have pins and staples that have to be removed first. All this can be arduous and time-consuming.

Copyright

Even though the question of copyright was not posed to the sample group in the study, it has been documented in past studies that one of the main challenges in digitizing library collections or items is the issue of copyright. Yan (2004) contributes that before beginning the digitization process, librarians have to consider whether or not the digitized material will violate copyright and intellectual property laws. Chiware (2007) adds that digital libraries are hampered by copyright law, because works cannot be shared over different periods of time in the manner of a traditional library.

Many institutions struggle with the question of whether it is permissible to digitize and index protected materials for preservation purposes only. Current laws can be unclear on whether it is permissible to digitize rights-protected materials for preservation purposes, even if there is no intention to publish the content.

Fast changing technologies

As data capture has become easier, some forms of data preservation have become less reliable because of shorter media life. This is one of the ironies of the information age. Yan (2004) states that, as the technology becomes outdated, old digital software will become unreadable. Digital libraries may have to constantly upgrade software and hardware from system to system as new technology warrants.

Staff Retention

The loss of qualified personnel in the libraries to "better" jobs or departments is posing serious problems to the libraries. Libraries may be forced to compete with local industry to attract qualified staff. Insufficient funding of libraries by their parent institutions affects their ability to offer better remuneration packages that will help to build better service infrastructure, to provide updated and more information resources to the users.

Way forward

Fabunmi, Paris & Fabunmi (2006) assert that even though digitization is useful in preserving precious materials, a digital copy should not be seen as a replacement for the original piece. The original document should be cared for even after digitization, as preservation is a secondary benefit of digital projects. Digital libraries should not be perceived as replacements for paper based collections. The traditional library still has its place in the society.

Despite the challenges and obstacles in setting up of digital libraries, Kenya can forge ahead and build libraries that are comparable to those situated in developed countries. Some of the things that the libraries and the country can begin to do are discussed below.

Collaboration

There is power in working together. If libraries can come together to plan on how to go about digitizing their collections, then Kenya digital libraries will be a topic of discussion in many forums. The current professional bodies for library professionals have the necessary framework to pursue the digitization agenda. Members of the KLA and KLISC who have established digital libraries should share their experiences in order to inspire the rest to join in. Collaboration will mean that librarians come together to discuss the challenges that they undergo or are likely to face if they embark on a digitization exercise. They can go further to discuss these issues with the policy makers both in their parent Institutions and at government level.

Standardisation

Libraries that wish to digitize should develop rules and standards specifically for the processes they intend to use. Standardization will ensure interoperability particularly if libraries intend to cooperate. KLA committee members should work closely with the Kenya Bureau of Standards to ensure that the standards are suitable for its members and that they are enforced by all the member libraries. This will help improve access and permanency of digital collections.

In support of what Kanyengo (2006) says, having standards will reduce costs as one institution will work on an item which is eventually be made available to all members of the consortium or network, and participating institutions can coordinate their collection development policies so that in a networked electronic environment they allocate themselves subject areas in which to collect and archive information.

Copyright

Contributors of material for digital libraries should be assured of the necessary legal protection by the parent institution management. In the case of university libraries, the students and academic staff who are involved in writing scholarly work should discuss this with university management before submitting their work for digitization. A solution on how to tackle copyright issues should be mutually agreed upon by all. For example, copyright permissions could be obtained in order to enable digitization. Fabunmi, Paris & Fabunmi (2006) suggest that when the copyright permission is granted, it is essential to enter the

date of approval and the name of the person who granted the permission into the database. If copyright issues were handled correctly, staff would not be afraid to submit their articles for scanning and uploading for public use.

Scholars may prefer to have their work published by commercial publishers due to the associated incentives, and yet digital libraries should be in a position to accommodate copyright concerns by licensing content and distributing it on a commercial basis. The contributors could be paid some royalty for their work by the parent institution.

User orientation

Library users should be made aware of the digital library and shown how to use the digital collection. When users learn that the digital collection is as good as the hard copy items, they will begin to enjoy the benefits of the digital library. Through orientation and promotional activities, the library will garner enough support from users who will then demand more and better services within the digital library.

Public awareness of the importance of digital libraries will help to demystify the digital library and many will not shy away from making use of the online services. There are still those who feel that they have to be "tech savvy" to be able to access electronic information. The KNLS should take advantage of its mandate and be in the forefront in creating more awareness, together with the professional associations mentioned earlier.

Training

As new technologies emerge, library staff involved in digitization should be trained continually. Workshops for the training of library personnel should be organized at local and national level by the KLA and other interested bodies in the public and private sector. INASP and EIFL have so far been very involved in training of library personnel on digitization of library collections.

The training programme must also address issues related to copyright law in a digital environment and how digital libraries can address copyright issues. Librarians should also have the skills to actively promote the benefits of publishing in the local digital libraries.

Information infrastructure at government and institutional level

The Kenyan government should be at the forefront of drafting and ensuring implementation of policies that support open access. Apart from the "Right to information" as enshrined in the current constitution, and the ongoing initiative under the "Open Access to Public Legal Information", policies should be created in support of open access initiatives for local institutions. With government backing, more scholarly and local content will be uploaded on to digital libraries for people to access.

At the institutional level, the infrastructure for setting up and sustaining the digital library must be in place. The right infrastructure includes the right equipment, skilled staff, management support, content developers or contributors and guidelines or standards. The right infrastructure helps to streamline the process of digitizing, indexing, and archiving

collections, managing archived data and ensuring efficient solutions that are compliant with current and emerging standards.

The flow of work in the digitization process, from the beginning to the end, must be able to progress from one point to the next within the established system with little or no obstruction. The underlying infrastructure must be well linked, from the initiator of the information , through the processor, and finally to the user.

Continuity of digital collection.

The digital library should not be static. The collection needs to be updated, upgraded and expanded with time and the library should set guidelines or rules for the continuity of the collection. The initial phase is the hardest but guidelines set by the parent institution to support the digital library will go a long way in ensuring that the collection continues to grow consistently. For example, the following policies can be set in place:

- Library users contributing own literary works, must put them in electronic format. For example, in the university, theses or dissertations can be submitted in PDF format;
- Documents must be stored electronically;
- Documents must then be made accessible online.

In the case of the academic library, staff, students and scholars have to be brought on board and become part of the digitization project. The importance, benefits and use of the digital library must be communicated to them through memos, newsletters, seminars and workshops to ensure that the collection continues to be current and relevant.

Conclusion

If Kenya's 2030 vision of "a globally competitive and prosperous nation with a high quality of life by 2030" is anything to go by then there is hope for digital libraries in Kenya. Progress so far indicates that digital libraries at national level will become a reality sooner than later. This paper proposes the way forward for libraries to design and implement digitization programmes both at individual and collective levels. The channels for forging ahead with the vision of national digital libraries not only lies with the Kenya Association of Library and Information Professionals(KLA), the Kenya Library and Information Services Consortium (KLISC) and the Kenya National Library Service (KNLS), but with every librarian. Each librarian must be ready to support the efforts of the individuals who are striving to put the library on the agenda of the country's development process. Digital libraries will then indeed improve the availability of and access to scholarly and cultural digital content, so as to enhance Africa's development efforts.

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Appendix

Survey Questionnaire

1. Name of respondent

2. Designation:

- Head Librarian
- Assistant Librarian
- Systems Librarian
- IT administrator

Other (please specify)

This question requires an answer.

***3. Name of Library / Organization**

4. Email:

5. Type of Library:

- Public
- Special
- Academic
- Research

Other (please specify)

Library Collection

6. Size of collection (Holdings)

- Less than 1000
- 1000 – 5000
- 6000 – 10000
- 10000 – 20000
- 20000 – 50000
- Over 50000

Holdings: These are the individual items held by the library regardless of the format

7. Specify number of registered users:

- Less than 500
- 500 – 1000
- 1000 – 3000
- 3000 – 5000
- 5000 – 10000
- 10000 – 20000
- Over 20000

8. What is the occupation of your user group?
(Select one or more answer)

- [ ] Researchers
- [ ] Secondary school students
- [ ] College/University students
- [ ] Children
- [ ] Members of the public

Other (please specify)

Digital collection comprises of information material that is available, retrievable or accessible to library users through electronic or digital media. T

9. Do you have a digital collection?

- ( ) Yes
- ( ) No

If you answered YES, move on to the next question

THE DIGITAL COLLECTION

10. Does your digital collection comprise of:

- [ ] Digital content that is acquired or purchased in digital format?
- [ ] Digital content that is developed by the library or parent institution?

Other (please specify)

11. Tick if you have information resources in the following formats:

- [ ] CD-ROMs
- [ ] VHS tapes
- [ ] Audio cassettes
- [ ] Online, accessible via a network or Internet (specify in next question)

Other (please specify)

12. If you have Online material that is accessible via a network or Internet, please select relevant type below:

- [ ] Electronic resources (including e- journals, dictionaries, encyclopedias, directories, handbooks, indexes and abstracts).
- [ ] Electronic texts (including e- books).
- [ ] Reserve collection (including electronic versions of past examination papers, dissertations and other reference material)
- [ ] Library catalog.

Other (please specify)

13. Select the range that best describes the size of your digital collection, regardless of format(s) selected above.

- ○ 100 – 500
- ○ 600 – 1000
- ○ 2000 – 4000
- ○ 5000 – 10000
- ○ Over 10000

14. How long ago since you set up your digital collection?

- ○ 1 year or less
- ○ 1 - 3 years
- ○ 3-5 years
- ○ Over 5 years

15. Have you installed software for searching and retrieving your digital collection?

- ○ Yes
- ○ No

16. If yes, what is the type of software(s) used for this purpose?

- ☐ Proprietary software
- ☐ Custom made/designed
- ☐ Open Source software

17. If you have proprietary software, please specify:

- ☐ MuseSearch
- ☐ WebFeat
- ☐ CAIRS
- ☐ CALM
- ☐ MuseSeek
- ☐ Commercial Integrated Library Software (ILS) eg InMagic, Millenium, Metalib, DigiTool

Other (please specify)

18. If you have open source software, please specify:

- ☐ DSpace
- ☐ EPrints
- ☐ Fedora
- ☐ Greenstone
- ☐ CERN
- ☐ Open Source Integrated Library Software (ILS) eg Koha, LearningAccess, Avanti, etc)

Other (please specify)

19. If you have custom made or improved software, please describe:

20. Is your digital collection searchable (i.e using keywords, subjects, etc)?

- ○ Yes
- ○ No

21. Is your digital collection available in full text on the World Wide Web (www)?

- ○ Yes
- ○ No

Other (please specify)

INSTALLATION/SUPPORT

22. Who set up your digital library/collection?

- ☐ Library staff
- ☐ IT department staff
- ☐ HR department staff
- ☐ Vendor/Consultant

Other (please specify)

23. How long did it take to set up your digital collection - from collection, to organization, to user access?

- ○ Less than 6 months
- ○ Between 6 months – 1 yr
- ○ More than 1 yr

Other (please specify)

24. Who is allowed to add information material to your digital collection?

- ☐ All library staff
- ☐ Specific Library staff
- ☐ All users
- ☐ Specific users

Other (please specify)

ACCESS

25. What percentage of your user group makes use of your collection?

- ○ Less than 10%
- ○ Between 20 – 40%
- ○ 50%
- ○ Between 50 – 60%
- ○ Over 70%

26. How or where do users access your digital collection?

- ○ Access from any Internet connected computer
- ○ Access from the library

Other (please specify)

27. For materials that are accessed online, what type of controls have you put in place?

- ☐ User passwords
- ☐ Access restricted to Library computers only
- ☐ Access restricted to Institution computers
- ☐ No controls in place (Collection is open to public)

Other (please specify)

28. When is your digital collection accessed?

- ○ At specific times
- ○ 24 hours

Other (please specify)