CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Libraries in Nigerian Universities have remained the heart of the institutions they serve; supporting research and learning using resources and tools that are available. In many cases, the Nigerian Universities have used only tools and technologies that the librarians are aware of, and that are readily available and accessible. It should be noted that, in the modern library setting, libraries are beginning to adopt the interactive, collaborative, and user-centered features embedded in "Web 2.0" into traditional library services, and this has led to the creation of what is now regarded as "Library 2.0" (Zimmer, 2015). Ramayah (2016) emphasized that ICT provides access to a huge range of resources that are of high quality and relevant to scientific learning. In some instances, the multimedia resources available enable visualization and manipulation of complex models, three dimensional images and movement to enhance understanding of scientific ideas.

Lua and Sim (2018) reiterated the capability of ICT in widening the range of materials that can be used in teaching and learning to include text, still and moving images and sound, and increase the variety of ways that the material can be used for whole class and individual learning. Therefore, science teachers have the opportunity of meeting the needs of students with different learning styles as well as being creative in their teaching through the use of ICT, hence bring about information storage and retrieved from cloud computing. The advent of these new technological tools in library service delivery has also enabled the provision of platforms that allow users and librarians to back up critical data for reuse. As a matter of fact, libraries have

been known as users of emerging technological tools, as far as the librarians are aware of it and perceive it as effective in information storage and retrieval. Sabiti, Sarika, and Bulu (2015) noted that modern technologies have instigated tremendous transformation in almost all disciplines and sectors, and library science is not an exception. In fact, libraries are adopting new technologies to ensure that the mandate of meeting users' needs are met within the shortest possible time.

In the recent, many changes have taken place in libraries, part of which includes the adoption of new technologies such as cloud computing. The cloud computing provides people the way to share distributed resources and services that belong to the library. Hussaini, Vashistha, Garba, and Jimah, (2018) submitted that cloud computing system enables the library to provide services to a larger number of users and cloud computing service is the practice of storing regularly used computer data on servers that can be accessed through the internet. As a matter of fact, Library professionals are being offered opportunities of taking advantage of Information and Communication Technology facilities to advance in their efforts to making library clientele connected to information resources in the cloud, by utilizing computer and its associative gadgets (Ademodi & Adepoju, 2019). The concept of cloud computing has been established as a lasting technological innovation and not just a transitory technology that will become obsolete in the nearest future (Breeding, 2015). In today's libraries "cloud-based services are set to transform the way libraries work, unleashing librarians from the admin burden to focus on services for students and researchers (Mahalakshmi & Sornam 2018).

According to Penfield and Yoon, (2018) defines awareness as the knowledge and understanding of something, especially as it relates to its development and its uses among people. It is the ability to be conscious of something new around someone. Awareness is a pre-requisite to subsequent deployment and usage of cloud computing technology unless an individual uses it unknowingly. Awareness in this study has to do with librarian's knowledge and understanding towards cloud computing technology in the library. Afolabi, (2017) identifies lack of awareness as one of the issues which adversely militate against the deployment of cloud computing technologies in Nigeria. He indicates that lack of awareness of cloud computing among librarians and other library staff is high in Nigeria. Afolabi, (2017) further notes that more than 80% of the respondents surveyed during his research are completely unfamiliar with cloud computing. This implies that knowledge of cloud computing is very low among librarians in developing region like Nigeria.

Alemayehu, (2016) indicates that regardless of librarians' years of practice, 31 out of 45 respondents have said that they didn't have any pre-knowledge of cloud computing. Therefore, awareness of cloud computing among librarians seems to be one major issue affecting the deployment of cloud computing in university libraries in South-south Nigeria. It is only when awareness is tackled in an empirical study that deployment may be enhanced. Oluwadamilare, (2017) identifies librarian's awareness as a factor that can affect the attitude towards deployment of cloud computing technologies in libraries. He illustrates that librarian's attitude towards deployment of cloud computing technology in the library depends on their awareness of cloud computing technology. In the library, due to its dynamic, flexibility, replaceable and ease of use, cloud computing has become more adoptive in helping the library to keep and maintain record of data, rendering efficient services. Suman and Singh (2016) stated the benefits of cloud

computing to library is that it enhances easy access to data over the internet, promotes accessibility to file sharing and savings, reduction of cost in managing and maintaining IT system, collaboration of projects being cost effective etc.

Amidst all the benefits prevailed in adopting cloud computing technology by librarians in discharging their functions in the history, there are also many challenges facing it. They include: security and privacy, application migration from one cloud to other; interoperability, computing performance, reliability and availability (Mate 2016). Cloud computing is an evolving paradigm that offers opportunities to library users or group of users that need to be provided limitless and without time, location bound services. However, in spite of great work advantages, many librarians still pay levity to its full awareness and adoptability to their service operation. One begins to wonder the cause and questions its level of awareness and use by librarians in academic library. Against this backdrop, the researcher investigates the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State.

1.2 Statement of the Problem

For effective use of cloud computing service, there is a need for librarians to be adequately aware of the services and this has been a great challenge. While many studies have examined the concept and uses of cloud computing in developed countries little research has been in the Nigerian library space. In spite of the numerous the numerous benefits of associated with the adoption of cloud-based technologies in libraries, the adoption rates in public university libraries differ around the world (Tamuno, 2016). Most public university libraries in the western world have adopted cloud-based technologies in their libraries. For instance, libraries in western world widely-use web cataloging tools of OCLC which are the most prominent examples of cloud-

based technology in library. However, the rate of adoption of cloud-based technologies in public university libraries in Africa, particularly in Nigeria is low as many of the libraries are yet to embrace the use of cloud-based technologies in the discharge of library services.

Observation also reveals that most university libraries in Nigeria are yet to adopt the use of cloud-based technologies in libraries. Adeleye (2017) observed that university libraries in Nigeria still prefer saving library data through hardware technology with no cloud backup. In view of the above, Alaba (2016) posited, that many librarians in Nigeria are not aware of the use of cloud-based technology in libraries while the few who are aware do not have positive perception about the technology. Particularly, no empirical evidence on the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. The aim of this study, therefore, is to investigate the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State.

1.3 Research Objectives

The main objective of the study is to investigate awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. The specific objectives are to:

i. Ascertain the extent of awareness of cloud computing services by librarians in selected academic libraries in Kwara State;
ii. Determine the types of cloud computing services used by librarians for information storage and retrieval in selected academic libraries in Kwara State;

iii. Highlight the benefits of cloud computing services usage for information storage and retrieval in selected academic libraries in Kwara State; and

iv. Identify the challenges facing the usage of cloud computing services for information storage and retrieval in selected academic libraries in Kwara State.

1.4 Research Questions

The following research questions are raised to guide the study:

i. What is the extent of awareness of cloud computing services by librarians in selected academic libraries in Kwara State?

ii. What are the types of cloud computing services used by librarians for information storage and retrieval in selected academic libraries in Kwara State?

iii. What are the benefits of cloud computing services usage for information storage and retrieval in selected academic libraries in Kwara State? and

iv. What are the challenges facing the usage of cloud computing services for information storage and retrieval in selected academic libraries in Kwara State?

1.5 Scope of the Study

This study will investigate the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. The study is limited in scope to three selected universities in Kwara State include: Kwara State University Malete, University of Ilorin and Al-Hikmah University. The study will adopt descriptive survey design with the use of qualitative research for collect and analyse data using SPSS, the researcher will also use structured questionnaire to obtain data from librarians of Kwara State University, University of Ilorin and Al-Hikmah University. Questionnaire items will be designed to get response from

librarians of Kwara State University Malete, University of Ilorin and Al-Hikimah University regarding their level of awareness and utilization of cloud computing for information storage and retrieval.

1.6 Significance of the Study

Cloud computing is seen as a technology that is still new, the study may be beneficial to librarians, academic institutions, special, private and public libraries. The study intends to evaluate the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. To librarians as information vendors, they may benefit from the result of this study as it may help them to improve on their technique to information provision, records dissemination in addition to data storage and retrieval. The study may also benefit to the academic institution's administration in policy formulation. It may enable them to understand the need to allocate adequate funds for regular training of staff who may use the technology effectively and efficiently. The university administration may therefore, be in a better position to make adequate provision to ensure that internet connection is available within its campuses, this can allow for appropriate and maximum utilization of the technology.

Similarly, it may be beneficial to the libraries and its management in the sense that it will reveal to them the degree of effectiveness of the cloud computing technology in meeting the information needs of the users and consequently encourage them towards working out modalities to improve the functionality of cloud computing technology if the need arises. More also, it will help to reveal the extent to which cloud computing technology is being adopted by the academic libraries as it will highlight the past and present state of the adoption of cloud computing technology in the library for its services. The improvement of cloud computing in the library will

lead to better library services for the fulfilment of the objectives of the libraries. The findings of the study may also benefit future researchers. This is because the suggestions for further research may serve as reference tool for their research. Future researchers may be informed of the findings of the study by making the copy of this work available to university library.

1.7 Operational Definition of Terms

Academic Libraries: these are types of libraries found in tertiary institution of learning such as universities, colleges, polytechnics etc.

Awareness: this is the knowledge or perception of a situation on the fact

Cloud: public or semipublic space in the cloud used for transmission.

Utilization: this refers to the action of making practical and effective use of something.

Resource Pooling: this refers back to the system which permits provider's computing sources to serve multiple clients or customers.

Scaling: that procedure which allows for scalable provisioning, or the ability to provide scalable services in the cloud.

Security: is the combination of confidentiality, the prevention of the unauthorized disclosure of information, integrity, the prevention of the unauthorized amendment or deletion of information, and availability, the prevention of unauthorized withholding of information.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of literature related to the study. It is arranged under the following sub-headings:

2.2 Concept of Information Storage and Retrieval;

2.3 Concept of Cloud Computing;

2.4 Extent of Awareness of Cloud Computing Services;

2.5 Type of Cloud Computing Services Used by Librarians for Information Storage and Retrieval;

2.6 Purpose of the Use of Cloud Computing Services for Information Storage and Retrieval;

2.7 Benefits of the Use of Cloud Computing Services for Information Storage and Retrieval;

2.8 Challenges Facing the Use of Cloud Computing Services for Information Storage and Retrieval; and

2.9 Summary of Literature Review.

2.2 Concept of Information Storage and Retrieval

Information as a resource requires careful handling by the information specialist. The major aim of careful information handling is to ensure that the right type of information gets to the right user at the right time with minimum cost (Wilson, 2022). This will enable the recipient to take correct decisions, formulate right policies or communicate effectively. Proper information handling ensures that IT is used in the dissemination of information. Madu and Adeniran (2020) saw IT as the coming together of computing and telecommunications for the purpose of handling information. Aguolu and Aguolu (2018) said, ‘‘the computer and telecommunications technologies have helped to concretize the network concept’’. In related terms, Wilson (2022) asserts that IT embraces computers, telecommunications and software systems that aid the organization, transmission, storage retrieval and utilization of what might better be called ‘‘knowledge resources’’.

Oketunji (2019) is of the view that IT is a term that encompasses the notion of application of technologies to information handling. This includes generation, storage, processing, retrieval and dissemination. Every library’s aim is to provide the right information at the right time and in the right format to its patrons. Thus, the imperativeness of IT in information storage and retrieval in university libraries (especially in this era of exponential growth of knowledge, tagged as ‘‘information explosion’’) is when IT is being used to check each library’s increasing workload, engineered by influx of information. Lending credence to this view, Tibi (2018) attested that IT could be used for the management of library processes in terms of information storage and retrieval. He further attested that computers can process information much faster than humans and can, therefore, help to increase the flow of work in libraries. It is worthy of note that in order to enable the computer to perform an accurate job, data inputted to it must be accurate.

This is best explained in computer jargon as ‘‘garbage in garbage out’’ (Tibi, 2018). Uwaifo (2019) advised librarians to be aware of the rapid growth being made towards integrated systems. He further advised that this is true because the numerous acquisitions functions cannot be fruitfully performed using the manual system, which is susceptible to delays, accumulation of backlogs, errors, patrons andlibrarians’ dissatisfaction. IT has eliminated many routine tasks and increased speed in the acquisition of materials. Molholt (2019) asserts that a computerized catalogue offers so many possibilities that the initial high cost of setting it up should not be a deterrent. He is of the view that computerized/ automated catalogue files can produce the following: author or main catalogue, title catalogue plus supplements; classified catalogue; accession list of oldand new arrivals to keep the staff up to date on the library’s stock. Aguolu and Aguolu (2018) opined, ‘‘information technology such as the computer-based circulation systems offers the prospect of regaining detailed knowledge of books usage at a price’’.

They see the role of computer internet, intranet as rapidly and accurately marrying borrowers’ books and data information together, enabling rapid, easy consultation of issue files at any time so as to detect where any book is located and this helps in restoring any items (print and electronic) that are returned from loan. It also detects delinquent borrowers at the point of issuing books and amends circulation records promptly (Aguolu and Aguolu, 2018). This is an information age, the dawn of the new age where information glows before us with the promise of new ways of thinking, living and working (Capron, 2019). Information scientists assert that information is the life blood of any organization, as very little can be achieved in any organization through manual processes. They believe that information is an essential ingredient of any control system – the library. The possession and the use of appropriate IT ensures organizational functionality (Capron, 2019).

The manual process of storing and retrieving information has been faced with a number of problems and weaknesses that frustrated librarians as well as library patrons (Aguolu & Aguolu, 2018). University libraries have every reason for embracing IT because it offers greater efficiency in operations/ information services, adds reality, clarifies communications, and stimulates interest and speedy comprehension (Aguolu & Aguolu,2002). It is important to note at this juncture that the services provided by IT, in information storage and retrieval, are more accurate and consistent and authentic than in a manual system (Aguolu & Aguolu, 2018). IT has equally helped with the selection, acquisition and organization of information during information storage and retrieval. Librarians now embrace new techniques within IT to assist in meeting the information needs of users.

The importance of information technologies in information storage and retrieval as stated by Dijken (2018) are: ‘‘to group the effects of information technology on society, readers should try to imagine a world without electricity or automobiles’’. It is interesting to note that a world without IT is difficult to comprehend because changes are less tangible. Burton (2004) posits that, ‘‘automated or computerized methods for information development helps to accommodate dramatic growth both in the amount of information and in the need to provide access to it’’.

2.3 Concept of Cloud Computing

The use of the term “cloud” has been an issue of contention among researchers. Yet understanding the concept of cloud is critical to grasp the issue of cloud computing. Over the past couple of years, various scholars have offered different viewpoints in a bid to define the concept of cloud and cloud computing. However, all the propositions more or less account for a single ideology. Some scholars trace the origin of the term “cloud” to the concealing nature of

this technology's framework where the system works for users yet they really have no idea about the inherent complexities that the system utilizes. What they do not realize is that there is a massive amount of data being pushed globally in real-time to make these applications work for them, the scale of which is simply amazing (Blokdijk & Menken, 2019).

Omwansa, Waema, and Omwenga (2014) reviewed the adoption state of cloud computing across the African continent and reported that South Africa, Kenya, and Nigeria are the leading countries in the use of cloud computing in Sub-Saharan Africa as of the year 2013. They further analyzed the report of a survey carried out by Cisco and World Wide Worx (2018) which found that 50% of South Africa's medium and large businesses were using cloud services, compared to 48% in Kenya and 36% in Nigeria. (Susanto, Almunawar, & Kang, 2016) also reviews that cloud computing has been identified as an affordable option which creates efficiency and effectiveness, reduction of costs involving electricity, bandwidth, operations, and hardware which does not require functional staff, in-house expertise, space, power, and infrastructure to perform. Ahmed and Othman (2018) highlighted that cost reduction, relief from managing complex IT infrastructure, flexibility, and scalability as some of the advantages of cloud computing adoption.

Yeboah-Boateng and Essandoh (2018) in their study of cloud computing usage among small and medium enterprises in developing economies found cost reduction on IT infrastructure and maintenance, improved communication, scalability, and business continuity as the main drivers of cloud adoption. Biddick (2018) remarked that the most likely applications to migrate to cloud computing are storage and business applications, while specialized information technology applications, such as security, management, or compliance, are far less likely to migrate to cloud computing. However, Greenberg (2018) observed that in spite of the advantages the individual, as well as organizations, derive from the movement toward transitioning computing and storage

applications to cloud computing, there are some applications that organizations are choosing not to transit.

Cloud computing derived its name from the acronym CLOUD, which stands as C for "Computing resources", L for "Location independent", O for "Online accessibility", U for "Utility for users" and D for "Demand by users" (Yuvaraj, 2018b). Computing has been in existence for a while now (Rajan & Shanmugapriyaa, 2017). According to Goldner (2016), the technology actually propelling cloud computing is the advent of internet, the increased reliability and reduced cost of internet, increased use of web-based applications, demand for applications access via multiple devices using multiple form factors. Cloud computing is "a style of computing in which massively scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies" (Pettey& Forsling, 2019).

2.4 Extent of Awareness of Cloud Computing Services

Awareness is a pre-requisite to deployment of cloud computing technologies in university libraries. Few research studies have been done on cloud computing. Abidi (2017) made a survey in four different universities of Faisalabad, Pakistan to find out the awareness and deployment level of cloud computing technologies in libraries. The Findings show that most of the participants are familiar with cloud computing but unfortunately some of them are not clear due to lack of resources. 91% of participants replied that they are aware of the different cloud computing technologies. In Dar es Salaam, Idhalama and Fidelis (2020) investigated librarians' perspectives on cloud computing. The results revealed that librarians are enthusiastic about the usage of cloud computing solutions.

Sudhier and Seena, (2018) carried out a survey to ascertain the awareness and use of cloud computing technologies among library professionals in the Kerala university library system in India. The survey was conducted using a questionnaire among 102 libraries professional employed in the central and departmental libraries of the University of Kerala. The study reveals that 42.16% of the library professionals did not have much idea about cloud computing technology. Analysis shows that Facebook and google apps like Gmail, Google Docs are the cloud computing technology used by the majority of the respondents. It is also worthy to note that the library professionals in Kerala University library are using cloud computing technology without being aware of using it.

Awareness of cloud service models is relatively low among library professionals. Web, OPAC, and journal discovery services are the area known to the respondents in applying cloud computing technology in library out of 102 respondents 14.71% of the library, 2 professionals in University of Kerala have average skill in using these technologies. The findings of the study show the need of providing training for the library professionals in handling technology in enhancing library services to its users. However, some studies suggest evidence of poor level of awareness among librarians on the deployment of cloud computing technologies in libraries. Alemayehu, (2016) notes that it has been found that the level of awareness of librarians on the use of cloud computing in general in university libraries in Nigeria is very low. His findings reveal that librarians in university libraries in South-South Nigeria have a very confused understanding of ‘cloud computing’ concept. As such librarians have not fully engaged in using the cloud to perform some library services. Adewara, (2019) found that 82% of the librarians sampled knew ‘nothing at all’ or ‘a little’ about cloud computing.

2.5 Type of Cloud Computing Services Used by Librarians for Information Storage and Retrieval

In PaaS, an Operating System, Hardware, and Network are provided, and the customer installs or develops their own software and applications. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application. Platform as a Service model helps in generating the computing platforms to run the software and other tools over the Internet without managing the software and hardware at the end of user side. PaaS offers a complete development and production environment, abstracted from concerns with details of underlying infrastructure. Amazon Elastic Cloud (AEC), EMC Atmos, Aptana are examples of PaaS model which provide platforms to users in maintaining and supporting their IT infrastructure without spending huge amount in buying hardware, software and related/technology.

Through cloud computing services, libraries in Nigeria can form a sort of collaboration by sharing their resources together in a centrally located server hosted on the Internet. Wasike and Njoroge (2015) observed that like the OCLC (Online Computer Library Centre) libraries can chose to share their cataloguing tools, and indeed any other library resources via the Internet for other member-libraries to access and use. With cloud computing, libraries in Nigeria can have a kind of union catalogue, hosted over the Internet; this can ease the process of inter-library cooperation, as libraries will know what are contained in each other's. With cloud computing solutions, libraries can share scholarly literature, thus providing effective services to their users. Dutt, (2015) noted that these open-source repository solutions are very famous in information retrieval solutions.

For Kaur (2014), libraries can build, maintain and sustain digital repositories on cloud infrastructure. This makes searching of library data/information easier, faster and more convenient, and for Luo (2013) it makes reference work much easy and fun to involve in. With cloud computing, the library can host her website on a third-party server, which is cheaper and cost efficient. Cloud computing services also serve as back up for libraries to save and archive information. Without mincing words, cloud computing services give the library the opportunity to automate the library. This assertion was made by Kutty (2019) when the researcher posits that most vendors of library automation packages are provided on the cloud and third-party services. Dutt (2015) opines that cloud computing is used for Collection Development. This will ensure that duplications are easily avoided and alternate resources can be located and made accessible to patrons.

Effective service deliveries are services offered by university library that has to do with ICT base modes to satisfy the host institution program effectively. Moghaddam (2019) notes that one of the vital elements of effective services and dynamism is specialized human resources. LaRue (2012) firmly believes that the library most powerful asset and effective services is its professional staff. According to the author, librarians have the power to change lives and build community but to do this, they have to leave their desks, leave their buildings and be global to show the community what a powerful tool they are. Librarian of the 21st century is no longer one that sits behind the reference desk answering mere reference questions but rather an active marketer who sells the library's products and services through online medium to the outside community at every opportunity.

Omekwu (2017) mentions basic knowledge of computers and their capabilities; competency with search engines; internet facilities; e-mail; internet navigator tools, web browsers and web file formats; database software; internet development and management know-how a librarian most possessed to be able to offer effective service delivery. Service deliveries are quality information services offered by university libraries. The emergence of ICT has redefined the library role and services. Print materials are no longer sufficient to store information and served the entire client effectively. CD-ROM databases, electronic document delivery, automated cataloguing, circulation systems, Online Information Retrieval (OIR) and of recent cloud computing has become the order of the day. Moghaddam (2019) admits that the advent of the internet, digitization and the ability to access library and research materials from remote locations have also created dramatic changes globally.

Therefore, for university library to offer an effective service professional librarian are the most powerful asset, and they have to be train and retrain to deliver effective services on ICT, computer, internet, search engines, web and digital information. Cloud computing can transform the way information systems are built and services delivered. This provides library with an opportunity to extend its impact to its users anywhere anytime. Anyone connected to the internet is probably using some type of cloud computing on a regular basis. Whether they are using Google's Gmail, organizing photos on Flickr or searching the Web with Bing they are engaged in cloud environment. As Geoffrey (2019) pointed out, the interesting thing about cloud computing is that it did not start as a technology for the business enterprise, but was driven by the public with services like Facebook and Flickr.

Cloud computing operations and services are software used to provide cloud services. Mell & Grance, 2017) listed some of the Google educational cloud as thus: Google Mail: one of the key components to Google Apps is Google Mail, also called Gmail which are administered by the organization's IT administrator in the institution, schools and universities. It has 7GB of storage per user, built-in chat, and IMAP capability that frees students from concerns about email quotas or spam: Google Sites is easy-to-use let students to create and publish information and media, without having to learn any programming languages. Google Video: provides secure and private video sharing for faculty and students: Google Calendar is a shared calendar management that puts everyone on campus "on the same page when it comes to organizing schedules: Google Talk is the Instant Messaging (IM) component of Google Apps IM is helpful for immediate, limited conversation with a colleague in remote location in the classroom: Google Docs Package: a real-time collaboration on documents, spreadsheets, and presentations that lets researchers and students work together across campus or around the world.

The emergence of cloud computing has drastically changed the way information technology (IT) services are used in organizations. When the cost of computing increases due to complex information architecture and infrastructure that deters organizations from employing advanced IT services, the emergence of cloud computing solves the problem by reducing upfront expenses of computing (Marston et al., 2011). Indeed, cloud computing services are extensively used for financial analysis, medical information and diagnoses to online gaming. International Data Corporation (IDC) projects cloud services will outpace traditional IT spending by 2014 (Gens, 2017). Cloud computing services involve a complex infrastructure of software, hardware, processing and storage integration (Maggiani, 2019). It is a relative new form of computing where scalable, elastic IT capabilities are delivered to customers using the Internet (Plummer,

2019). Clouds are defined as clusters of distributed computers, providing on-demand resources and services over a network, with the scale and reliability of a data center (Grossman, 2019).

According to Zhang and Zhou (2019), cloud computing provides an environment to enable resource sharing in terms of scalable infrastructures, middleware and application platforms and value-added business applications. Resources (e.g., CPU and storage) in the cloud model are provided as general utilities that can be leased and released by users through the Internet in an on-demand fashion (Zhang, Cheng & Boutaba, 2017). For many organizations, the advantages to adopt cloud computing are increasingly appealing as it can add capacities quickly to an IT system without investing in new expensive infrastructure, buying new software, or training new personnel (Gruman, 2018). However, adopting cloud computing may also cause organizational risk, such as consumer data protection and privacy, problems with data segregation in the cloud and long-term viability of the cloud computing provider (Brodkin, 2018). In mid-2012, a survey about the future of cloud computing reveals that scalability, business agility, and cost are the top three drivers for decision makers to adopt the technology, while security inhibits its adoption (Nusca, 2012).

Microsoft Azure (2019) explain that cloud computing can be classify base on three computing models. Infrastructure as a Service (IaaS) which has to do with renting of physical or virtual servers, storage facilities, operating system and networking capabilities from a cloud provider on a pay-as-you-go basis; Platform-as-a-Service (PaaS) refers to cloud computing services that supply an on-demand environment for developing, testing, delivering and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network and databases needed for development; Software-as-a-Service (SaaS) is a

method for delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet or PC. Libraries use cloud-based SaaS tools as OpenURL resolver, online reference, research guides; PaaS tools as integrated library system, interlibrary loan; IaaS as discovery systems, archives management (Shaw, 2013).

2.6 Purpose of the Use of Cloud Computing Services for Information Storage and Retrieval

Cloud computing has become an attractive option for organizations, like libraries, that would prefer to concentrate on their core mission rather than IT issues. This because cloud computing has solved the urge for utilising limited resources (Wale, 2015). Shifting library core applications to cloud-based services will reduce or eliminate most or the entire local technical needs in managing server hardware and operating systems that underlie the applications (Liu, 2013). Cloud computing not only benefits individual end-users and companies but also attracts libraries in many ways when they must cope with budget cuts and constrained financial resources. Flexibility is important if a "library has to maintain its character and yet be adaptive to inevitable and unpredictable changes that happen at an accelerated pace. This calls for librarians being able to provide a wide variety of information from an equally varied selection of sources and formats, particularly with the prevalence of cloud use" (Ambrose, 2015).

The extent at which cloud computing is used for library services cannot be over emphasized despite the fact that most librarians face problems with software installation and it updates which has no direct implication with library services (Yuvaraj, 2015a). Online Public Access Catalogue (OPAC) management is difficult. With the emergence of cloud-based library management systems, IT support including installing hardware or the up gradation of systems are circumvented (Yuvaraj, 2015b). Furthermore, Sorensen and Glassman (2015), are of the opinion that cloud-base applications give libraries alternative channels to provide library services that are not available in traditional library operations. Patel et al. (2019) "have enlisted four core areas of cloud computing solutions in libraries: technology, data-hosting archives, information and community". This is as against previous e-mailing services that are provided mainly to a few members of the academic community with so many restrictions and no online storage platform.

Cohn (2012) believes that libraries use "database vendors or integrated library system providers who provide external servers to host library software and data in the cloud. Romero (2012) argues that in the field of library automation, there are several commercial suppliers already offering various adaptations of their products which make the use of the cloud possible to a lesser or greater extent". Sun (2012), in an article titled "Avoiding the death zone: choosing and running a library project in the cloud" found out that there are some projects that are better suited to cloud computing than others. Flexibility and cost savings are the best reason for moving projects to the cloud (Yuvaraj, 2015). Goldner (2012) maintained that libraries can take advantage of cloud computing services and get rid of all technologically related problems that hinder the smooth running of library services. Breeding (2018) added that libraries can take advantage of cloud computing and put in place important aspect of modern libraries which

include building of digital libraries/repositories, facilities for searching library data, hosting website, searching scholarly content, store files and improve library automation.

However, studies have revealed different rate at which cloud computing services are being adopted in most of Nigerian university. Safiya, Mueen, Amad, Raed and Asadullah (2014) acknowledge that computing resources and capabilities became evenly available as a result of popularity and advancement in the ICT, but the level of cloud computing adoption especially in developing countries like Nigeria are still at the very low stage. Ume, Bassey and Ibrahim, (2017) added that in developing countries' university like Nigeria, cloud technology adoption is still at the slow rate of adoption likely due to the cost involved in buying and maintaining of ICT facilities and the poor power supply in the country. The situation is more severe in Nigerian context as Omekwu and Echezona (2018) observed that the state of ICT in Nigeria is poor when compared to some Africa countries such as Egypt and South Africa, and ICT gave birth to cloud computing.

Omwansa, Waema and Omwenga (2014) conducted a review on the state of cloud computing adoption among some African countries and eventually discovered that South Africa, Kenya and Nigeria are the countries that have gone far in the use of cloud computing in SubSaharan Africa as of the year 2013. They further analyzed the report of a survey carried out by Cisco and World Wide Worx (2018) which found that 50% of South Africa's medium and large businesses were using cloud services, compared to 48% in Kenya and 36% in Nigeria. This is another indication that several initiatives are already in place to adopt cloud computing, but the rate at which the adoption is going in Nigeria is too slow. Idowu and Saheed (2017) concluded that the reality of constant progress being realize in technology circle has manifested on all professions and

particularly library and information science field. Although the startup of latest technology such as cloud computing is still at the very infant stage among academic librarians in Nigeria.

2.7 Benefits of the Use of Cloud Computing Services for Information Storage and Retrieval

Libraries today have discovered the need to migrate from the print or paper form to a digital or web-based environment because of the numerous benefits associated with the used of cloud or web-based technologies. Reid (2017) notes that the broad network access is a major benefit that libraries derived from using cloud computing technologies. Cloud Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops, and PDAs. Similarly, according to Kroski (2019), cloud services enable cheaper linkup since services may be retrieved from any device, at any time, regardless of location. Srivastava and Verma (2015), studied cloud computing for libraries. The findings reveal that security of library files, ease of access to file less security concern, efficiency as a virtual workspace, fast and efficient services require less investment, helps in the information storage and retrieval are among the gains of cloud services for libraries.

Olson (2014) identified resource pooling as one benefit libraries enjoy while using cloud computing technologies. The provider's computing resources are pooled together to serve multiple consumers using multiple-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. The resources include among others storage, processing, memory, network bandwidth, virtual machines, and email services. The pooling together of the resource builds economies to scale. The use of cloud

computing technologies in libraries leads to rapid elasticity. Cloud services can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time (Onuoha, 2018).

Gartner (2015), opined that cloud services is enables the reuse, preserve resources, and maximize utility by lowering cost and reinvesting available funds into efficient service delivery. Libraries can obtain measured services when using cloud computing technologies. The more you utilize the higher the bill. Just as utility companies sell power to subscribers, and telephone companies sell voice and data services, IT services such as network security management, data centre hosting or even departmental billing can now be easily delivered as a contractual service. In addition, the use of cloud computing technologies in libraries is advocated by the Cloud Security Alliance. It refers to the need for policy-driven enforcement, segmentation, isolation, governance, service levels, and chargeback/billing models for different consumer constituencies.

Krosk (2019) notes that a major benefit in the deployment of cloud computing technologies in libraries is relatively low cost when compared to its functionality. Cloud computing reduces paperwork, lowers transaction costs, and minimizes investment in hardware (and the resources to manage it). And as your business grows, you can accommodate by adding more server space. Cloud computing providers offer small and mid-size businesses access to more sophisticated technology at lower prices. Sharing IT resources with other companies reduces the cost of licensing software and buying servers. Yaacob (2017). states that the use of cloud computing technologies facilitates easier collaboration. Since services in the cloud can be accessed anytime from any computer, it’s easy to collaborate with employees in distant locations.

Cloud computing enables the scale up or down of IT requirements of organizations quickly and efficiently, without hampering productivity. It cuts down the time involved in buying and setting up additional hardware, software & other necessary resources every time a new service is required. A lot of cost related affairs like administration and maintenance can be reduced when using cloud computing technologies in libraries. It also helps cut down unnecessary capital expenditure as one has to pay only for the duration the service was used for. This also ensures effective utilization. As in cloud computing the total IT infrastructure is as a pool of resources, it reduces wastage of resources to a great extent and improves utilization. Beyond the basic components of hosted email services that have a strong consumer base, cloud computing can be utilized to address needs which are specific to libraries. This can be broken down into the three types of cloud services, replacing a library's onsite technology environment with an online version, and then situations where a library can create its own cloud infrastructure.

These areas offer "benefits to information professionals: outsourced infrastructure, greater flexibility, reduced barriers to innovation, and lower start-up investments". The three main types of cloud services are Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS) (Kroski, 2019). First, cloud computing offers the ability of libraries to use online software to handle a task like a video chat through either Gmail video chat or through Skype. Both are free services though there is "little customization or control available with these applications" Libraries can create applications in an online environment. These environments allow a library to build, test, and deploy Web-based applications (Kroski, 2019). PaaS gives the library the freedom to explore development options without having to purchase and maintain the required infrastructure. This way, if a particular program turns out to not be popular or the best fit for a library, they are not stuck with unwanted hardware and software

which they could not recoup the costs from. Third, a library no longer must purchase their own servers to host their content. By using IaaS, a library can purchase server space and computing power. One of the major players in this arena is Amazon which offers the Elastic Compute Cloud (EC2), which provides computing resources and Simple Storage Services (S3) for data storage.

Cloud computing has immensely contributed to the ways academic libraries create, processes of service provision by saving cost, improvising services, and also allowing libraries to incorporate resources together to enhance qualitative services. Scholars have made various approaches to note the benefits of cloud computing to library services. Goldner (2017) affirmed that cloud computing technology can create the new workflows needed by librarians because it offers the opportunity for a cooperative platform for libraries to build on. Back-up and recovery and easy access to information are the core benefits of cloud computing emphasized by Neethu and Vanaja (2017). They opined that most cloud service providers are usually competent enough to handle the recovery of information, which makes the entire process of backup and recovery much simpler than other traditional methods of data storage. In the aspect of easy access to information, they described that once the users register in the cloud, they can access the information from anywhere with the availability of an internet connection.

Saving financial and human resources is another benefit observed by Raghavendra, Indrami, and Narayama (2017). The authors asserted that another benefit benefits in moving to a cloud computing environment for an academic library are the ability to give a trial to new software without any need to buy the hardware as well as being able to scale the computing power to meet the demand of users. This can make an academic library's IT department to be more flexible in raising the amount of cloud computing they require by contacting their vendor with no need to physically acquire new hardware, software, and manpower to meet increased demands. This

system will save the library financial and human resources. Ranchal et al. (2017) identified space maximization is another benefit. He asserted that operating systems, as well as office package applications, are never used to their fullest capabilities. This also amounts to a waste of resources due to duplication of system capacities. But with the trend of cloud computing, academic libraries can maximize space on the cloud because it permits integration of resources from various users.

The economy of use is another benefit of cloud computing. Gartner (2015) posited that economy of resources and maximization of utilities through reduced cost associated with waste of resources, management, and maintenance of physical facilities and reinvestment of available funds to optimal services provision. He also acknowledged expansion of service as a benefit by suggesting that deployment of cloud computing can help libraries reclaim clientele patronage and win sponsors' encouragement. Wada (2018) identified flexibility in the provision and exchange of service as a benefit. It is averred that cloud computing has the propensity to specially assist academic libraries to fully satisfy the needs of their respective clientele to the unimaginable level because the cloud computing paradigm is independent of location and can be accessed on any media having network connectivity and browsers. With cloud computing, information is not stranded on individual machines; it is combined into one digital cloud available at the touch of a finger from many devices.

Nooshinfard and Ghorbani (2019) highlighted cost saving, flexibility, innovation, user-centric, openness, transparency, interoperability, representation, availability anytime anywhere with the aid of a network, connect and converse, create and collaborate as benefits of cloud computing in academic libraries. Yuvaraj (2018) and Neethu & Vanaja (2017) enumerated several benefits academic libraries would derive from applying cloud computing to their operations and services.

According to them, in the meantime academic libraries would optimize their services by applying cloud computing to achieve maximum service provision through high computing power, location and device independence, high scalability, minimal maintenance, little indulgence in library activities, unlimited storage capacity, diverse support, faster deployment and development, greener library services, virtual presence and availability of library services, pay-per-use, reduced technology obsoleteness, and no capital investment. With cloud computing, the meager budget of academic libraries can sustain to provide maximum information services.

According to Tuncay (2019), library can benefit from using cloud computing technology by increasing computing performance, storage capacity, universal accessibility and cost reduction. This can help library in terms of fixed and maintenance cost reduction in the IT investment of both hardware and software as well as computer services. With cloud computing, libraries may prevent financial waste, better track staff activities, and avert technological headaches such as computer viruses, system crashes, and loss of data. When cloud computing is used in the library, this will likely have a significant impact on library services. According to Spreeuwenberg (2017), with cloud computing, it becomes easier to access data with several devices. Especially for mobile devices, this can be really useful since the only thing that is needed is an internet connection. Libraries are shifting their services to cloud computing technology to facilitate its services anywhere and anytime. In libraries, the following have been identified as possible areas of applying cloud computing: Building Digital Library/Repositories, Searching Library Data, Web Site Hosting, Searching Scholarly Content, File Storage, Building Community Power and Library Automation.

Nevertheless, the biggest benefit of the adoption of cloud computing technology is that one does not “buy” the cloud as purchases for software and hardware and hitherto being made for library automation. Much like a common utility, one just pays for what was used, and then turn it off when one is done. The ability to have a server somewhere, to not have to worry about it, turn it up as needed, and pay for only what is used attracts a lot of people to cloud deployment (Creeger: 2019), Library community can apply cloud infrastructure to amplify the power of cooperation and to build a significant, unified presence on the Web. This approach to computing can help libraries save time and money while simplifying workflows. To date, the main focus of libraries moving into the cloud has been due to, the need to disclose their vast collections. (Gbaje and Aliyu 2019).

In order to contend with the barrage of information available in today’s society, a medium, and an educational institution such as library needs to be put in place for proper acquisition, processing, documenting, retrieving and disseminating of information. The mode of information storage and transmission has undergone many radical changes in format; ranging from print materials to other information storages and transmitting media like non-print sources such as Compact Disc (CD); Diskettes; Magnetic tapes; CD ROMS; hard disks; punched paper tapes; Internet publications; zip disks; educational video and transparencies; books on cassettes; micro form publications; electric publications; machine readable tape; and cloud computing. Libraries have been using some cloud computing services for over a decade. Online databases are accessed as cloud applications. Large union catalogs can also be defined as cloud applications. The selection of which of these information resources to use is a continuous process dictated by changing curriculum, availability of new materials for Library Services.

Ordi (2016) observed that these media are useful for storage of data, information, and programs for safe keeping. Gbaje & Aliyu (2019), asserted that cloud computing comes into focus when there is need for increased capacity or added capabilities of computer without investing in new infrastructure, training new personnel, or licensing new software. Users can access database resources via the internet from anywhere for as long as they need without worrying about any maintenance or management of information technology infrastructure. Libraries can earn a number of benefits from cloud computing adoption in this information explosion era. Storage capacity, increased computational performance, cost minimization and global accessibility to information resources form part of some benefits derivable from adoption of cloud computing by libraries (Tuncay, 2018). This is in line with the assertion of Grace (2017) who ascertains that scalability, elasticity, virtualization, cost reduction, mobility, collaboration and risk minimization are among the reasons why organizations globally opted for cloud computing in their mandate to deliver efficient services to end users.

This can help libraries to have fixed and maintenance cost in their IT investment cheaper and affordable, thereby providing an enabling environment for effective service delivery. According to Okwoli, Ezra and Baba (2016) with cloud computing in libraries, all sort of financial wastage on IT investment, careless attitudes of users and technological headaches such as computer virus, system crashes and loss of data will be drastically monitored and avoided. There will likely be a significant improvement when cloud computing is adopted in library services delivery. This is coincided with the view of Spreeuwenberg (2017), who affirms that with the presence of cloud computing, it will be easier and efficient to have access to stored data through several remote devices. This can be usefulness especially with the mobile devices that can only require internet connection. Libraries now a day's vow to provide their services to client anywhere any time by

mounting their services on cloud computing (Okwoli, Ezra & Baba, 2016). Grant (2016) propounded that with the advent of new technologies, there is need for librarians to get used to such technologies, expand their skills and avails new ideas and approaches to market library services.

2.8 Challenges Facing the Use of Cloud Computing Services for Information Storage and Retrieval

The evolution of cloud computing brings about another challenge to academic libraries, irrespective of the benefits they enjoy from it. Radha (2018) highlighted three major challenges of cloud computing application to an academic library. This includes data security and privacy; the cost involved for software and hardware; technical skills required for maintenance. Tang (2018) specifically outlined issues of data security (user privacy leaks and virtualization security) and internet bandwidth as utmost challenges of cloud computing applications in academic libraries. This data security may create doubt in the minds of professionals. As in the case of digital data, there is still a huge fear of putting information in the hands of third parties because customers may lose ownership as the data is often stored in servers; and it is very difficult to migrate from cloud to cloud. According to Pandya (2015), failure in compliance, constant connectivity required, dependency, quality problems with a cloud service provider, time and budget constraints are challenges of cloud computing in academic libraries. He submitted that since all the development and deployment have been done by cloud service providers, it is very difficult to get a good grip on the overall system.

However, irrespective of the way or approach scholars have taken to describe the challenges of cloud computing in academic libraries, it is apparent that time and budget constraints, failure of compliance, the bandwidth of internet service, dependency on the cloud service providers, cost of hardware and software, data privacy and security, technical skills to maintain cloud services the major challenges in academic libraries. As more mid-sized libraries move to the cloud, the staffing implications for IT departments are becoming clearer. Whether the size of a giving library's IT staff will need to change as it ascends into the cloud depends on current staffing and staffing shifts will take place: individuals who are working in IT today will need new skills, and certain jobs will shift from the enterprise to the cloud service provide posited by Geoffery (2018). Experts have pointed out that it is wishful to think that cloud – based systems will manage themselves. If the library IT department is working in a cloud computing environment, then the library will continue to need individuals who understand the library's software applications and how the applications relate to the business.

Cloud computing challenges are interdisciplinary in nature and cannot be fully addressed from a purely technical perspective (Khajeh & Sriram, 2016). To successfully adopt cloud computing in library services, cooperation among library administrators and practitioners, other library personnel, cloud users (Lecturers and students), and cloud services providers is needed. It is important to note that the migration of IT applications and system to the cloud takes time. The timeline for cloud adoption can vary from several months to several years (Sullivem, 2019). It is of great importance that qualified and adequate staff be involved in the running and adoption of cloud computing. Inadequacy and incompetency of the staff might lead to ineffective utilization of cloud computing for library services according to Breeding (2012). He further observed that

regular training and retraining is needed to have a positive outlook of the provision of relevant library services.

Resolutions passed on all these issues are favorable although there are reservations on security. Breeding (2019), for one, noted that from a privacy and security perspective, comfort levels for using cloud –based products vary depending on the type of information and activity involved. Thus, libraries involved with highly sensitive information may gravitate towards private rather than public cloud offerings for instance, Kaushik and Kumar (2012) maintained that although the issues were not fully resolved, there is no doubt that libraries are moving towards cloud computing technology in present time and taking advantage of cloud-base services especially in building digital libraries, social networking and communication with manifold flexibilities. Romero (2018) added confidentiality, theft, and loss of file to the list. It stands to reason, therefore, that IT departments will need individuals who understand security issues at a deep level.

Oyeleye, Fagbola and Daramola (2019) on the "impact and challenges of the adoption of cloud computing in public universities in the South-west, Nigeria". Their results revealed that adopting cloud computing has a key influence on cost-effectiveness, enhanced availability, reduced investment in physical assets, reduced IT complexities, and ultimately increased operability. This was affirmed also by Yuvaraj and Mayank (2018), that 91% of the organizations in the US and Europe agree that the reduction of cost is a major reason for them to migrate to a cloud environment. From the user's point of view, a study by Ashtari and Eydgahi (2017) examined the influence of users' perceptions toward the cloud computing technologies was investigated the researchers focused on the associations between variables identified in the literature that were considered to be influencing the perception of students in the university in Southeast Michigan.

These variables include users' perceptions of the usefulness and effectiveness of cloud computing applications, perceived ease of use, Internet self-efficacy, computer anxiety, computer self-efficacy. They carried out an online survey among 40 undergraduate students at Michigan University and used the Technology Acceptance Model (TAM) to analyze the adoption of cloud computing by students. Challenges in the cloud computing environment are the lack of guiding policies, operational procedures and standards for acquisition, development of Information Technology and services among the cloud providers. This could limit organizational control over employees who manage cloud-computing infrastructures. Zhou and Zhang (2019) noted that many privacy and security breaches occur from within the cloud providers themselves, since the employees may have direct access to stored data and sell them to third parties in order to gain profit. Such malicious activities could put research data at risk.

2.9 Summary of Literature Review

This chapter reviewed literature that is related to the adoption of cloud computing technology for library services. It reviewed literatures on computer networks in libraries, rationales for adopting cloud computing in libraries, information services provided through cloud computing in libraries, implication of cloud computing in libraries in terms of cost and summary of the literature review. However, it has been revealed that although much works has been done in this area, and equally much more work still remained to be done especially on the adoption of cloud computing technology for information storage and retrieval in universities library in Kwara State. Recently, cloud computing has been an important concept in the field of Information Technology; it is recognized as an important area of Information Technology investment.

Cloud computing is considered a new phenomenon that provides opportunities for organizations, by offering a large collections of easily accessible virtual computer resources, and it has the possibility for facilitating economic growth by offering existing implemented remote infrastructure for computing and data management needs with lower initial investment capital (Oliveira, Thomas & Espadanal, 2019). Nevertheless, the challenge remains to determine the factors that lead organizations to adopt and deploy cloud computing. This revelation has offered the opportunity for the researcher to fill the missing gap with awareness and utilization of cloud computing for information storage and retrieval in academic libraries in Kwara State.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter is devoted to the methodology applied in carrying out the research. The procedures used in gathering data and statistical tools used in analyzing the data are explained. The following are covered in this chapter: Research design; Population of study; Sample size and sampling technique; Data collection Instrument; Method of data collection; Validity and Reliability of Instrument; Method of data analysis and Ethical consideration.

3.2 Research Design

The approach used for this study is descriptive survey method. A survey research design was adopted for this study. The survey research involves the act of conducting a study of specific groups. It critically examines events, opinions, objects, attitudes, subjects or ideas with the aim of providing accurate information about the phenomenon being studied (Kothari, 2013). The survey method is very appropriate in this study because it will allow the researcher to investigate the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State.

3.3 Population of the Study

The population for this study consists of all librarians in the selected universities in Kwara State which are University of Ilorin, Ilorin; Summit University, Offa; and Kwara State University, Malete. The total number of librarians in University of Ilorin is fifty (50), Summit University is three (3) and Kwara State University is twenty (20) making a total of 73 respondents.

3.4 Sample Size and Sampling Technique

Sample size is the actual number chosen to represent the population. Sample is a crucial issue in any quantitative research like this. It was unethical to derive "small" group of elements as sample from a "small" population. Hence, total enumeration sampling technique was used. This implies that all the population of the study (73) forms the sample size also. Total enumerative was use because the population is minimal.

3.5 Research Instrument

The instrument that was used for data collection in this study was questionnaire. The questionnaire was a closed-ended one. In order to secure honest responses from the respondents, they were promised anonymity and were assured that any information they give was treated in strict confidence. The questionnaire was of two parts. Part-one elicited the demographic information about the respondents including age, gender. Part-two of the questionnaire comprised of sub sections based on the objectives of the study.

3.6 Validity and Reliability of the Instrument

The instrument was validated to ensure both the content and face validity. To achieve these, the instrument was given to the supervisor including other two lecturers in the Department of Library and Information Science. Their observation was incorporated in the final questionnaire for distribution and in order to guarantee validity, the researcher will provide enough clear questions for respondents. To achieve the reliability of the instrument that would use for data collection in this study, a split half reliability method was used and the reliability of the instrument was calculate using Person Moment Correlation. A pilot study was conducted among librarians in Al-Hikmah University, Ilorin. Ten copies of the questionnaire were administered on a work day to librarians at the Main Library. The respondent at the pilot stage were encouraged to provide feedback on the ambiguity (if any) and structure of the questions. All the questionnaire were processed and analysed using Cronbach's Alpha analysis. Cronbach reliability test was conducted to determine the reliability of main constructs in the questionnaire.

3.7 Method of Data Collection

Copies of the questionnaire was personally administered randomly to the librarians in the university libraries under study. No research assistant was needed due to the simplicity of the research work and its components.

3.8 Method of Data Analysis

Descriptive statistics including percentages and mean were used in analyzing the data. Descriptive statistics was adopted because of ease and simplicity to understand. Primary data solicited using questionnaires was cleaned, coded and entered into the Statistical Package for Social Sciences (SPSS) version 20 software for quantitative analysis. Tables were used for results presentation and interpretation.

3.9 Ethical Considerations

The study employed the anonymity ethical consideration and follow all the ethics guiding scholarly writing by ensuring the work is original. According to Mugenda and Mugenda (2003), anonymity refers to keeping secret by not identifying the ethnic or cultural background of respondents, refrain from referring to them by their names or divulging any other sensitive information about a participant. This is why, during study, the researcher must promise to protect the information given in confidence by the respondent. But, if any information has to be revealed, then consent must be sought from the respondent(s).

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter focused on the analysis of the data, presentation of results and discussion of findings. Data collected through questionnaires are presented in tables and analyzed using frequency counts and percentages. Also in this chapter, the major findings of the study are further discussed.

4.2 Response Rate

Table 4.1: Distribution of Questionnaire & Response Rate

Description	**Frequency**	**Percentage (%)**
Returned questionnaires	64	85.9
Unreturned questionnaires	9	14.1
Total	73	100.0

The total of 73 copies of questionnaire were distributed to librarians in the three selected universities in Kwara State, out of which 64 were completed and retrieved. Resulting in as response rate of 85.9%.

4.3 Demographic Information

Table 4.2: Demography of the Respondents

Gender	Frequency	Percentage
Male	41	64.1
Female	23	35.9
Total	**73**	**100.0**
Age		
15-20 years	--	--
21-25 years	--	--
26-30 years	--	--
31-35 years	11	17.2
36 years and above	53	82.8
Total	**73**	**100**
Highest Academic Qualification		
HND/BSC	18	28.1
MSC/PhD	46	71.9
Total	**73**	**100**
Years of Work Experience		
1-5 years	11	17.2
6-10 years	20	31.3
11-15 years	17	26.6
16-20 years	11	17.2
21-25 years	5	7.8
Total	**73**	**100**

Table 4.2 shows the demographic information of librarians in three selected universities in Kwara State. It revealed that larger ratio of the respondent was male 41(64.1%) while the remaining 23(35.9%) were female. The table also shows the distribution of the respondents by their age. A total of 11(17.2%) of the respondent were between the age range of 31-35years, while 53(82.8%) of the respondents are of the range age of 36years above. The table also distribute the respondent by their academic qualification, a total of 18(28.1%) of the respondent has HND/BSC while 46(71.9%) of the respondents are MSc/PhD holders. A total of 11(17.2%) of the respondents have 1-5yrs working experience, 20(31.3%) of the respondents have 6-10yrs working experience, more so, 17(26.6%) of the respondents has 11-15yrsworking experience, while 11(17.2%) of the respondents has 16-20yrsworking experience and 5(7.8%) of the

respondents has 21-25yrsworking experience. essentially, the largest percentage of the respondents for this study is male, with the respondents with 6-10yrs teaching experience followed by 11-15yrs teaching experience counterparts.

4.3 Analysis of Data on Research Questions and Interpretation

Research Question One: What is the extent of awareness of cloud computing services by librarians in selected academic libraries in Kwara State?

Table 4.3: The extent of awareness of cloud computing services by librarians in selected academic libraries.

ITEMS	VHE	HE	LE	VLE	$\bar{x}$	St.D
OCLC	39(60.9%)	15(23.4%)	6(9.4%)	4(6.3%)	2.49	0.85
Scribed	51(79.7%)	9(14.1%)	2(3.1%)	2(3.1%)	3.11	0.89
OSS Labs	39(60.9%)	19(29.7%)	1(1.6%)	5(7.8%)	2.28	0.89
Polaris Library System	30(46.9%)	18(28.1%)	12(18.8%)	4(6.3%)	1.98	1.04
Discovery Service	39(60.9%)	15(23.4%)	3(4.7%)	7(10.9%)	3.11	0.97
WorldCat	32(50.0%)	13(20.3%)	11(17.2%)	8(12.5%)	3.07	1.05
Google Docs	40(62.5%)	16(25.0%)	7(10.9%)	1(1.6%)	3.50	0.49
Weighted Mean = 16.47						

Table 4.3 show extent of awareness of cloud computing services by librarians, the following results were obtained by using weighted mean scores indicated on Table: majority of the respondents 3.50 indicated Google docs followed 3.11 indicated Scribed and Discovery service while 3.07 indicated World cat while on a contrary view 2.28disagreed with OSS Labs and 1.98 Polaris library system. The inference to this finding is that majority of the respondent indicated they are aware of Google docs, Scribe, Discovery service and World cats cloud computing services used by librarians for information storage and retrieval.

Research Question Two: What are the types of cloud computing services used by librarians for information storage and retrieval in selected academic libraries in Kwara State?

Table 4.4: The types of cloud computing services used by librarians for information storage and retrieval in selected academic libraries.

ITEMS	SA	A	D	SD	$\bar{x}$	St.D
OCLC	33(51.6%)	12(18.8%)	14(21.9%)	5(7.8%)	2.44	0.97
Scribed	35(54.7%)	13(20.3%)	8(12.5%)	8(12.5%)	2.81	1.09
OSS Labs	36(56.3%)	10(15.6%)	11(17.2%)	7(10.9%)	2.39	1.03
Polaris Library System	30(46.9%)	12(18.8%)	22(34.4%)	--	2.37	1.13
Discovery Service	25(39.1%)	19(29.7%)	13(20.3%)	7(10.9%)	2.31	1.03
World Cat	43(67.2%)	11(17.2%)	6(9.4%)	4(6.3%)	2.79	1.06
Google Docs	53(82.8%)	11(17.2%)	--	--	3.31	0.83
Weighted Mean = 21.89						

Table 4.4 show the type of cloud computing services used by librarians for information storage and retrieval, the following results were obtained by using weighted mean scores indicated on Table: almost all of the respondents 3.31 indicated Google docs followed 2.81 revealed Scribe, while the next in rate 2.79who indicated World cat. This suggest that librarians in universities library in Kwara state used cloud computing services for information storage and retrieval.

Research Question Three: What are the benefits of cloud computing services usage for information storage and retrieval in selected academic libraries in Kwara State?

Table 4.5: The benefits of cloud computing services usage for information storage and retrieval in selected academic libraries.

ITEMS	SA	A	D	SD	$\bar{x}$	St.D
It is universally accessible.	28(43.8%)	21(32.8%)	9(14.1%)	6(9.4%)	2.35	1.09
It results in high users' satisfaction.	40(62.5%)	14(21.9%)	5(7.8%)	5(7.8%)	2.47	1.10
CCS prevents repetition of routines.	64(100%)	--	--	--	3.24	0.96
It prevents loss of data.	64(100%)	--	--	--	3.24	0.96
It enhances efficient collaboration with other libraries.	43(67.2%)	10(15.6%)	5(7.8%)	6(9.4%)	2.29	1.18
It is effective and efficient in-service delivery.	54(84.4%)	5(7.8%)	3(4.7%)	2(3.1%)	3.15	0.88
Limitless storage capacity.	34(53.1%)	16(25.0%)	10(15.6%)	4(6.3%)	2.25	0.68
CCS is time saving.	37(57.8%)	12(18.8%)	14(21.9%)	1(1.6%)	3.11	0.97
CCS is cost saving.	36(56.3%)	11(17.2%)	13(20.3%)	4(6.3%)	2.88	1.21
Weighted Mean = 16.38						

Table 4.5 show the benefits of using cloud computing services for information storage and retrieval, the following results were obtained by using weighted mean scores indicated on table: majority of the respondents 3.24 agreed with CCS prevents repetition of routines and it prevent loss of data followed by 3.15 who agreed with It is effective and efficient in-service delivery, while 3.11 agree with CCS is time saving, 2.88 who indicated CCS is cost saving. This suggest that there are great benefits of using cloud computing services for information storage and retrieval.

Research Question Four: What are the challenges facing the usage of cloud computing services for information storage and retrieval in selected academic libraries in Kwara State?

Table 4.6: The challenges facing the usage of cloud computing services for information storage and retrieval in selected academic libraries.

ITEMS	SA	A	D	SD	$\bar{x}$	St.D
Poor internet connections.	44(68.8%)	12(18.8%)	4(6.3%)	4(6.3%)	2.88	1.21
Problem of data privacy.	34(53.1%)	6(9.4%)	10(15.6%)	14(21.9%)	2.47	1.10
The management of cloud costs and budgets.	42(65.6%)	12(18.8%)	6(9.4%)	4(6.3%)	3.24	0.96
Staff training and readiness for cloud-based technologies.	46(71.9%)	14(21.9%)	2(3.1%)	2(3.1%)	3.15	0.88
compliance with data privacy regulations.	40(62.5%)	13(20.3%)	8(12.5%)	3(4.7%)	2.29	1.18
Problem of data security.	33(51.6%)	18(28.1%)	8(12.5%)	5(7.8%)	3.24	0.96
Poor funding of the library.	41(64.1%)	15(23.4%)	8(12.5%)	--	3.14	0.98
Technical problems associated with the use of cloud computing.	39(60.9%)	18(28.1%)	7(10.9%)	--	3.29	1.18
Poor technical knowledge among librarians.	39(60.9%)	13(20.3%)	8(12.5%)	4(6.3%)	3.11	0.97
Unreliable power supply.	26(40.6%)	17(26.6%)	19(29.7%)	2(3.1%)	2.35	1.09
Weighted Mean = 16.38						

Table 4.6 show the challenges facing the use of cloud computing services for information storage and retrieval, the following results were obtained by using weighted mean scores indicated on Table: majority of the respondents 3.29 indicated Technical problems associated with the use of cloud computing followed by3.24agreed with The management of cloud costs and budgets and Problem of data security followed by 3.15 who agreed with Staff training and readiness for cloud-based technologies, while 3.14 agree with Poor funding of the library and 3.11 agree with Poor technical knowledge among librarians, 2.88 who indicated Poor internet connections. This suggest that despite the great benefit of using cloud computing services in library there are some challenges militating against it for information storage and retrieval.

4.4 Discussion of Findings

The study investigated the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. Five research question were raised, each of the four research questions were based on determine the extent of awareness of cloud computing services by librarians; examine the type of cloud computing services used by librarians for information storage and retrieval; examine the purpose of using cloud computing services for information storage and retrieval; determine the benefits of using cloud computing services for information storage and retrieval and; determine the challenges facing the use of cloud computing services for information storage and retrieval. The findings of study are discus as follows:

Findings to research questions one shows in the that majority of the respondents indicated that they are aware of Google docs, Scribe, Discovery service and World cat while on a contrary view some respondents disagreed with (Operating Support System) OSS Labs and Polaris library system. This finding substantiates the submission of Moghaddam (2019) admits that the advent of the internet, digitization and the ability to access library and research materials from remote locations have also created dramatic changes globally. Therefore, for university library to offer an effective service professional librarian are the most powerful asset, and they have to be train and retrain to deliver effective services on ICT, computer, internet, search engines, web and digital information. It is worthy of note that in order to enable the computer to perform an accurate job, data inputted to it must be accurate. This is best explained in computer jargon as ‘‘garbage in garbage out’’ (Tibi, 2018). Uwaifo (2019) advised librarians to be aware of the rapid growth being made towards integrated systems. He further advised that this is true because the numerous acquisitions functions cannot be fruitfully performed using the manual system,

which is susceptible to delays, accumulation of backlogs, errors, patrons and librarians' dissatisfaction.

Findings to research questions two using a 4-point scale, the table is explain using weighted mean score from strongly agree. Table shows that Google docs, Scribe, and World cat are the type of cloud computing services used by librarians for information storage and retrieval. The finding corroborates with Yaacob, (2017), states that the use of cloud computing technologies facilitates easier collaboration. Since services in the cloud can be accessed anytime from any computer, it's easy to collaborate with employees in distant locations. Cloud computing enables the scale up or down of IT requirements of organizations quickly and efficiently, without hampering productivity. It cuts down the time involved in buying and setting up additional hardware, software & other necessary resources every time a new service is required. Salaam, Idhalama and Fidelis (2020) investigated librarians' perspectives on cloud computing. The results revealed that librarians are enthusiastic about the usage of cloud computing solutions. Sudhier and Seena, (2018) carried out a survey to ascertain the awareness and use of cloud computing technologies among library professionals in the Kerala university library system in India. Analysis shows that Facebook and google apps like Gmail, Google Docs are the cloud computing technology used by the majority of the respondents.

Findings to research questions three shows benefits of using cloud computing services for information storage and retrieval, the table is explain using weighted mean score from strongly agree: CCS prevents repetition of routines, it prevents loss of data, it is effective and efficient in-service delivery, CCS is time saving, and CCS is cost saving. This finding substantiates Reid, (2017) notes that the broad network access is a major benefit that libraries derived from using cloud computing technologies. Cloud Capabilities are available over the network and accessed

through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops, and PDAs. Similarly, according to Kroski (2019), cloud services enable cheaper linkup since services may be retrieved from any device, at any time, regardless of location.

Finding to research questions four shows challenges facing the use of cloud computing services for information storage and retrieval, the table is explain using weighted mean score from strongly agree: Technical problems associated with the use of cloud computing, The management of cloud costs and budgets, Problem of data security, Staff training and readiness for cloud-based technologies, Poor funding of the library, Poor technical knowledge among librarians, and Poor internet connections. This finding substantiates Radha (2018) highlighted three major challenges of cloud computing application to an academic library. This includes data security and privacy; the cost involved for software and hardware; technical skills required for maintenance. Tang (2018) specifically outlined issues of data security (user privacy leaks and virtualization security) and internet bandwidth as utmost challenges of cloud computing applications in academic libraries. While Pandya (2015) furthered identify failure in compliance, constant connectivity required, dependency, quality problems with a cloud service provider, time and budget constraints are challenges of cloud computing in academic libraries.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusion and recommendations of the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State**.**

5.2 Summary

The study was undertaken to examine the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State, total of 73 copies of the questionnaires were distributed to librarians in three selected universities in Kwara State, out of which 64were completed, retrieved and used for data analysis. Four research questions were raised and descriptive survey was adopted for the study. Questionnaire was the main instrument used for data collection. The instrument was subjected to validation by the supervisor and two lecturers in the department of library and information science Kwara State Polytechnic Ilorin. The summary of the findings was based on the analysis made in chapter four.

The descriptive survey method was adopted for this study and it was conducted based on guided objectives of the study which were also the research questions for the study. From the data collected and analyzed, the researcher was able to examine and ascertain the awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State**.** The questions were presented in tabular form. The data for the study was

collected and presented and analyzed using percentage and frequency tables with the aid of questionnaire. The finding of the study are summaries as follows:

i. Majority of the respondent revealed that they are aware of Google docs, Scribe, Discovery service and World cat while on a contrary view some respondents disagreed with OSS Labs and Polaris library system,

ii. Majority of respondents indicated that Google docs, Scribe, and World cat are the type of cloud computing services used by librarians for information storage and retrieval.

iii. Majority of respondents indicated that cloud computing services prevents repetition of routines, it prevents loss of data, it is effective and efficient in service delivery, cloud computing services is time saving, and cloud computing services is cost saving.

iv. Technical problems associated with the use of cloud computing, the management of cloud costs and budgets, problem of data security, staff training and readiness for cloud-based technologies, poor funding of the library, poor technical knowledge among librarians, and poor internet connections were the major challenges facing the use of cloud computing services for information storage and retrieval.

5.3 Conclusion

Based on the findings of this study, the following conclusions were drawn from the outcomes of the study. The study focuses on awareness and utilization of cloud computing for information storage and retrieval in selected academic libraries in Kwara State. the study gives an insight into Google docs, Scribe, and World cat as the type of cloud computing services used by librarians for information storage and retrieval, the study further revealed respondents use cloud computing services in providing information, to be universally accessible, they use cloud computing services for lending of e-books, they use cloud computing services for marketing and for current

awareness service**,** they use cloud computing services for statistic taking, they use cloud computing services for article delivery service to patrons and they use cloud computing services for cataloguing**.**

However, the study further identified technical problems associated with the use of cloud computing, the management of cloud costs and budgets, problem of data security, staff training and readiness for cloud-based technologies, poor funding of the library, poor technical knowledge among librarians, and poor internet connections as the major challenges facing the use of cloud computing services for information storage and retrieval. Conclusively, Awareness and use of cloud computing services in the library is a very vital and crucial thing that has to happen and changes every aspect of librarianship in the 21st century. It must be noted that cloud computing service is used to carry out library services that were previously done manually; this will aid easy access and retrieval. Therefore, for effective use of cloud computing service in the library, the management should make provision for proper backup of data, constant power supply, constant Internet connection, adequate funding of the library, availability of technically skilled librarians, and increased awareness/sensitization.

5.4 Recommendations

The following recommendations are suggested based on the findings of the study:

i. Problems related to slow connectivity should be overcome by upgrading the bandwidth.

ii. Adequate financial support is essential to enable institutional managers to provide the necessary infrastructure facilities.

iii. Government should increase funding to ensure that tertiary institutions have access to adequate funds to address existing gaps and implement necessary upgrades to enhance the working environment for academic staff.

iv. Government and policymakers should reduce academic workload especially those not related to individual professions, and encouraging productivity by giving out research grants.

v. In the same vein, the government and university management should address the problem of poor funding of the library and poor technical knowledge among librarians more seriously through research and development.

5.5 Suggestion for Further Study

From the findings of the study, it is suggested that further studies could be carried out to encourage generalization of findings obtained from the study:

i. It is recommended that a study should be carried out on the systematic review of working condition as determinant of utilization of cloud computing for information storage and retrieval.

ii. It is also recommended that a study should be carried on the impact of workload induced stress on the utilization of cloud computing for information storage and retrieval.

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APPENDIX

QUESTIONNAIRE ON:

AWARENESS AND UTILIZATION OF CLOUD COMPUTING FOR INFORMATION STORAGE AND RETRIEVAL IN SELECTED ACADEMIC LIBRARIES IN KWARA STATE

Dear Respondent,

Thank you for participating in this questionnaire. The purpose of this survey is to gather insights into the adoption of cloud computing in university libraries and to understand the perspectives and experiences of professionals working in these institutions. Your responses will remain anonymous and confidential. Please answer the following questions to the best of your knowledge and experience. Your valuable inputs will contribute to valuable research in this domain.

HAKEEB, Warith Hackinkumin

Researcher

SECTION A: Demographic Information

INSTRUCTION: Kindly fill by ticking (✓) in the appropriate column the one that best suit your response. Please note that your responses would be treated as confidential. Thanks.

Gende Status: Male ( ); Female ( )

Age: 15-20 years ( ); 21-25 years ( ); 26-30 years ( ); 31-35 years ( ); 36 years and above ( )

Highest Academic Qualifications: HND/BSc ( ); MSc/PhD ( )

Years of Work Experience: 1-5 years ( ); 6-10 years ( ); 11-15 years ( ); 16-20 years ( ); 21-25 ( )

SECTION B: What is the extent of awareness of cloud computing services by librarians in selected academic libraries in Kwara State?

Keys: VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent

ITEMS	VHE	HE	LE	VLE
OCLC				
Scribed				
OSS Labs				
Polaris Library System				
Discovery Service				
WorldCat				
Google Docs				

SECTION C: What are the types of cloud computing services used by librarians for information storage and retrieval in selected academic libraries in Kwara State?

Keys: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

ITEMS	SA	A	D	SD
OCLC				
Scribed				
OSS Labs				
Polaris Library System				
Discovery Service				
World Cat				
Google Docs				

SECTION D: What are the benefits of cloud computing services usage for information storage and retrieval in selected academic libraries in Kwara State?

Keys: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

ITEMS	SA	A	D	SD
It is universally accessible.				
It results in high users' satisfaction.				
CCS prevents repetition of routines.				
It prevents loss of data.				
It enhances efficient collaboration with other libraries.				
It is effective and efficient in-service delivery.				
Limitless storage capacity.				
CCS is time saving.				
CCS is cost saving.				

SECTION E: What are the challenges facing the usage of cloud computing services for information storage and retrieval in selected academic libraries in Kwara State?

Keys: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

ITEMS	SA	A	D	SD
Poor internet connections.				
Problem of data privacy.				
The management of cloud costs and budgets.				
Staff training and readiness for cloud-based technologies.				
compliance with data privacy regulations.				
Problem of data security.				
Poor funding of the library.				
Technical problems associated with the use of cloud computing.				
Poor technical knowledge among librarians.				
Unreliable power supply.				