

IMPLEMENTING CLOUD COMPUTING IN ACADEMIC LIBRARIES IN IMO STATE: AWARENESS AND CHALLENGES.

By

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ABSTRACT

This study ascertained the extent of implementing cloud computing in academic libraries in Imo State. The study looked at the ICT skills possessed by library staff, reasons for adopting cloud computing as well as the possible challenges to effective implementation of cloud computing in academic libraries in Imo State. The study was guided by three research questions, three objectives and three hypotheses. The researcher adopted a descriptive survey design to carry out the study. A census study technique was employed to cover the entire population of three hundred and eighteen (318) staff in academic libraries in Imo State. A rating scale captioned "Extent of Staff Preparedness towards Implementing Cloud Computing Rating Scale (ESPTICCRS)" was used for data collection. The reliability index (r) of 0.82 was established using PPMC statistics. The data obtained were analyzed using mean and standard deviation statistics to answer the research questions posed. The hypotheses were tested using one sample t-test statistics at 0.05 level of significance. The findings of the study showed that staff in academic libraries in Imo State do not possess the requisite skills in readiness for the adoption of cloud computing and that the challenges associated with the adoption of cloud computing in academic libraries in Imo State are significantly high. It was therefore recommended that academic library managers should begin the adoption of cloud computing in their various libraries since there are already existing library networks at their disposal; that staff in academic libraries should undergo training on ICT and other related areas to enable them have some level of expertise in basic computer operations, networking, software and data management, among others and that academic library managements should be provided with adequate funds to enable them make proper planning and execution of any project including the adoption of cloud computing in their institutions/libraries.

Keywords: Implementing, Cloud computing, Academic libraries, Awareness, Challenges, Imo State

Introduction

Academic libraries are attached to higher educational institutions, such as universities, polytechnics and colleges of education. These libraries are created to support the course of teaching, learning and research in achieving the missions of their parent institutions. The academic library is regarded as a repository of information in both prints and electronic forms which responds to the information needs of its diverse users. Libraries have advanced in their activities to integrate Information Technology (IT) based products and services for efficiency. Academic libraries are struggling to keep their place as the major source of inquiry in the face of emerging information technologies, which have revolutionized not only ways that information is packaged, processed, stored, and disseminated, but also how users seek and access information (Anunobi & Okoye, 2008).

One of the emerging information technologies is cloud computing. Pritzker and Gallagherr in National Institute of Standards and Technology (2024) defined cloud computing as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly positioned and released with minimal management effort or service provider interaction. Hayes (2018) describes it as highly scalable and used virtualized resources that can be shared by users. Prior to the introduction of Information and Communication Technology (ICT), tasks were handled manually and independently in academic libraries. Provision of effective library services relies so much on the information and communication technology expansion. Cloud preparedness assessment that was done in most firms identified technological capabilities which included the IT infrastructure, and human resource which deals with skills and attitude as well as external capabilities which included security, policies and regulations as key factors of preparedness of cloud computing. (Workineh, Garcia & Midekso, 2017).

Cloud computing can be defined as a technology that relies on the transfer of processing and storage space of a computer to the so-called cloud that is accessed via the Internet. According to Lijuan (2020), cloud computing is a platform solution for handling all library systems, including circulation, cataloging, acquisitions, serials, wireless access point, digital tools, internet connectivity, thin client architecture, system data analytics and digital librarians. Cloud computing

initiatives for libraries include dark archive solution, CLOCKSS, Ex Libris, Dura Cloud, LibLime, Polaris Integrated Library System, the 3M Cloud Library App and OCLC WorldShare Management Services (WMS), and PORTICO; Vishakha and Sarangapani (2019) stated that libraries worldwide have also started using cloud computing to handle e-resources usage, hosting web applications, cataloging online public access, managing digital libraries, hosting various statistical tools and data sets, etc.

The need for the adoption of cloud computing services has become a thing of great concern to librarians in academic libraries in Nigeria. Commenting on this issue, Sinha (2023) asserts that quality features, including access to a broader computing resource network, self-services, agile services, pay-as-you-go services and resource centralization offer compelling case for academic libraries to integrate cloud services. Five facilities such as internet service, thin client architecture, digital librarian, digital resources and wireless access point are considered requirements for cloud computing implementation. It is recommended that libraries will revive and sustain their importance by integrating cloud computing technologies, which will make them part of the Internet of Things (IoT) experience that will soon rule every educational sector's activities. Libraries in cloud computing technologies will certainly turn into smart library and optimize library services in information era (Wada, 2018). Each library needs to develop up- date knowledge delivery infrastructure and conducive environment that promotes teaching, research and learning. Globally, a study conducted by AMD (2024) found that every region in the world appears to be at different stages of cloud computing implementation where organizations worldwide are implementing cloud-based solutions signaling a healthy uptake of the technology with North America leading followed by Asia. Molla and Licker (2014) opined that human resource capabilities refer to training and experience posed by the staff in an organization. Organizations where staff have accumulated more knowledge and skills will easily adopt cloud computing successfully. This makes knowledge and skills key indicators to cloud adoption readiness in an institution ((Workinch, Garcia & midekso, 2017).

In this era, libraries are changing almost by using cloud computing technology. Academic libraries in developed world use cloud-based resources primarily to create digital libraries, social networking and knowledge communication. Therefore, academic libraries in developing countries (Nigeria inclusive) need to think deeply about library services with cloud-based technology to

provide their customers with the required services. The researcher therefore examined implementing cloud computing in academe libraries in Imo State.

Statement of the Problem

Despite the fact that cloud computing has strong guarantee for effective service delivery in academic libraries and has also predisposed library staff for increased productivity, yet many tertiary institutions and their library staff have not fully integrated cloud computing in their libraries due to lack of awareness and challenges such as lack of manpower, adequate skills, poor infrastructure, poor funding and poor power supply. The managers of academic libraries still look at various impediments in the adoption process, ranging from awareness, acceptance, poor skilled human resources as well as other security concerns and all the above issues constitute setbacks in implementing cloud computing in academic libraries in most institutions of high learning hence the need to embark on this research.

Purpose of the Study

Generally, the purpose of the study is to examine the extent of staff preparedness and challenges towards implementing cloud computing in academic libraries in Imo state. Specifically, it sought to:

1. determine the ICT skills possessed by library staff that-showed-preparedness towards the adoption of cloud computing in academic libraries in Imo State.
2. establish the reasons for adopting cloud computing in academic libraries in Imo State.
3. identify the possible challenges, staff would face in implementing cloud computing in academic libraries in Imo State.

Research Questions

The following research questions were posed to guide the study.

1. What are the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State?
2. What are the reasons for adopting Cloud computing in academic libraries Imo State?

3. What are the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

- H₀₁:** The mean rating score on the ICT skills possessed by library staff towards the adoption of cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50
- H₀₂:** The mean rating score on the reasons for adopting Cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50
- H₀₃:** The mean rating score on the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50.

Literature Review.

The word cloud computing is a new technology model for IT services which many organizations and individuals are adopting. It can transform the way systems are built and services delivered, providing the libraries with an opportunity to extend their impact. Cloud computing is internet-based computing where virtual shared servers provide software, infrastructure, platform devices and other resources and hosting to customers on a pay –as –you use basis. All information that digitized system has to offer is provided as services in the cloud computing model. Sahu (2014) pointed out that users can access these services available on the” internet cloud “without having any previous know how on managing the resources involved.

Meanwhile, cloud computing is a model for enabling ubiquitous, convenient and on-demand network access to a shared pool of configurable computing resources like networks, servers, storage, applications and service which can rapidly provisioned and released with minimal management effort or service provider interaction (Bhattacharjee & Das-purkayastha, 2023). Gartner Group (2018) opined that cloud computing as a style of computing in which massively scalable and elastic IT –enabled capabilities are delivered as a service to external customer using internet technologies. Cloud computing is delivering computing services over the internet on

demand instead of from local hardware. According to Forrester (2019) cloud computing is a pool of abstracted, highly scalable, and manage computed infrastructure capable of hosting end-customer applications and billed by consumption. This IT services provided people the way to share distributed resources and services that belong to different organizations or sites. Many companies, such as Amazon, Google, and Microsoft and so on, accelerate their paces in developing cloud computing systems and enhancing their services to provide for a larger amount of users.

Libraries all over the world are using compute to run their services with Integrated Library Management Software (ILMS), website or portal, digital library or institutional repository etc. These are either maintained by parent organization's computer staff or library staff. It involves investment on hardware, software, and staff to maintain these services and undertake backup and upgrade as and when new version of the software gets released. Sahu (2014) stated that library professional are being trained in maintaining servers , find it difficult to undertake some of these activities without support of IT staff from within or outside the organization.

Library and information networks have the potential to improve library services in several ways. It brings down the cost of information products and services in the network environment in shared mode. It also enable libraries to offer need-based services to the end users eliminating the limitation of size, distance and language barriers among them. With evolution in library networks, the emphasis has move from the network as physical entities to the resources available through the network. A network is developed is developed when a group of libraries and information centers decide to exchange information using computers. Miyazawa (2017) opined that library networks use existing communication facilities to establish networks amongst libraries that agreed to cooperate amongst themselves through more or less formal agreement with a view to pooling their resources and to offer better service to the users. Networking and modernization are becoming very important in all types of libraries as they enable the users to have access to the resources of many other libraries in addition to their own (Li,2013). The major purpose of a library is to share resources and services amongst member libraries. According to Subba-Rao (2011) a library network is broadly defined as a group of libraries and information centres that are interconnected to form a system with the aim in helping each other with information needs of the users. It is seen as a group of individuals or organization that are interconnected to form a system to accomplish

some specific goals. So these linkage must include a communication mechanism, and many networks exist for express purpose of facilitating certain types of communication among members.

Information and Communication Technology Skills Possessed by library Staff.

In this ICT –oriented environment, library professionals must become ICT competent in order to scale through. Sinha (2023) stated that since skills are essential for the success of individuals and libraries, the universities should include emerging skills in their curricula to meet the need of 21st century librarians and expectation of potential employers. Library and information science professional must update and upgrade their ICT skills to perform better in digital environment. Must often some people will asked if libraries have a place in the next century. Ogaga, Uzezi and Antidius (2020) is among the individual who believes that libraries have no place in the next century , while Adams(2020) opines that the position of the librarians is still relevant but they ought to redefined their roles to fit into the technological advancement before making libraries to consider ways that could improve the staff. Cloud services minimize the involvement of non- ICT staff, the need to have cloud computing experts is not an option due to roles such regulatory compliance, service support , cloud service developers and meeting this gap in developing countries may take a bite longer to fully adopt cloud computing (Raza, Khan, Rafi and Javaid , 2020)

Karim and Rampersad (2017) pointed out that the gap among librarian’s skills and priority areas for training and skills critical information technology required by library and information professionals with regards to the requirements of the current technology in the developing libraries. That is why librarians are part of a global world that is increasingly shaped by electronic networks and information technology. According to Eke (2020) heavy reliance on technology suggests that LIS professionals must be able to adapt and learn new technology, advanced skills and tools such as web 2.0, for academic success. This LIS professional must be an expert to use them for the maximum benefits of the users. Meanwhile, librarians should apply the skills acquired through professional development while discharging their professional duties. ICT skills handle resources, create awareness about library automation and digital library software, LIS professional’s attitude towards ICT, ETC. The needs to improve IT Infrastructure and regular training of library professional are required to utilize library e-resources effectively.

On the reason for adoption of cloud computing in academic libraries, Hussaini, Vishisth, Garba and Jimah (2017) discovered that the use of cloud computing in library services ensures security in terms of data loss, leakage and system crash is guaranteed since the account, services is always monitored by the their party to avoid traffic hijacking and malicious insider. With cloud computing there less change of virus invading the device, device being physically stolen and less chance for data to be lost if the client computer crashes or is stolen. Pal (2013) revealed that data stored in the cloud is safe since a cloud hosing company uses several ways of backup in order to ensure that no any data will be lost. He also pointed out there is need for maintaining and backing up data will be no more the responsibility of the libraries since all the data will be stored in the cloud which shall be managed by some cloud provider. Hussaini et.al stated that with cloud computing libraries can be rest assured of a strong back up of their information resources in case of server crash and other unforeseen events.

The use of cloud computing in library services allows information sharing, mobility and collaboration. Abidi and Abidi (2022), Trtt and Kendrick (2024) opined that collaboration with colleagues in other libraries simply would not be possible without cloud computing. These have allowed sharing and access to library information services without geographical restrictions. This affirmed with Alotaibi (2013) study which pointed out that since services in the cloud can be accessed anytime from any computer, its' easy to collaborate with employees in distant location. Furthermore, the sharing of data among the libraries will in principle reduce the overall cost and increase the efficiency. All adoption of cloud computing will check the staff redundancies and increase the library efficiency (Yuvaraj, 2013). The author went further in stating some of the benefit libraries derived in implementing cloud computing such as optimize library services through high computing power, location and device independency, high scalability, less maintenance, less indulgence in the library activities, unlimited storage capacity, diverse support, faster deployment and development, greener library services, ubiquitous availability of the library services, pay-per-use, reduced technology obsolesce and no capital investment. Geoffrey (2023) observed that having data stated in the cloud offers several advantages such as common data which can be easily shared and accessed by users. Libraries can now form a network of services, which ordinarily would have been a private to a single library. Technical operation such as serial catalogue, initially was done thousands of time by libraries differently and its update done separately, now cloud computing offers the opportunity for the catalog to be store and updated by

a single library, then share to other libraries. Oden (2021) noted that cloud computing technologies offers cloud options such as private cloud, public cloud and hybrid cloud each with different features. Libraries can choose these options depending on what best serves their need. He also mentioned scalability as cloud computing is the best option for libraries with growing collections and fluctuating workloads, since its infrastructure scales depending on the demands of the library.

Possible Challenges to effective implementation of Cloud Computing in Academic Libraries. Just like every technological concept cloud computing is not an accepted in terms of trust and security issues. Yuvaraj (2015) stated that ensuring both privacy and security of cloud information is not easy. Also, Sahu (2025) pointed out that efforts to encourage people to use cloud computing are not yielding the needed results because people have fear of putting their digital information in the hands of third parties. Many people fear that their information will not be confidential or even more prone to theft and loss because do not have ownership of the servers on which they keep the contents. The problem of dependence on internet connection is among the challenges facing cloud implementation in libraries. According to Hussaini, Vishistha, Garba and Jimah (2017) opined that libraries without or with unstable internet connection cannot implement cloud computing. Where cloud computing is in use, whenever internet connection goes down for any reason, all the operation of the organization in question will be in a stand –still until connectivity is back. Internet has been a driving force in various technologies that have been developed, including cloud computing. It is impossible for library that has lost its internet connection. Hussaini, Vishistha, Garba and Jimah (2017) said apart from reliance on internet connectivity, cloud computing increases bandwidth demand because of the need for high-speed connections to perform effectively and efficiently. He further stated that budget constraint is another issue for libraries who want to use cloud computing. The cost implication from equipment procurement, infrastructure set up and implementation. Also, Goldner (2019) emphasized that another problem in cloud computing in libraries are as a result of lack of guiding policies, operational procedures and standard for acquisition, development of information technology and services among the cloud providers. Moreover, cloud computing offers many benefits , but it is also vulnerable to threats. As the uses of cloud computing increase, more criminal will probably find new ways to target vulnerable points in the system. Kumar (2015) discovers that introduction of cloud computing requires IT governance model to ensure computing environment and to comply with all relevant organizational information technology policies. As such, organizations need a set of capabilities

that are essential when effectively implementing and managing cloud services, including demand management, relationship management and data security management.

Methodology

This study adopted descriptive survey. The choice for the survey is to investigate, identify and explain the extent of staff awareness and preparedness towards implementing cloud computing in academic libraries. The population for the study is 318 library staff which consisted of all the library staff in Federal University of Technology Owerri, Imo State University, Owerri, Federal Polytechnic Nekede, Imo State Polytechnic, Umuagwo, Alvan Ikoku Federal University of Education and Federal College of Land Resources Technology, Owerri (FECOLART). All the 318 library staff in the above institutions was used. This is because the population of the study were small. So, a census study technique was adopted. The instruments for data collection were a 4-point Likert rating scale. The researcher visited the six academic libraries in Imo State and administered the instrument; copies of the instrument distributed were collected back on the spot after completion. Data generated using the instrument were analyzed using mean and standard deviation, while hypotheses were tested using t-test statistic at 0.05 level of significance.

Decision Rule: Any item that recorded a mean below 2.50 was regarded as disagree, while 2.50 and above were regarded as agree. The level of rejection or acceptance of the null hypotheses was based on t-calculated and t-tabulated values. Since the test statistics is a one tailed test, when the t-calculated is greater than the t-tabulated value which is 1.645, the hypothesis was rejected. But when the t-calculated is less than the t-tabulated of 1.645, the hypothesis was accepted.

Results

Research Question 1

RQ1: What are the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in the academic libraries in Imo State?

Table 1: Descriptive results for the mean score on the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State.

S/N	Item	Statement: the required skills possessed by library staff include	n	ΣX	$\bar{x}$	S	Remarks
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1	Networking skills	305	388	1.02	1.03	Disagree
2	System installation skills	305	496	1.54	1.19	Disagree
3	Electronic resources management skills	305	545	2.41	1.10	Disagree
4	Information storage and retrieval skills	305	537	2.73	1.09	Agree
5	Digital technology skills	305	488	2.11	1.15	Disagree
Cluster/Pooled Mean				9.81		
Mean of Item Means				1.96	Disagree	

Sample Size (n), Summation (ΣX), Mean ($\bar{X}$), Standard Deviation (S), and Remarks

Table 1 show the item mean scores and standard deviation used in answering research question one in order to ascertain the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State. As indicated by the criterion decision mean, the result shows that item 4 was seen as agreed while the remaining items 1, 2, 3 and 5 were considered to be disagreed. In the same vein, the values of standard deviations are seen to be small as they are not close to the mean, indicating that the scores in the distribution are homogeneous. The answer that can be derived therein is that staff in academic libraries in Imo State do not possess the requisite skills in readiness for the adoption/implementation of cloud computing.

Hypothesis

Ho₁: The mean score on the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50

Table 2: Inferential results for the mean score on the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State.

n	X	$\bar{X}$	S	S.E	df	T _{cal}	T _{tab}	Decision
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305 9.81 12.50 5.435 .239 303 1.585 1.645 Accept
Ho₁

Sample Size (n), Mean ($\bar{X}$), Standard Deviation (S), Standard Error (SE), degree of freedom (df), one sample t-test statistics and Decision

Table 2 shows the result of the test of hypothesis one. This was tested to establish the significance of ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State. The outcome indicates that the t-calculated value of 1.585 is less than the t-tabulated value of 1.645. Hence, the acceptance of the null hypothesis and the conclusion that the mean score on the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12. 50. This indicates that the skills possessed by library staff in academic libraries in Imo State showed that their preparedness towards the adoption of cloud computing is not significantly high.

Research Question 2

RQ₂: What are the reasons for adopting Cloud computing in academic libraries in Imo State?

Table 3: Descriptive results for the mean score on the reasons for adopting Cloud computing in academic libraries in Imo State

S/N	Item Statement:	n	ΣX	$\bar{x}$	S	Remarks
6	To maintain record data	305	341	2.52	0.92	Agree
7	For electronic books and journal access	305	512	2.64	1.10	Agree
8	To host digital libraries	305	500	2.51	1.18	Agree
9	To track statistical data	305	398	2.33	1.056	Disagree
10	To integrate new media of all types like record labels and film archives into general collection and special document reserved areas (repositories)	305	528	2.72	1.10	Agree
Cluster/Pooled Mean				12.72		

Mean of Item Means	2.54	Agree
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Sample Size (n), Summation (ΣX), Mean ($\bar{x}$), Standard Deviation (S), and Remarks

Table 3 shows the item mean scores and standard deviations used in answering research question two with a view to ascertaining the reasons for adopting cloud computing in academic libraries in Imo State. The results from the data presented above indicated that all the items (6, 7, 8, and 10) were agreed by the respondents since their mean scores were within and above the criterion mean of 2.50 while item 9 showed disagree as its mean score is below the criterion mean of 2.50. Similarly, the values of standard deviations are seen to be small as they are not close to the mean, indicating that the scores in the distribution are homogeneous. Based on the above analysis, it was therefore, concluded that the reasons for adopting cloud computing in the library are: for proper maintenance of record data, access to electronic books and journals, hosting of digital libraries, as well as integration of new media into general collection and special document reserved areas.

Hypothesis 2

H₀₂: The mean score on the reasons for adopting cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12. 50

Table 4: Inferential results for the mean score on the reasons for adopting Cloud computing in academic libraries in Imo State

n	$\bar{X}$	μ	S	S.E	df	T_{cal}	T_{tab}	Decision
305	12.72	12.50	5.624	.389	303	4.738	1.645	Reject H ₀₂

Sample Size (n), Mean ($\bar{x}$), Standard Deviation (S), Standard Error (SE), degree of freedom (df), one sample t-test statistics and Decision

The result of the test of hypothesis two in Table 4 was carried out to establish the significance of the reasons for adopting cloud computing in academic libraries in Imo State. The outcome indicates that the t-calculated value of 4.738 is greater than the t-tabulated value of 1.645. Hence, the rejection of the null hypothesis and the conclusion that the mean score on the reasons for adopting cloud computing in academic libraries in Imo State is significantly greater than the

expected mean of 12.50. This indicates that the reasons for adopting cloud computing in academic libraries in Imo State are significantly high.

Research Question 3

RQ₃: What are the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State?

Table 5: Descriptive results for the mean score on the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State.

S/N	Item Statement:	n	ΣX	$\bar{x}$	S	Remarks
11	Technical skills deficiency.	305	394	2.83	1.045	Agree
12	Poor political will on the part of government.	305	527	2.61	1.118	Agree
13	Resistance to change on the part of library managers	305	489	2.30	1.150	Disagree
14	Unstable internet connection	305	507	2.62	1.130	Agree
15	Insufficient financial budgets	305	519	2.73	1.158	Agree
Cluster/Pooled Mean				13.09		
Mean of Item Means				2.62		

Sample Size (n), Summation (ΣX), Mean ($\bar{x}$), Standard Deviation (S), and Remarks

Table 5 shows the item mean scores and standard deviations used in answering research question 3 in order to identify the possible challenges staff would face in implementing cloud computing in academic libraries in Imo State. From the criterion decision mean, all the items, except item 13, were considered as agreed because the mean scores of the items were above the criterion mean of 2.50. In the same vein, the values of standard deviations are seen to be small and as a result, not close to the mean, indicating that the scores in the distribution are homogeneous. The answer that can be derived therein is that there are many challenges that could hinder the effective implementation of cloud computing in academic libraries in Imo State.

Hypothesis 3

Ho₃: The mean score on the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50.

Table 6: Inferential results for the mean score on the possible challenges staff would face in implementing Cloud Computing in academic libraries in Imo State

n	$\bar{X}$	μ	S	S.E	df	T _{cal}	T _{tab}	Decision
305	13.09	12.50	4.945	.356	303	8.421	1.645	Reject Ho ₃

Sample Size (n), Mean ($\bar{x}$), Standard Deviation (S), Standard Error (SE), degree of freedom (df), one sample t-test statistics and Decision

Table 6 shows the result of the test for hypothesis 3. The test was conducted to establish the significance of the possible challenges staff would face in implementing cloud computing in academic libraries in Imo State. The outcome indicates that the t-calculated value of 8.421 is greater than the t-tabulated value of 1.645. Hence, the rejection of the null hypothesis and the acceptance of its alternative, thus indicating that the mean score on the possible challenges staff would face in implementing cloud computing in academic libraries in Imo State is significantly greater than the expected mean of 12.50. This therefore, implies that the challenges associated with the implementation of cloud computing in academic libraries in Imo State are significantly high.

Discussion of the Findings

Information and Communication Technology Skills Possessed by Library Staff

The first objective of this study was to ascertain the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State. The study revealed that the staff in academic libraries in Imo State do not possess the requisite skills in readiness for the adoption/implementation of cloud computing. This finding is supported by the establishment that the mean score on the ICT skills possessed by library staff that showed preparedness towards the adoption of cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50. This development has shown that though there are existing networks in academic libraries studied, it may take a bit longer to fully

implement/adopt cloud computing by the library staff. This is because it requires high level of staff expertise to adopt and provide cloud services in the library. This therefore, may inform why many libraries including academic libraries more especially in the developing countries are yet to embrace cloud computing completely. This finding is in agreement with the statement by Ogaga, Uzezi and Antidius (2020) who believed that libraries have no place in the next century, while Adams (2020) opines that the position of the librarian is still relevant but they ought to redefine their roles to fit into the current technological advancement, thus making libraries to consider ways that could improve the skills of staff. Collaborating this finding, Raza et al (2020) asserts that cloud services minimize the involvement of non-ICT staff and as such the need to have cloud computing experts is not an option.

Reasons for the adoption of cloud computing in Academic Libraries

The second objective was to ascertain the information services being provided using Cloud Computing in academic libraries in Imo State. Going by the outcome of the study, the reasons for adopting cloud computing in academic libraries are to effectively maintain record data, access electronic books and journals, host digital libraries, track statistical data as well as integrate new media into general collection and special document reserved areas. It was further established that the mean score on the information services being provided using cloud computing in academic libraries in Imo State is not significantly greater than the expected mean of 12.50. Hence the acceptance of the null hypothesis. This goes to explain that any academic library adopting cloud computing in the provision of its services is bound to have technological improvements, efficient data management and enhanced service delivery. It therefore, behooves the management to see the need for adoption/implementation of cloud computing in academic libraries. This finding conforms with the findings by Hussaini, Vishistha, Garba and Jimah (2017) that with cloud computing, libraries can be rest assured of a strong back up of their information resources in case of server crash and other unforeseen events. Lending support to this, Abidi, and Abidi (2020) and Tritt and Kendrick (2024) stated that using cloud computing in library services allows information sharing, mobility and collaboration. Yuvaraj (2013) also posits that adoption of cloud computing will check the staff redundancies and increase library efficiency.

Possible Challenges to Effective Implementation of Cloud Computing in Academic Libraries

The third objective was to identify the possible challenges staff would face in implementing cloud computing in academic libraries in Imo State. Based on the data analyses, it was observed that staff are bedeviled with many challenges that could affect the implementation of cloud computing in academic libraries. These included; technical skills deficiency, resistance to change on the part of library managers, unstable internet connection, insufficient financial budgets, etc. Furthermore, it was established that the mean score on the possible challenges staff would face in implementing cloud computing in academic libraries in Imo State is significantly greater than the expected mean of 12.50. Thus, indicating that the challenges associated with the implementation of cloud computing in academic libraries in Imo State are significantly high. These findings above are in line with the assertions made by Hussaini, Vishistha, Garba, and Jimah (2017) that the challenge for cloud computing is its dependence on internet connection. The authors went further to say that libraries without or with unstable internet connections cannot implement cloud computing. Corroborating this, Goldner (2019) maintained that the challenges in cloud computing in libraries are as a result of lack of guiding policies, operational procedures and standards for, acquisition, development of information technology and services among the cloud providers.

Summary and Conclusions

That staff in academic libraries in Imo State do not possess the requisite skills in readiness for the adoption/implementation of cloud computing, that academic libraries in Imo State are yet to fully commence the provision of information services using cloud computing; that the reasons for adopting cloud computing in academic libraries are to effectively maintain record data, access electronic books and journals, host digital libraries, track statistical data as well as integrate new media into general collection and special document reserved areas and that challenges associated with the adoption/implementation of cloud computing in academic libraries in Imo State are significantly, high.

The study concluded that, to ensure a cloud-based service in academic libraries, constant training of staff on ICT and other related areas must be made a priority. In this regard, adequate funding of academic libraries is necessary to ensure proper planning and execution/implementation of any cloud computing project.

Recommendations

Based on the findings, the following recommendations are made:

1. Academic library managers should begin the implementation/adoption of cloud computing in their various libraries since there are already existing library networks at their disposal.
2. Staff in academic libraries should undergo training on ICT and other related areas to enable them have some level of expertise in basic computer operations, networking, software and data management, among others.
3. Given the importance of cloud computing towards technological improvements, efficient data management and service delivery, the management of academic libraries should see the need for adoption/implementation of this cloud-based service in academic libraries.
4. Academic library management should be provided with adequate funds to enable them make proper planning and execution of any project including the implementation of cloud computing in their various libraries.

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