A CRITICAL ANALYSIS OF CLOUD COMPUTING TECHNOLOGY: IT'S INNOVATIVE ROLE ON QUALITY LIBRARY SERVICE

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ABSTRACT

The study aimed to analyze cloud computing technology: it's innovative role on quality library service. Cloud computing makes information available at any time and from any location. Cloud computing has made library operations more efficient, reducing the time and effort required to manage and maintain library systems. Libraries can now automate tasks like cataloging, circulation, and interlibrary loan, allowing staff to focus on more complex tasks. This has also led to cost savings, as libraries no longer need to invest in expensive hardware and software. The study assessed the concept of cloud computing, the concept of quality library service and the roles of cloud computing on quality library service. On this basis the study concludes that Cloud computing technology has revolutionized the way library services are offered, improving the quality and accessibility of resources to library users. The innovation of cloud computing has enabled libraries to provide a wider range of services to their patrons through the use of cloud-based applications, software, and storage systems. One of the key benefits of cloud computing technology in libraries is its ability to improve collaboration and communication among library staff, allowing them to work together more efficiently and effectively. This technology also allows library staff to provide remote access to resources, making it possible for users to access materials from any location at any time. One of the recommendations made was that libraries should invest in cloud computing technology and explore the various options available to them. This investment will enable libraries to improve the quality of their services and enhance user satisfaction.

KEYWORDS: Cloud Computing, Technology and Quality Library Service

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

Introduction

ICT, or information and communications technology, has significantly changed how library patrons utilize information and how they look for information. In today's environment, kids are very accustomed to their personal computers, laptops, mobile phones, and tablets with cognitive capabilities. To find out what kinds of e-products and facilities society wants to use or buy in the following year, renowned IT management consultant ACCENTURE recently conducted a fascinating poll. According to the findings, consumers are anticipated to purchase fewer multi-functional devices, such as smartphones, and to use cloud-based services and applications far more frequently, such as virtual mailboxes. One can determine why Facebook thrived whereas MySpace failed by critically analyzing the success of Facebook. For success, "Sharing and Innovation" is the credo.

The fourth point outlined by Dr. Ranganathan is particularly relevant when discussing cloud computing. You save the reader's time by making information accessible at any time and from anywhere. The services ought to be created to be accessible every day of the week if a user has a strong internet connection. Currently, "Ophelia," a project being worked on by the American multinational computer technology corporation Dell, may alter how people interact with computers in the future. Ophelia is an online computer that is reachable from anywhere. Ophelia is a concept that would allow users to access their computer and its programs from any linked device, despite the fact that it is already easy to access an online email account or update one's Facebook status from any computer. As a result, rather than concentrating on finding new technologies to provide services to users, librarians now need to focus on delivering proactive services and moving away from conventional services to personalize information facilities for the benefit of academic society.

Statement of Problem

As technology continues to evolve, the use of cloud computing technology has become increasingly popular across various sectors, including libraries. Cloud computing technology has the potential to provide innovative solutions to enhance the quality of library services. However, there are still some challenges that need to be addressed for libraries to fully embrace and utilize this technology. One of the main challenges is the lack of awareness and understanding of the benefits of cloud computing technology in the library community. Many libraries still rely on traditional systems and processes, which can limit the quality and efficiency of their services. Additionally, there may be concerns about the security and privacy of cloud-based systems, which can hinder adoption. Another challenge is the need for libraries to invest in the necessary infrastructure and resources to implement cloud computing technology. This can include upgrading hardware and software systems, training

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

staff on new processes, and ensuring that the necessary security measures are in place. Finally, there may be cultural resistance to change within the library community, which can slow down the adoption of new technologies. This can include resistance to new workflows, reluctance to learn new skills, and fear of job displacement due to automation.

Concept of Computing Technology

Computing is the process of using computer technology to complete a given goal-oriented task. Computing may encompass the design and development of software and hardware systems for a broad range of purposes often structuring, processing and managing any kind of information to aid in the pursuit of scientific studies, making intelligent systems, and creating and using different media for entertainment and communication (Rouse,2012). Computing technology is ubiquitous, in the form of computers, tablets, smartphones, the web, cloud computing, email, text messages, social media, and much more (ASEE, 2016). Computing technology is centrally relevant in the careers and lives of increasingly more people. According to Law Insider (2013), Computer Technology means any and all electronic media and services, including computers, software, e-mail, telephones, voicemail, facsimile machines, online services, internet, provided to employees by the City.

Concept of Cloud Computing

Cloud-based is a term that refers to applications, services, or resources made available to users on demand via the Internet from a cloud computing provider's server. Companies typically utilize cloud-based computing as a way to increase capacity, enhance functionality, or add additional services on demand without having to commit to potentially expensive infrastructure costs or increase/train existing in-house support staff (Beal, 2021). Cloud computing refers to the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. You typically pay only for the cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change. According to Marielle, (2022), a cloud-based system, often known as cloud computing, is a broad term for anything that involves the delivery of hosted services via the internet. A cloud-based service can be either private or public. A public cloud sells services to anybody who has access to the internet. A private cloud is a proprietary network or data center that provides services for a small group of individuals with limited access and rights.

Cloud computing, whether private or public, aims to give easy access to computer resources and information technology. Cloud-based or cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases,

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

networking, and software. Cloud computing is a popular option for people and businesses for a number of reasons, including cost savings, increased productivity, speed and efficiency, performance, and security (Frankenfield, Mansa, & Schmitt, 2022). Cloud computing is the use of off-site systems to help computers store, manage, process, and/or communicate information. These off-site systems are hosted on the cloud (or the internet) instead of on your computer or other local storage. They can encompass anything from email servers to software programs, data storage, or even increasing your computer's processing power. According to Chai & Bigelow (2021), "cloud computing" is a general term for anything that involves delivering hosted services over the internet. These services are divided into three main categories or types of cloud computing: infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). Cloud computing is the delivery of computing services such as servers, storage, databases, networking, software, analytics, intelligence, and other resources via the Internet's cloud. Cloud computing is becoming more popular day by day. It is the most recent trend that causes companies to use the term in their marketing campaigns to entice people to buy their products. However, cloud computing is the use of hardware or software off-site that is accessed over networks for computing needs.

Concept of Quality Library Service

Library Service means a service that provides reading materials for convenient use; circulation of reading materials; service to help provide users with library materials, educational and recreational audiovisual materials; or a combination of these services. Libraries are built and maintained to provide information resources for a specific and defined community. A public library serves the residents of a specific geographic region. An academic library serves the students and faculties of a parent college or university. Special libraries support to achieve organizational goals by serving the members. Corporate libraries serve the commercial firms. In each case, the library only exists to serve its parent community (Pranjit, 2022). Each library performs three basic functions in the process of serving its community, selecting and collecting information, organizing information, and serving users. In the agricultural university, librarian used the ICT as a tool (such as Library Management Software (LMS), Internet, and Telecommunication etc.) to serve it researcher's right information at the right time. Some librarian suggested four basic functions in the area of library services.

Quality services means resources and services, which satisfy users' expectations and perceptions. It is very clear that librarians must use management tools to run the library services. These tools such as TQM, SERVQUAL, LibQUAL help them to assess services, to make decisions, to improve services and to achieve a better quality. The networked environment offers libraries' challenges and opportunities in a number of areas including

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Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

management, services, and collection development. The main objective of this paper is to describe and identify the issues meriting attention by the library professionals to gear up the library product and services so that user communities get satisfied coming to library.

Role of Cloud Computing on Quality Library Service

Cloud computing has had a profound impact on the quality of library services, enabling libraries to provide more efficient, effective, and innovative services to their patrons. Here are some of the ways in which cloud computing has influenced library services (Khorshid, 2017):

Enhanced Access to Library Resources: Cloud computing has made it easier for patrons to access library resources from anywhere, at any time. With cloud-based services, library users can access digital collections, e-books, and other online resources remotely, without the need for physical access to the library. This has enabled libraries to extend their reach beyond their physical boundaries and provide access to a wider audience.

Improved Collaboration: Cloud computing has enabled libraries to collaborate with other institutions, researchers, and scholars more efficiently. By sharing resources and data in the cloud, libraries can work together to provide more comprehensive and useful services to their patrons. This has also led to the emergence of collaborative networks and consortia that share resources and expertise to enhance library services.

Increased Efficiency: Cloud computing has made library operations more efficient, reducing the time and effort required to manage and maintain library systems. Libraries can now automate tasks like cataloging, circulation, and interlibrary loan, allowing staff to focus on more complex tasks. This has also led to cost savings, as libraries no longer need to invest in expensive hardware and software

Cost-Effective: Cloud computing has reduced the cost of acquiring and maintaining library infrastructure. Libraries no longer need to invest in expensive hardware and software, as cloud providers offer a range of services at affordable prices. This has enabled smaller and under-resourced libraries to access the latest technologies and services, thus reducing the digital divide.

Enhanced Security: Cloud computing has improved the security of library systems and data. Cloud providers implement stringent security measures to protect against data breaches, and libraries can rely on them to secure their resources and services. This has also enabled libraries to comply with data protection regulations and safeguard the privacy of their patrons (Singh &Gautam, 2020).

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

Hindrance to Defective Cloud Technology

Cloud computing technology has been a game-changer for businesses across industries. It has allowed organizations to reduce costs, increase efficiency, and enhance scalability. However, like any other technology, cloud computing has its share of drawbacks and hindrances. In this response, I will discuss some of the common hindrances to defective cloud technology and provide references to support my arguments.

Security and Privacy Concerns: Security and privacy concerns remain the biggest hindrance to cloud adoption. Organizations need to ensure that their data is secure and protected from unauthorized access, breaches, and cyber threats. According to a survey conducted by IDC, security and privacy concerns are the primary reason why organizations hesitate to move their workloads to the cloud (IDC, 2020).

Vendor Lock-In: Vendor lock-in is another hindrance to defective cloud technology. Organizations that rely heavily on a specific cloud provider may find it challenging to switch to another provider due to compatibility issues and the high cost of migration. According to a study by Gartner, vendor lock-in is a major concern for organizations that use public cloud services (Gartner, 2019).

Lack of Control: Another hindrance to cloud technology is the lack of control over the infrastructure and services provided by the cloud provider. This can make it challenging for organizations to customize and configure their applications to meet their specific needs. According to a report by Flexera, lack of control is a significant challenge faced by organizations that use cloud services (Flexera, 2020).

Downtime and Reliability: Cloud providers can experience downtime, leading to service disruption and loss of productivity for organizations. While cloud providers have measures in place to minimize downtime, it remains a concern for organizations that rely heavily on cloud services. According to a study by CloudEndure, (2019), downtime and reliability are major concerns for organizations that use cloud services.

Performance and Latency: Cloud technology relies on the internet, which can be affected by latency and network congestion. This can lead to poor performance for applications and services hosted on the cloud. According to a study by LogicMonitor, performance and latency are the primary challenges faced by organizations that use cloud services (LogicMonitor, 2020).

Cloud technology has transformed the way organizations operate, but it is not without its challenges. Security and privacy concerns, vendor lock-in, lack of control, downtime and reliability, and performance and latency are some of the hindrances to defective cloud technology. Organizations must carefully evaluate

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

their needs and choose the right cloud provider that can address these concerns to ensure a successful cloud migration.

Conclusion

Cloud computing technology has revolutionized the way library services are offered, improving the quality and accessibility of resources to library users. The innovation of cloud computing has enabled libraries to provide a wider range of services to their patrons through the use of cloud-based applications, software, and storage systems. One of the key benefits of cloud computing technology in libraries is its ability to improve collaboration and communication among library staff, allowing them to work together more efficiently and effectively. This technology also allows library staff to provide remote access to resources, making it possible for users to access materials from any location at any time. In addition, cloud computing technology has enhanced the security of library resources, ensuring that sensitive data is protected from unauthorized access. This technology also makes it possible for libraries to reduce their IT infrastructure costs by outsourcing their data storage and management needs to cloud service providers. Overall, the innovative role of cloud computing technology in library services has significantly improved the quality of services provided to library users. With its continued development and implementation, cloud computing technology is expected to continue playing a vital role in transforming the library industry and meeting the evolving needs of library users.

Recommendations

Based on the innovative role of cloud computing technology on quality library service, the following recommendations can be made:

1. Libraries should invest in cloud computing technology and explore the various options available to them. This investment will enable libraries to improve the quality of their services and enhance user satisfaction.

2. Libraries should provide adequate training for staff members to enable them to effectively use cloud computing technology. Staff members should be trained on the use of cloud-based applications, software, and storage systems to ensure efficient service delivery.

3. Libraries should collaborate with cloud service providers to ensure they are getting the most out of their investment. By working with cloud service providers, libraries can ensure they have access to the latest technology and receive technical support when needed.

4. Libraries should prioritize the security of their resources when using cloud computing technology. This can be achieved by

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

implementing security protocols, regular data backups, and training staff on how to identify and respond to security threats.

5. Libraries should continuously evaluate the impact of cloud computing technology on their services and make improvements where necessary. This will ensure that libraries remain up-to-date and meet the evolving needs of their users.

Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

REFERENCES

ASEE, (2016), *Introduction to Computing Technology: New Interactive Animated Web-Based Learning Content.* Retrieved from: https://monolith.asee.org/public/conferences/64/papers/16679/view

Bala, R. (2012). How cloud computing will affect college libraries. *International Journal of Information Technology and Knowledge Management*, 5(2), 381-383.

Beal, V. (2021), *Cloud-Based.* Available at: https://www.webopedia.com/definitions/cloud-based/

Chai, W. & Bigelow, S. (2021). *Definition of Cloud Computing.* Available at: https://www.techtarget.com/searchcloudcomputing/definition/cloud-computing

CloudEndure (2019). *The State of Resilience: Downtime and Disaster Recovery.* Retrieved from https://www.cloudendure.com/the-state-of-resilience/

Flexera (2020). *State of the Cloud Report.* Retrieved from https://www.flexera.com/about-us/press-center/state-of-the-cloud-report-2020.html

Frankenfield, J., Mansa, J. & Schmitt, K. (2022), *What is Cloud Computing? Pros and Cons of Different Types of Services.* Retrieved from: https://www.investopedia.com/terms/c/cloud-computing.asp

Gartner (2019). *Gartner Survey Reveals Public Cloud Services Adoption, Drivers and Challenges.* Retrieved from https://www.gartner.com/en/newsroom/press-releases/2019-04-10-gartner-survey-reveals-public-cloud-services-adoption-drivers-and-challenges

IDC (2020). *IDC's Cloud Adoption Survey.* Retrieved from https://www.idc.com/getdoc.jsp?containerId=prUS46607720

Khorshid, M. (2017). Cloud Computing in Libraries: A Review of the Literature. *Journal of Academic Librarianship,* 43(1), 32-39.

Law Insider (2013). *Computer Technology definition.* Available at: https://www.lawinsider.com/dictionary/computer-technology

LogicMonitor (2020). *Cloud Vision 2020: The Future of the Cloud.* Retrieved from https://www.logicmonitor.com/resource/cloud-vision-2020-the-future-of-the-cloud/

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Theresa Nse UDO-OKON, *Ph.D*; AMAH, Kanu Ogbonnaya, *Ph.D* & AKPAN, E. Ebenezer, *Ph.D*

Marielle, G. (2022). *What's a Cloud-Based System and How Does It Work?* Retrieved from: https://unity-connect.com/our-resources/tech-insights/what-is-a-cloud-based-system-and-how-does-it-work/

Pranjit K. (2022). *Concept of Quality in Library Services: An Overview.* Retrieved from: https://ir.inflibnet.ac.in/handle/1944/1370

Rouse, M. (2012), *Computing*. Available at: https://www.techopedia.com/definition/6597/computing

Singh, A. K. & Gautam, A. K. (2020). Cloud Computing Applications in Libraries: A Comprehensive Review. *Journal of Library Administration,* 60(6), 647-663.