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Investigating the Use of Cloud Computing Services among Postgraduate Students at the University of Ibadan, Nigeria

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ABSTRACT

Cloud computing services (CCS) offer many benefits which have improved their acceptance in the educational sector, especially, tertiary education. While it is true that the benefits of CCS include less worries about data loss, ease of accessibility and the ability to interact with data in real-time, there is no known study on how awareness of cloud computing services, perceived ease of use, computer self-efficacy, and intention to use CCS influence its actual use among postgraduate students in Nigeria. This study provides answers to four research questions and tests two research hypotheses. It adopts a descriptive survey design using a multistage sampling technique for data collection. Convenience sampling technique was used to select a sample size of 360 postgraduate students from the University of Ibadan, Nigeria. Descriptive statistics, Friedman mean rank, Spearman rank correlation and Multiple linear regression were used for analyses. The findings revealed that awareness of cloud computing services, perceived ease of use, and computer self-efficacy had significant relationships with the intention to use cloud computing services, and the intention to use cloud computing services had a significant influence on the actual use of cloud computing services among postgraduate students. The study recommends that university authorities should encourage courses that train students on the use of CCS, as well as course curricula to improve students' computer self-efficacy and their use of cloud computing services.

Keywords: Awareness, Cloud Computing, Self-Efficacy, Intention to Use, Perceived Ease of Use, Postgraduate students, Cloud Computing Services, University of Ibadan, Nigeria

I. INTRODUCTION

When traditional computing emerged as a novel technological idea for gathering and storing information through the use of computer devices, it was considered to be secure and easy to manage in-house (Kerby, 2020). It enabled the installation of software and hardware programme according to the user's needs.

As a result, computer users were able to produce, store and assess information on their personal laptops or desktops. Accessibility by others was impossible except permitted with the use of passwords or passcodes. Whenever there is a need for joint use, multiple-user applications were limited especially when networking is required. New advancements in computer technology in cloud computing helped to resolve these limitations. Software programmes and stored documents in single computer devices became manageable and accessible through computer servers that can be accessed via the Internet (Fomin, 2021).

The evolution of cloud computing has given users more options and frequency of use of technological devices. The advantage that cloud computing offers includes creating more convenience for users as they no longer have to install software and other applications on the storage compartments of their devices. The users neither have to worry about the rising costs of expensive storage devices, nor software licenses before accessing or using large information. Cloud computing helped to bridge this gap by offering new platforms where data can be stored in a network-connected system via the internet, and where applications and software can be shared across servers. Some of the current cloud computing services and providers are Google Cloud by Google; Web Server by Amazon; Cloud by IBM; Cloud by Alibaba; and Azure by Microsoft (Almishal and Yousse, 2014).

The arrival of cloud computing in the 1960s, according to Regalado (2011), created new vestiges of innovations in service delivery and improvement in all sectors of the economy for businesses and educational institutions. For educational institutions, the introduction of cloud computing technology created alternative solutions to storage and cost control challenges in the educational system (Kaur, Kuliya, Sarki, Sharma and Suleiman (2021) and ensured competitive and strategic advantage for all stakeholders (Gülbahar, 2007). Okai, Uddin, Arshad, Alsaqour, and Shah (2014), Velev and Zlateva (2011) affirm that cloud computing provides backup and recovery services such that customers can easily recover their data anytime in case of disaster or failure. This suggests that the users understand the benefits of cloud computing services and will take the necessary steps by conducting regular storage and backup of their files in case of emergencies.

The importance of cloud computing services in Nigeria's education sector is seen in the government's vision for ICT education through the establishment of specific support instruments such as The National Vision; The National Policy on Education, The National Information and Communication Technology Policy, The National Information Technology Education Framework and The Ministerial Strategy Plan or the Educational Sector (2016-2019). These instruments led to the promulgation of the National Policy on Information and Communication Technologies (ICT) in Education in Nigeria by the Federal Ministry of Education, Nigeria (2019). Its mission intent was to address the human capital needs for sustainable social and economic development using ICT within global educational and environmental challenges such as was seen during the Covid-19 pandemic.

The impact of Covid-19 changed the face and circle of several activities that were normally conducted physically. Alternative solutions such as virtual services became the order of the day to prevent the existential spread of the infection. To keep pupils and students safe, schools and universities had to change their mode of study from physical to online learning where teachers teach from internet-compatible devices from home. The use of online applications such as Google Classroom, OpenLearning.com, Teachable and other learning management systems (LMS) became essential.

These online applications operate the cloud computing system with the capacity to store elaborate and key information resources and applications which can be shared. For instance, Google Cloud provides several educational packages such as Google Classroom, Google Drive, Google Form, Google Docs, and Google Sheets to assist teaching and learning. In most universities, students had to adjust to the new challenges of reliance on online resources for study and storage of large information in alternative resources (Imahasees, Mohsen and Amin (2021). This study, therefore, examines how awareness of cloud computing services, perceived ease of use, and computer self-efficacy influence the intention to use CCS, and the actual usage by postgraduate students of the University of Ibadan, Nigeria.

In this study, awareness of cloud computing services refers to the degree to which the postgraduate students in the University take cognizance of cloud computing services. Perceived ease of use refers to the degree to which the postgraduate students in the university believe that using cloud computing would be free of effort while computer self-efficacy refers to the judgement students make about their ability to use cloud computing.

Intention to use CCS refers to the level at which a person has developed a conscious plan to perform or not perform some specified tasks with the aid of cloud computing services in the near future. The use of CCS in this study refers to the actual activities that are being performed with the aid of cloud computing services. The study is in two parts. Part A reports the relationship between perceived security and the use of cloud computing services among postgraduate students of the University of Ibadan, Nigeria (Ogunsola and Fadoju, 2022) while Part B investigates the use of cloud computing services based on awareness of cloud computing services, perceived ease of use, computer self-efficacy and the intent to use CCS among postgraduate students at the University of Ibadan, Nigeria.

1.1 Statement of the Problem

Cloud computing presents many advantages that are key to the educational system, especially in terms of storing data for communication and collaboration. These advantages effectively help to improve e-learning capabilities as study materials and contents are easily shared among tutors and students without worrying about data loss, and access to text, audio or video information in real-time from an internet-compatible computer device. Previous studies among students and allied adoptees of cloud computing have always focused on data theft or loss, data leakage, insecure interface (Kuznetsov, 2022), mismanagement and mishandling of sensitive data, and reliability issues (Shakeel, 2020), and inadequate network responsiveness (Rao, 2011).

Oyeleye, Fagbola and Daramola (2014), studied the challenges of adopting cloud computing among public university students in south-western Nigeria, while Sogbeye, Ekpu and Udoh (2019), reviewed literature based on the benefits, prospects, and challenges of cloud computing services in Nigerian universities. None of these studies examined the influence of awareness of cloud computing services, perceived ease of use, and computer self-efficacy, on the intent to and actual use of cloud computing services by postgraduate students of the University of Ibadan, Nigeria. This study fills the knowledge gap.

This study is important because the data safety and security concerns in Nigeria have impacted the wholesome acceptance of cloud computing and its popularity among students in Nigerian educational institutions (Dogo, Salami and Salman, 2013; Saidu and Kwadan, 2020).

1.2 Objectives of the Study

The objectives of this study are to determine if awareness of CCS, perceived ease of use, and computer self-efficacy influence the intention to use cloud computing services as well as the actual use of CCS among postgraduate students of the University of Ibadan.

1.3 Research Questions

1. What is the level of awareness of cloud computing services of the postgraduate students of the University of Ibadan?
2. Is there a significant relationship between perceived ease of use and the intention to use cloud computing services by postgraduate students?
3. Is there a significant relationship between computer self-efficacy and the intention to use cloud computing services by postgraduate students?
4. Is there a significant relationship between awareness of CCS and the intention to use cloud computing services by postgraduate students?

1.4 Research Hypotheses

1. There is no significant joint influence of the independent variables (awareness of CCS, perceived ease of use, and computer self-efficacy) on intention to use cloud computing services among postgraduate students of the University of Ibadan.
2. There is no significant influence of the intention to use cloud computing services on the actual use of cloud computing services.

2. LITERATURE REVIEW

2.1 A Brief Overview of the Origin and Development of Cloud Computing

The development of cloud computing is impossible without the benefits offered by mainframe computing since the 1960s. The mainframes are data servers that can process billions of calculations and data operations with a maximum level of reliability and digital security (Bhardwaj, 2022). Its relevance for several small and big corporations in managing huge amounts of data is affirmed by Hammond (2022). The high cost of purchasing the mainframe computer may have made it unaffordable for individuals, small and medium-scale businesses and created the need to develop economical IT solutions that culminated in cloud computing. Aside from the inability of every computer user to own a mainframe, the sheer size of mainframe installation in homes made it impracticable. As a result, the idea of having shared access to the same mainframe computers began to evolve with time (Almishal and Youssef, 2014).

Another idea which contributed to the development of cloud computing was the Intergalactic Computer Network (ICN) which was proposed by Joseph Carl Robnett Licklider in the early 1960s (Srivastava and Habib, 2020). ICN initiated a networking platform where computer users in different locations globally were interconnected to programme and data from any location without physical presence where the information is broadcast. This idea later transformed into ARPANET in the late 1960s, and finally, in the 1970s, it became known as the Internet (McKelvey and Driscoll, 2019). The era of cloud computing began in earnest as individuals, researchers, and organisations gained access to information with ease. Srivastava and Habib (2020) found it useful as an on-demand service for companies to have online data storage despite the apparent security challenges to the online storage of information.

Widyastuti and Irwansyah (2017) considered cloud computing not only for providing support through data availability and associated services but for its flexibility and cost-effectiveness to small and medium-scale businesses. Jamal and Khan (2020) referred to cloud computing as an important model for an ever-present, easy-to-use capacity to provide on-demand network access that can share information across networks of configurable computer devices.

Though it is still an evolving technological model, its readiness and availability help as a model virtual service for large-capacity users in terms of usage of the application and shared network strength (Mell and Grance, 2011). According to Peterson (2022), the essential characteristics of cloud computing are fifteen: on-demand self-service, multi-tenancy, resource pooling, broad network access, rapid elasticity and scalability, measured and reporting service, automation, resilience, large network access, work from any location, comfortable payment format, service excellence, easy maintenance, flexibility, economic and security, and availability.

Apart from the characteristics of cloud computing, there is a need to identify the service models upon which cloud computing operates. Service models from the viewpoint of Bokhari, Shallal and Tamandani (2016) give the benefits of rentals and usages to clients to enjoy the services professionally from the provider. There are three common service models in cloud computing. They are Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). The SaaS provides users with a piece of software over a network (Gangwar, Date, and Ramaswamy, 2015), while the PaaS layer gives online access to all the resources that are required to build an application. The IaaS are the basic level of cloud services which providers utilise to deliver infrastructure services to customers over designated networks.

2.2 Benefits of Adopting Cloud Computing

Cloud computing provides efficient services without the need to acquire the required IT infrastructure (Gonzalez-Martinez, Bote-Lorenzo, Gomez-Sanchez and Cano-Parra, 2015; Bogdanovic, Milic, and Labus, 2014). Although the choice of deployment model may determine the benefits which can be realised from cloud computing, the technology has become popular in many organisations and educational institutions.

The following are some of the benefits of cloud computing:

- a. **Availability and accessibility:** Cloud computing gives easy access and availability to data infrastructure, internet services, online applications, and online computer tools and resources anytime from everywhere on different devices as long as internet compatibility is in the location (Almazroi, 2017). Generally, cloud-based resources and services can be accessed through the internet by students on or off campus for saved resources such as documents, files, assignments, and lecture notes (Mansuri, Verma and Laxkar (2014)).
- b. **Cost-effectiveness:** According to Castillo (2020), cost-effectiveness is one of the operational benefits of cloud computing because of its affordability to low-profile users such as small and home office owners, small and medium-scale enterprises. The cost-saving benefits result from not having to establish any IT infrastructural investments and becoming free from potential expenses associated with system maintenance. Another cost-saving benefit is the possibility of optimising the hardware facilities by sharing the economies of scale to reduce the cost to both the service providers and their clients. The third cost-saving benefit of cloud computing is the daily-saved energy costs which makes power usage efficient as cloud providers are likely to charge lower prices

for storage. The fourth is the lack of in-house IT service personnel and the attendant office rentals, wages and allowances of IT staff. Another benefit is the elimination of redundancies which are regular challenges for most in-house IT management teams. There is no need to purchase additional hardware as it is inexpensive to move data and other business information to the cloud.

- c. **Level of efficiency:** Amanpreet, Singh and Gill (2019) noted that energy efficiency was guaranteed when the data centre's computation power is shared between service providers and clients. Aside from energy efficiency, cloud computing allows efficiency in the management of business resources while improving conventional business procedures.
- d. **Sharing of benefits:** this includes the capacity to avoid the replication of resources by several organisations since it reduces the need for new infrastructure for data storage and accessibility. A single resource will be sufficient to reduce the costs of accessing educational content by students and other users of learning materials (Ramadhan, 2018).
- e. **Flexibility (elasticity):** Effective cloud computing employs a variety of technologies such as virtualisation and modularity of parts to promote flexibility. Almjlai, Mohamad and Suryani (2019) affirm that the effectiveness of IT service in that regard relies on modularity, connectivity and compatibility. The authors noted that the connectivity factor poses a higher influence than the other two for effectiveness and that the factors are likely to offer efficient ways of managing, implementing and deploying financial resources in organisations.
- f. **Security:** Zeng and Germanos (2019) claimed that the benefits and costs of the security of data or information are two major considerations when choosing cloud computing services. According to the authors, there must be benefits that securing company information can bring to the organisation and these must be treated as key assets. The cost of securing an organisation's information could highlight the implications of information leakage and suggest. What level of security service to invest in? However, the risk of losing or duplicating information in the IT industry is not new. In terms of the cost of security, the measurement metrics are tangible and intangible. The tangible costs are estimated in financial terms and other factors of available security technology like the cost of the technology, data transfer, and cost of system upgrade. Intangible costs would consist of costs of administration, employee training and non-productive losses (Zeng and Germanos, 2019).
- g. **Backup and recovery:** A major benefit of cloud computing is its capacity to back up and retrieve data for customers in the event of system collapse or another form of disaster (Okai, Uddin, Arshad, Alsaqour, and Shah, 2014). Challagidad and Birje (2019) acknowledged that data could be lost due to crashes, system failures, power outages and security threats. The authors highlighted some techniques that are used in recovering data in India such as NoBackup, WARBackup or LocalRecovery. For the recovery of huge volumes of data, it was suggested that a new recovery mechanism that can accommodate high-volume data be put into use. The mechanism was adopted because of the characteristics of cloud infrastructures. It proposes a hierarchical system that was designed to replicate information across a data centre.
- h. **Large storage capacity:** The amount of storage that the cloud service accommodate is larger than traditional modes of information storage such as flash disks or external hard drives. Its unlimited capacity makes it economical and it can be accessed in real-time, and virtually. Akingbade

(2016) stated that cloud storage reduces the need for costly software and hardware solutions for storage. The apparent risks associated with cloud storage also come with the need for improvements through the data de-duplication solution for space management. The technique is a specialised data compression designed to eliminate duplication or repeated data. It initiates a system of compressing related and synonymous terms. It is used to improve storage space as data transfers can also reduce the number of bytes in an ongoing process of analysis. Obrutsky (2016) stated that the structure of cloud computing is defined by layers. Infrastructure as a Service (IaaS) is the layer that incorporates cloud storage where physical and virtual layers are used as part of the construction. Users are required to pay only rent instead of buying expensive computer systems for storage. The rental service could be negotiated. Its key benefits are found in its economy, accessibility to data, and solution for backup, replication and recovery.

2.3 Use of Cloud Computing During Crises

Velev and Zlateva (2011) considered cloud computing as the key response tool for governments and organisations in emergency circumstances. Their location in remote geographical spaces allows communication between those in need and emergency workers assisting victims. For example, at the height of the Covid-19 pandemic in 2020, Alhomdy, Thabit, Abdulrazzak, Haldorai, and Jagtap (2020) stated that the impact of the pandemic which affected about 98 million individuals worldwide made people adopt social distancing as a new norm. The challenges of that time affected workplace schedules and activities and made access to critical applications and infrastructure impracticable. Cloud computing was a ready technological solution that helped governments, and organisations in different sectors of life such as communication, health, education, remote surveillance and the military. It was crucial to the survival of many countries' databases and organisations during the pandemic.

Gokama (2021) observed that the pandemic created new strategic planning methods for organisations and the government to utilise cloud computing as a reliable means of information storage. While it became a catalyst for organisations requiring digital transformation, remote working became a common work arrangement among all IT service providers. According to Gokama (2021), the adoption of cloud computing for remote working elicited benefits for users who were no longer scared of contracting the Covid-19 virus by working remotely away from people in computer-networked offices.

Cloud computing has become essential to the needs of individuals and organisations in the post-Covid-19 era. This is because people are used to its advantages. Kostanica, Youssef and Zeqiri (2017) recalled that cloud computing became acceptable for its benefits of low costs, easy access and other free services.

2.4 Theoretical Models and Hypotheses

Different theoretical models were developed to explain users' readiness for technology adoption (Venkatesh, Morris, Davis and Davis, 2003). Some of these models include the Technology Acceptance Model (TAM), Technology-Organisation-Environment (TOE), Diffusions on Innovation (DOI), and Unified Theory of Acceptance and Use of Technology (UTAUT). This study adapts Davis's (1989) original Technology Acceptance Model (TAM) by using perceived ease of use and intention to use CCS, while awareness and computer self-efficacy were added to the study. Therefore, the study comprises awareness about cloud computing services, perceived ease of use, computer self-efficacy, intention to use cloud computing services and actual use. Understanding these factors will enable researchers as well as cloud computing professionals to determine how much the use of cloud computing will be influenced by variables discussed in the paragraphs that follow.

2.4.1 Awareness of Cloud Computing Services

According to Rogers and Shoemaker (1971), the adoption or refusal of innovation begins when consumers become aware of a product. Low awareness is the main factor that indicates the adoption or non-adoption of cloud computing (Sathye, 1999). According to Irshad and Johar (2017), the adoption of cloud computing is still at a very low level. Awosan (2014), Kostanica, Youssef and Zeqiri (2017) are of the opinion that awareness of CCS would influence its use. One of the focal points of this study is to determine the amount of influence awareness has on the intention to use CCS.

2.4.2 Perceived Ease of Use

Perceived ease of use has been created from the foregoing studies to be a significant factor impacting user acceptance and usage action of Information Technology (IT) (Igarria and Igarria, 1995). According to Venkatesh (2000), perceived ease of use is defined as how simple it is to learn and use the technology. Rogers (1995) argued that perceived ease of use is a term that indicates the difficulty an innovation encountered. Studies by Pinheiro, Aparicio and Costa (2014); Rababah, Khasawneh and Yaseen (2017) show that ease of use has a significant relationship with the intention to use CCS. In this study, perceived ease of use refers to the degree to which the postgraduate students at the University of Ibadan find it easy to employ cloud computing.

2.4.3 Computer Self-Efficacy

Computer self-efficacy refers to a judgement that users make about their ability to commit to a specific task in the future (Bandura, 1986). Computer self-efficacy impacts people's motivation and actions (Bandura, 1986). According to Kostanica, Youssef and Zeqiri (2017) and Anderson and Rainie (2010), users will find cloud computing easy to use if they believe that they can use it and they are confident in using it. In this study, computer self-efficacy refers to the degree to which the postgraduate students in the university believe in their capability to utilise cloud computing.

2.4.4 Intention to Use Cloud Computing

Intention to use cloud computing services in this study is based on awareness of cloud computing services, perceived ease of use, and computer self-efficacy. Although it is believed that the intention to use cloud computing should lead to the actual use of services, this may not apply in all cases. However, a user may intend to use cloud computing services but technical know-how and awareness about the technology could be barriers. This study investigates the relationships between awareness of cloud computing services, perceived ease of use, computer self-efficacy and intention to use CCS, and consequently use of CCS. The influences of each of the independent variables on the use of CCS were also determined. The intention to adopt and use cloud computing services is primarily taken from the diffusion of the innovation theory (Rogers, 1995). Rastogi, Verma and Sushil (2018), Ramadhan (2018) are of the opinion that intention to use CCS has a significant relationship with the actual use of CCS. In this study, the intention to use cloud computing services is based on the conscious plan of a user to perform some tasks via cloud computing services.

3. RESEARCH METHODOLOGY

This study adopts the descriptive survey design to investigate factors influencing the use of cloud computing services by postgraduate students of the University of Ibadan. Data were collected using a questionnaire. This study used content and face validity which was established by the researchers before testing the research instrument in the field. A reliability test which ensures the consistency of the research instrument for data collection was also conducted.

The reliability test was carried out with 30 students of the Federal University of Agriculture, Abeokuta. The result of the reliability test shows that the research instrument is reliable as the Cronbach alpha result are as follow: Awareness of CCS (0.894), Perceived ease of use (0.841), Computer self-efficacy (0.705), Intention to use CCS (0.700) and Actual Use of CCS (0.875).

Friedman's mean rank was used to rank the mean of awareness of CCS while Spearman rank correlation was employed to check the relationship among the variables. Multiple linear regression analysis was used to determine the influence of each independent variable (Awareness of CCS, Perceived ease of use, Computer self-efficacy, Intention to use CCS) on the dependent variable (use of CCS).

The population of the study were registered postgraduate students of the University of Ibadan numbering seven thousand, nine hundred and twenty-four thousand (7,924), (University of Ibadan Planning Unit - 2017 Pocket Statistics). The respondents were 18 years and above from different departments at the Master's level. Multistage sampling technique was adopted for this study. The purposive sampling method was used for the selection of departments and faculties, while the selection of respondents across faculties, and institutes was done using the convenience sampling method.

The sample size of respondents for this study was determined using the sample size formula (Yamane, 1967):

$$n = \frac{N}{(1 + N(e)^2)}$$

n = required sample size
 N = estimate population (7,924)
 e = degree of error tolerance (5%)

$$n = \frac{7,924}{(1 + 7,924(0.05)^2)}$$

$$n = 400$$

The final sample size is shown in Table I:

Table 1: Sample Population of Postgraduate Students			
Location	Population	Proportional allocation to each Faculty	Population selected
Faculty of Agriculture	1,357	$\frac{1357 \times 400}{7,924}$	69
Faculty of Arts	1,451	$\frac{1451 \times 400}{7,924}$	73
Faculty of Multidisciplinary Studies	482	$\frac{482 \times 400}{7,924}$	24
Faculty of Science	1,872	$\frac{1872 \times 400}{7,924}$	94
Faculty of Technology	1,154	$\frac{1154 \times 400}{7,924}$	58
Faculty of The Social Sciences	1,278	$\frac{1278 \times 400}{7,924}$	65
Institute of African Studies	163	$\frac{163 \times 400}{7,924}$	8
Institute of Child Health	80	$\frac{80 \times 400}{7,924}$	4
Institute of Education	87	$\frac{87 \times 400}{7,924}$	5
Total	7,924		400

Table 1 shows that the estimated sample population (n) for this study was 400. However, only 360 copies of the questionnaire were returned and found fit for the analysis. This shows a 90% return rate.

4. RESEARCH FINDINGS

The following results were obtained after the data were coded and analysed using SPSS version 23.

4.1 Demographic Profile of Respondents

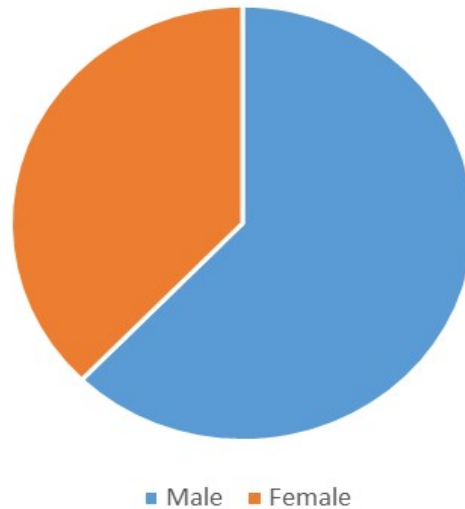


Fig 1: Gender of Respondents

There were 224 (62.2%) males and 136 (37.8%) females participating in the study.

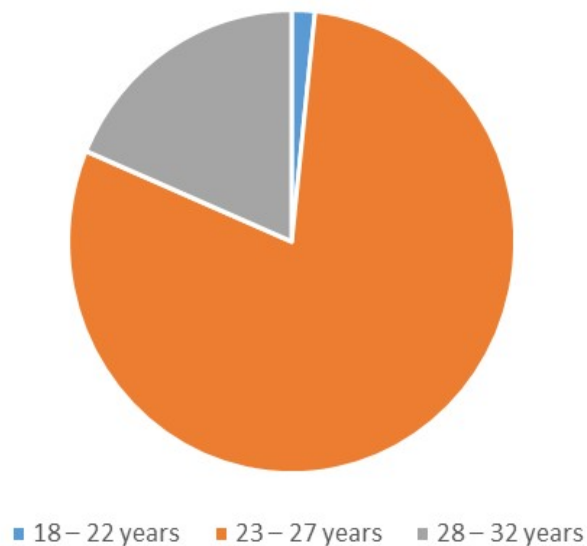


Fig 2: Age Range of Respondents

Respondents within the age range of 18-22 years were 6 (1.7%). Two hundred and eighty-seven (79.7%) of the respondents were within 23-27 years. The remaining 67 (18.6%) respondents had ages between 28-32 years.

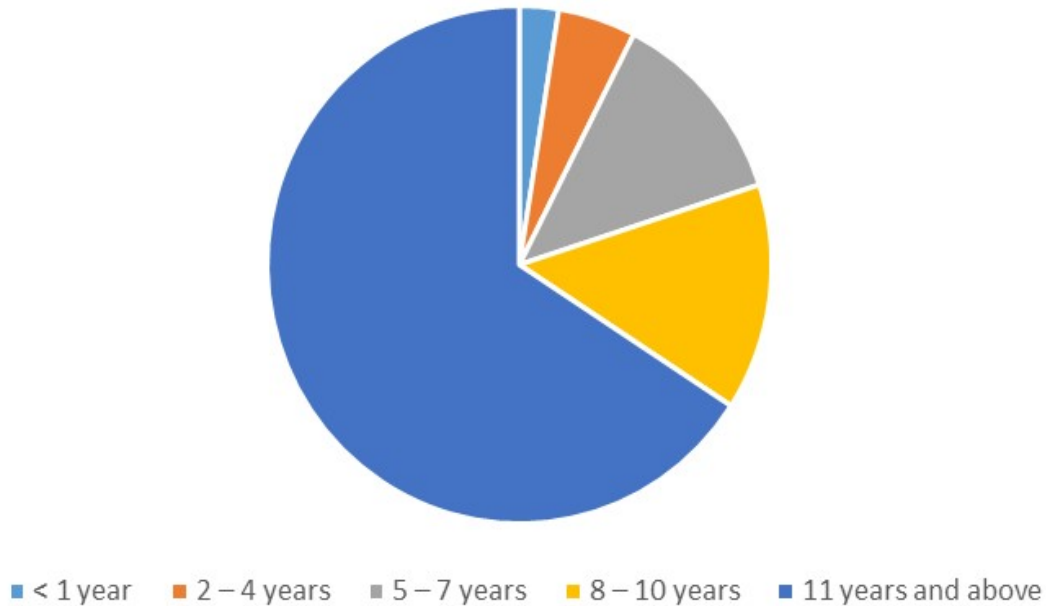


Fig 3: Years of Experience in Using the Computer

Respondents with 1 year or less experience of using the computer were 9 (2.5%) while those with 11 or more years had the highest frequency of 237 (65.8%) respondents. A total of 45 (12.5%) respondents were in the 5-7 years' category, while 51 (41.2%) respondents were in the 8-10 years' category.

4.2 Answers to Research Questions

This section provided answers to four research questions raised in this study. They are as follow:

Research Question One: What is the level of awareness of cloud computing services among the postgraduate students of the University of Ibadan?

The different responses concerning the level of awareness about cloud computing services are presented in Table 2:

Table 2: Level of Awareness about Cloud Computing Services

S/N	Statement	Extremely aware	Moderately aware	Slightly aware	Not aware	St.D	Mean
1.	Apple Web Services such as iCloud	65 (18.1%)	163 (45.3%)	73 (20.3%)	59 (16.4%)	.96	2.65
2.	Google Apps such as Google Docs, Gmail, Google Drive	85 (23.6%)	142 (39.4%)	49 (13.6%)	84 (23.3%)	1.08	2.63
3.	Slide Rocket	64 (17.6%)	133 (36.9%)	130 (36.1%)	33 (9.2%)	.87	2.63
4.	Oracle Cloud	50 (13.9%)	180 (50.0%)	61 (16.9%)	69 (19.2%)	.95	2.59
5.	Others such as Facebook, WhatsApp, Yahoo	31 (8.6%)	178 (49.4%)	95 (26.4%)	56 (15.6%)	.86	2.51
6.	IBM Cloud	100 (27.8%)	83 (23.1%)	75 (20.8%)	102 (28.3%)	1.17	2.50
7.	Amazon Web Services	87 (24.2%)	89 (24.7%)	93 (25.8%)	91 (25.3%)	1.11	2.48
8.	Adobe such as Photoshop, Indesign, and Creative Software	66 (18.3%)	129 (35.8%)	72 (20.0%)	93 (25.8%)	1.07	2.47
9.	Dropbox	19 (5.3%)	166 (46.1%)	83 (23.1%)	92 (25.6%)	.91	2.31
10.	Microsoft Web Services such as MS Azure, One Drive	40 (11.1%)	133 (36.9%)	83 (23.1%)	104 (28.9%)	1.01	2.30

Table 2 shows the level of awareness of the respondents about cloud computing services. The table shows that there is a moderate level of awareness of cloud computing services among postgraduate students of the University of Ibadan as the majority of the respondents are moderately aware of some cloud computing services.

The different cloud computing services were ranked using Friedman's mean rank. The mean score showed that 6 out of the 10 cloud computing services listed had a scale mean above 2.50. They are: Apple web services = 2.65, Slide Rocket = 2.63, Google Apps = 2.63, Oracle cloud = 2.59, and IBM cloud = 2.50. This suggests a moderate level of awareness of cloud computing services among postgraduate students of the University of Ibadan.

Research Question Two: Is there a significant relationship between awareness of CCS and the intention to use cloud computing services by postgraduate students?

To answer this research question, Spearman rank correlation analysis was performed to determine if there is a significant relationship between awareness of CCS and intention to use cloud computing services by postgraduate students. Table 3 presents the result:

Table 3: Relationship between Awareness of Cloud Computing Services and Intention to Use Cloud Computing Services

Variables	Intention to Use Cloud Computing Services	
Awareness of Cloud Computing Services	Correlation Coefficient	.641
	Sig. (2-tailed)	.000
	N	360

Table 3 shows that awareness of CCS has a significant positive and moderate relationship with the intention to use cloud computing ($r=.641$, $p<.05$). This result indicates that an increase in awareness of CCS will increase the intention to use cloud computing services by postgraduate students.

Research Question Three: Is there a significant relationship between perceived ease of use and the intention to use cloud computing services by postgraduate students?

Spearman rank correlation analysis was performed to determine if there is a significant relationship between perceived ease of use and the intention to use cloud computing services by postgraduate students. Table 4 presents the test result:

Table 4: Relationship between Perceived Ease of Use and Intention to Use Cloud Computing Services

Variables	Intention to Use Cloud Computing Services	
Perceived Ease of Use	Correlation Coefficient	.150
	Sig. (2-tailed)	.004
	N	360

Table 4 shows that perceived ease of use has a significant positive relationship with the intention to use cloud computing ($r=.150$, $p<.05$) by the postgraduate students. This shows that an increase in perceived ease of use will increase the respondents' intention to use cloud computing services.

Research Question Four: Is there a significant relationship between computer self-efficacy and the intention to use cloud computing by postgraduate students?

To determine if there is a significant relationship between computer self-efficacy and intention to use cloud computing services by postgraduate students, Spearman rank correlation analysis was performed and the result is presented in Table 5.

Table 5: Relationship between Computer Self-Efficacy and Intention to Use Cloud Computing Services

Variables	Intention to Use Cloud Computing Services	
Computer self-efficacy	Correlation Coefficient	.674
	Sig. (2-tailed)	.000
	N	360

Table 5 shows that computer self-efficacy has a significant positive and moderate relationship with the intention to use cloud computing ($r=.674$, $p<.05$). This result indicates that an increase in computer self-efficacy will increase the postgraduate students' intention to use cloud computing services.

4.3 Test of Research Hypotheses

Two hypotheses were tested at 0.05 level of significance. The results of the two hypotheses tested are as follow:

Hypothesis One: There is no significant joint influence of the independent variables (awareness of CCS, perceived ease of use, and computer self-efficacy) on intention to use cloud computing services among postgraduate students of the University of Ibadan.

Table 6: Influence of the Independent Variables on Intention to Use Cloud Computing Services

Model Summary					
Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate	
1	.605 ^a	.366	.361	.09715	
ANOVA					
Model	Sum of Square	df	Mean Square	F	Sig
Regression	1.939	3	.646	68.460	.000 ^b
Residual	3.360	356	.009		
Total	5.299	359			
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
(Constant)	.361	.114		3.178	.002
Awareness of Cloud Computing Services	.126	.052	.138	2.429	.016
Perceived Ease of Use	-.320	.115	-.125	-2.776	.006
Computer Self-efficacy	.739	.077	.526	9.656	.000

*Dependent variable is the Intention to use cloud computing services.

Table 6 revealed the predictive influence of the independent variables (awareness of CCS, perceived ease of use, and computer self-efficacy) on intention to use cloud computing services among postgraduate students of the University of Ibadan. Table 6 shows $F_{(3, 356)} = 68.460$, $R = .605$, $R^2 = .366$, $p < .05$. This suggests a relationship among the variables. Therefore, the null hypothesis is rejected. Thus, there is a predictive significant influence of the independent variables (perceived ease of use, computer self-efficacy and awareness of CCS) on the intention to use cloud computing among postgraduate students.

Table 6 also shows the individual contributions of each of the independent variables: awareness of CCS ($\beta = 0.138$, $p < 0.05$), perceived ease of use ($\beta = -0.125$, $p < 0.05$), and computer self-efficacy ($\beta = 0.526$, $p < 0.05$). This result confirms that computer self-efficacy has the highest influence on the intention to use cloud computing.

Hypothesis Two: There is no significant influence of the intention to use cloud computing services on the actual use of cloud computing services

Table 7: Influence of Intention to Use Cloud Computing on the Actual Use of Cloud Computing among Postgraduate Students of the University of Ibadan

Model Summary					
Model	R	R Squared	Adjusted R Square	Std. Error of the Estimate	
1	.590 ^a	.348	.346	5.604	
ANOVA					
Model	Sum of Square	Df	Mean Square	F	Sig
Regression	6009.006	1	6009.006	191.316	.000 ^b
Residual	11244.325	358	31.409		
Total	17253.331	359			
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
(Constant)	26.320	1.253		21.004	.000
Intention to use cloud computing	2.002	.145	.590	13.832	.000

Table 7 revealed the predictive influence of the intention to use CCS on the actual use of cloud computing services among postgraduate students of the University of Ibadan. Table 7 shows that $F_{(1, 358)} = 191.316$, $R = .590$, $R^2 = .348$, $p < .05$. This is significant. Therefore, the null hypothesis is rejected. This result also indicates that the intention to use cloud computing services influences the actual use of cloud computing services ($\beta = 0.59$, $p < 0.05$) among postgraduate students.

4. DISCUSSION OF FINDINGS

The results of this study show that there is a moderate level of awareness of cloud computing services among postgraduate students of the University of Ibadan. This, therefore, means that most of the respondents had heard about cloud computing services. Although there are few cloud computing services that the participants of this study are not aware of, this does not justify low awareness of cloud computing services among postgraduate students. According to Rogers and Shoemaker (1971), adoption or refusal of innovation begins when the consumer becomes aware of the product. This, therefore, means that the postgraduate students of the University of Ibadan can fully maximize the potential of cloud computing services if there can be more awareness about these services. This corroborates the submission of Almazroi (2017) who observed that training courses on how to use cloud computing applications ought to be provided to all students as part of their study. This will make them not only more aware of cloud computing benefits but also provide them with effective ways of utilizing cloud computing services in the conduct of their academic activities.

This study shows that there is a significant but moderate positive relationship between awareness and intention to use cloud computing services by postgraduate students of the University of Ibadan. The higher the awareness, the stronger the intention to use cloud computing services. This is supported by Kostanica, Youssef and Zeqiri (2017) who affirmed that awareness of CCS directly impacted its adoption. A study by Ogunsola and Olojo (2020) shows that awareness significantly increases citizens' continual usage intention of web-enabled services.

This finding also aligns with the stance of Awosan (2014) that proper awareness of CCS would influence its use and therefore suggested that cloud service providers should provide enough awareness to users on its risks and benefits. Awosan (2014) encourages that along with this awareness creation, cloud computing service providers should provide more free trials to clients for a stipulated period that will encourage the use of cloud computing services.

Results from this study show that the majority of the postgraduate students of the University of Ibadan perceived cloud computing to be easy to use. The results also revealed that postgraduate students can learn to use cloud computing quickly. These findings align with the findings of Abdullah and Seng (2015) that 53.8% of participants in their study in Klang Valley's healthcare industry in Malaysia believed cloud computing was easy to use. In addition, studies by Tan and Kim (2011), Sukumaran (2011) and Mansuri, Verma and Laxkar (2014), suggested that since cloud-based resources and services are accessed via the Internet, they can be readily accessed on- and off-campus. Mansuri, Verma and Laxkar (2014) affirmed that students who use cloud computing services can easily access files, assignments, and lecture notes stored in the cloud.

Amron and Noh (2021) revealed that the positive perception of the ease of using cloud computing strongly predicts the intention to use cloud computing. This implies that the intention to use cloud computing is largely influenced by the perception that it is easy to use more for the benefits it offered. This corroborates the findings of Pinheiro, Aparicio and Costa (2014), Rababah, Khasawneh and Yaseen (2017) that perceived ease of use has a significant relationship with the use of CCS. Also, Almazroi (2017) asserted that there is high use of cloud computing when students find cloud computing easy to use, but in situations where the technology is difficult, they may not be sufficiently motivated to use it.

Findings in this study show that computer self-efficacy highly influences the intention to use cloud computing services. This agrees with Anderson and Rainie (2010), Kostanica, Youssef and Zeqiri (2017), Wang, Lew, Lau, and Leow (2019) whose studies established the existence of a significant positive influence of self-efficacy on the use of cloud computing technology. The study findings as supported by Rababah, Khasawneh and Yaseen (2017), Rastogi, Verma and Sushil (2018), Ramadhan (2018) also show that intention to use CCS has a significant relationship with the actual use of CCS.

5. CONCLUSION

Cloud computing services have become important in the post-covid-19 era, therefore, investing in it makes life better and easier for people, especially in developing countries. To reach this goal, understanding the level of awareness, perceived ease of use and computer self-efficacy of users is important. This study showed that computer self-efficacy has the largest influence on the intention to use cloud computing services, and intention to use also significantly influences the actual use of cloud computing services.

6. RECOMMENDATIONS

This study recommends the following:

1. Universities should encourage courses that train students on the use of cloud computing services as this will increase students' confidence in their ability to handle cloud computing tasks.
2. Courses that can improve students' computer self-efficacy should be a regular part of the curriculum as they will increase the use of cloud computing services and technologies.

REFERENCES

- Akingbade, I. O. (2016). Cloud Storage Problems, Benefits and Solutions Provided by Data De-duplication, *International Journal of Engineering and Innovative Technology*, 5 (6), pp: 70-77
- Alhomdy, S., Thabit, F., Abdulrazzak, A. H., Haldorai, A., and Jagtap, S. (2020). The Role of Cloud Computing Technology: A Saviour to Fight the Lockdown in COVID-19 Crisis, the Benefits, Characteristics and Applications. *International Journal of Intelligent Networks*, 2, 166-174.
- Almazroi, A. A. (2017). An Empirical Study of Factors that Influence the Adoption of Cloud Computing Applications by Students in Saudi Arabian Universities. Thesis Submitted to Flinders University. Available at <https://theses.flinders.edu.au/view/7187b653-2156-4b02-a26b-0fc5bf938575/1>
- Almishal, A., and Yousse, A. E., (2014). Cloud Service Providers: A Comparative Study, *International Journal of Computer Applications and Information Technology*, 5(2).
- Almjlae, S. A., Mohamad, Z., and Suryani, W. (2019). Impact Aspects of IT Flexibility Specific to Cloud Computing Adoption on IT Effectiveness, *Journal of Theoretical and Applied Information Technology*, 97(3), pp: 1041-1059
- Amanpreet, K., Singh, V. P., and Gill, S. S. (2019). The Future of Cloud Computing: Opportunities, Challenges and Research Trends, Proceedings of the *Second International Conference on Social, Mobile, Analytics and Cloud (I-SMAC)*. Accessed September 21, 2022, at: https://www.researchgate.net/publication/331417431_The_Future_of_Cloud_Computing_Opportunities_Challenges_and_Research_Trends
- Amron, M. T., and Noh, N. H. M. (2021). Technology Acceptance Model (TAM) for analysing cloud computing acceptance in higher education institutions (HEI). *IOP Conference Series: Materials Science and Engineering*. doi:10.1088/1757-899X/1176/1/012036
- Anderson, J. Q. and Rainie, L. (2010). *The Future of the Internet IV*. Washington, DC: Pew Internet & American Life Project.
- Awosan, R. K. (2014). Factor Analysis of the Adoption of Cloud Computing in Nigeria. *African Journal of Computing & ICT*, 7(1).
- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bhardwaj, R. (2022). Mainframe vs Cloud Computing. Accessed September 20, 2022 at: <https://networkinterview.com/mainframe-vs-cloud-computing/>
- Bogdanovic, Z., and Milic, A., and Labus, A. (2014). Model of E-Education Infrastructure Based on Cloud Computing, in *The Handbook of Research on High Performance and Cloud Computing in Scientific Research and Education*, Chapter 5, pp: 104-105. Accessed September 20, 2022 at: <https://www.igi-global.com/viewtitlesample.aspx?>
- Bokhari, M. U., Shallal, Q. M., and Tamandani, Y. K. (2016). Cloud Computing Service Models: A Comparative Study, Paper presented at the *International Conference for Sustainable Global Development (INDIACom)*. Accessed September 8, 2022 at: https://www.researchgate.net/publication/333117926_
- Castillo, A. F. (2020). Where is the Real Cost Savings in Cloud Computing? Accessed September at: <https://cloudcomputingtechnologies.com/where-is-the-real-cost-savingsin-cloud-computing?>
- Challagidad, S. P. and Birje, M. N. (2019). Local and Remote Recovery of Cloud Services Using Backwards Atomic Backup Recovery Technique for High Availability in Strongly Consistent Cloud Service: Recovery of Cloud Service for High Availability, *International Journal of Advanced Pervasive and Ubiquitous Computing*, 11(4).
- Davis F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319-340.

- Dogo, E. M., Salami, A. and Salman, S. I. (2013). Feasibility Analysis of Critical Factors Affecting Cloud Computing in Nigeria, *International Journal of Cloud Computing and Services Science*, 2(4), pp: 276-287
- Federal Ministry of Education, Nigeria (2019). National Policy on Information and Communication Technologies (ICT) in Education in Nigeria. Accessed on September 8, 2022, at: <https://education.gov.ng/wp-content/uploads/2019/08/NATIONAL-POLICY-ON-ICT-IN-EDUCATION-2019.pdf>
- Fomin, V. V. (2021). The Shift from Traditional Computing Systems to Artificial Intelligence and the Implications for Bias, Accessed at: https://www.researchgate.net/publication/333720228_The_shift_from_traditional_computing_systems_to_Artificial_intelligence_and_the_implications_for_bias/link/5f2c58aa6fdcccc43b01cb0/download
- Gangwar, H., Date, H. and Ramaswamy, R. (2015). Understanding Determinants of Cloud Computing Adoption Using an Integrated TAM-TOE Model. *Journal of Enterprise Information Management*, Vol. 28, pp 107-130. <http://dx.doi.org/10.1108/JEIM-08-2013-0065>
- Gokama, M. (2021). Reasons behind Growing Adoption of Cloud after Covid-19 Pandemic and the Challenges Ahead. Accessed August 10, 2022, at: <https://arxiv.org/ftp/arxiv/papers/2103/2103.00176.pdf>.
- Gonzalez-Martinez, J. A., Bote-Lorenzo, M. L., Gomez-Sanchez, E. and Cano-Parra, R. (2015). Cloud Computing and Education: A State-of-the-Art Survey, *Computer Education*, 80, 132-151
- Gülbahar, Y. (2007). Technology Planning: A Roadmap to Successful Technology Integration in Schools. *Computers and Education*, 49(4), 943–956.
- Hammond, B. (2022). Why the Mainframe Remains Relevant in 2022. Accessed September 10, 2022, at: <https://www.precisely.com/blog/mainframe/mainframe-remains-relevant-in-2022>
- Igbaria, M. and Iivari, J. (1995). The Effects of Self-Efficacy on Computer Usage, *Omega*, Elsevier, 23(6), pp. 587-605,
- Imahasees, Z., Mohsen, K. and Amin, M.O. (2021). Faculty's and Student's Perceptions of Online Learning During COVID-19. *Frontiers Education*, Vol. 6. doi: 10.3389/feduc.2021.638470
- Irshad, M. B. M., and Johar, Md. G. Md. (2017). The Study on Awareness and Adoption of Cloud Computing by Academics in Sri Lankan Universities. *International Journal of Advanced Research in Computer Science and Software Engineering*, 7(6).
- Jamal, F., and Khan, R. Z. (2020) Emerging Technologies and Developments in Cloud Computing: A Systematic Review, *International Journal of Emerging Trends in Engineering Research*, 8(5), 894-905
- Kerby, J. (2020). How Cloud Computing Differs from Traditional IT Infrastructure. Retrieved from on 10 February 2021 from <https://micropro.com/blog/cloud-computing-vs-traditional-it-infrastructure/>
- Kostanica, F., Youssef, A. B., and Zeqiri, A. (2017). Factors Affecting Intention to Adopt Cloud Computing by Students in Kosovo, being Conference Paper Delivered at the 1st International Scientific Conference at University Prishtin, Kosovo, November 2017. Accessed September 17, 2022
- Kuznetsov, S. D. (2022). New Storage Devices and the Future of Database Management, *Baltic Journal of Modern Computing*, 24 (1), 1-3
- Mansuri, A., Verma, M., and Laxkar, P. (2014). Benefit of Cloud Computing for Educational Institutions and Online Marketing. *Information Security and Computer Fraud*, Vol. 2, Issue 1, 5- 9
- McKelvey, F., and Driscoll, K. (2019). ARPANET and its Boundary Devices: Modems, IMPs, and the Inter-structuralism of Structures. *Internet Histories*, 3, 31-50
- Mell, P., and Grance, T. (2011). *The NIST Definition of Cloud Computing*. Gaithersburg National Institute of Standards and Technology. Special Publication: 800-145

- Obrutsky, S. L. (2016). Cloud Storage: Advantages, Disadvantages and Enterprise Solutions for Business, Accessed September 8, 2022, at: https://www.researchgate.net/publication/305508410_Cloud_Storage_Advantages_Disadvantages_and_Enterprise_Solutions_for_Business
- Ogunsola K. and Fadoju V.O (2022). Perceived Security and its Relationship with Use of Cloud Computing Services among Postgraduate Students of the University of Ibadan, Nigeria. *Web of Deceit*. Accra: SMART – Creative Research Publisher
- Ogunsola, K. and Olojo, T.P. (2020). Citizens’ Continual Usage Intention of Government 2.0 in Nigeria: From Awareness and Perceived Motivation Perspectives. *Behavioural Informatics, Digital Humanities & Development Journal*, 6(1), 115-135
- Okai, S., Uddin, M., Arshad, A., Alsaqour, R. and Shah, A. (2014). Cloud Computing Adoption Model for Universities to Increase ICT Proficiency. DOI: <https://doi.org/10.1177/2158244014546461>
- Oyeleye, C. A., Fagbola, T. M., and Daramola, C. Y. (2014). The Impact and Challenges of Cloud Computing Adoption on Public Universities in Southwestern Nigeria, *International Journal of Advanced Computer Science and Applications*, 5(8), 13-19
- Peterson, R., (2022) Characteristics of Cloud Computing: Essential Features. Accessed September 10, 2022, at: <https://www.guru99.com/characteristics-of-cloud-computing.html>
- Pinheiro, P., Aparicio, M. and Costa C. (2014). Adoption of Cloud Computing Systems. Information Systems and Design of Communication Proceedings of the *International Conference on Information Systems and Design of Communication*, 127–131 <https://doi.org/10.1145/2618168.2618188>
- Ramadhan, R.D. (2018). The Uses of Cloud Storage: A Study on Accounting Students of Economic and Business Faculty at Brawijaya University. A Bachelor's degree project of Brawijaya University, Indonesia.
- Rao, U. H., (2011). Challenges of Implementing Network Management Solution, *International Journal of Distributed and Parallel Systems*, 2(5), 67-76.
- Rastogi, G, Verma, H. and Sushil R. (2018). Determining Factors Influencing Cloud Services Adoption in India. *Serbian Journal of Management*, 13(2), 335-352
- Regalado A. (2011). Who Coined ‘Cloud Computing’? Retrieved on 16 January 2022 at <https://www.technologyreview.com/2011/10/31/257406/who-coined-cloud-computing/>
- Rogers, E.M. (1995). *Diffusion of Innovations*, Fourth edition, New York: Free Press.
- Rogers, E.M. and Shoemaker, F.F. (1971) *Communication of Innovation: A Cross-Cultural Approach*. 2nd Edition, The Free Press, New York.
- Saidu, A. and Kwadan, S. M. (2020). Investigation of Trends, Benefits and Challenges in the Adoption of Cloud Computing Application in E-Learning among Polytechnics in North East, Nigeria, *European Journal of Computer Science and Information Technology*, 8(2), 38-47.
- Sathye, M. (1999). Adoption of Internet Banking by Australian Consumers: An Empirical Investigation. *International Journal of Bank Marketing*, 17(7), 324-334.
- Shakeel, J, T. P. (2020). Advantages and Security Challenges of Cloud Computing – Overview, *International Journal of Computer Science and Mobile Computing*, 9(22), pp: 76-85
- Sogbeye, G. T., Ekpu, F. S., and Udoh, H. (2019). Cloud Computing in Nigerian Universities in Southwestern Nigeria, *World Educators Forum*, 5(8), 13-19
- Srivastava, A., and Habib, A. S. K. (2020). An Overview of Cloud Computing, *International Journal of Advanced Trends in Computer Applications*, (2), 36-38
- Sukumaran, K. (2011). Prospective of Cloud Computing Applications in Professional Education. *Journal of Modern Education Review*, 1(2), 89-98
- Kaur, T., Kuliya, M., Sarki, A, Sharma, D. and Suleiman, M. (2021). A Review of Application of Cloud Computing in Education. I. 46-55

- Tan, X., & Kim, Y. (2011). Cloud Computing for Education: A Case of Using Google Docs in MBA Group Projects. *2011 International Conference on Business Computing and Global Informatization*, 641-644.
- Velev, D. and Zlateva, P. (2011). Principles of Cloud Computing Application in Emergency Management, paper presented at *International Conference on E-business, Management and Economics*, 25, IACSIT Press, Singapore
- Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Perceived Behavioural Control, Computer Anxiety and Enjoyment into The Technology Acceptance Model. *Information Systems Research*, 11, 342–365
- Venkatesh, V. Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, 27(3), 425-478. <https://doi.org/10.2307/30036540>
- Wang, L.Y., Lew, S.L., Lau, S.H., & Leow, M.C. (2019). Usability factors predicting continuance of intention to use cloud e-learning application. *Heliyon*, 5.
- Widyastuti, D., and Irwansyah (2017). Benefits and Challenges of Cloud Computing Technology Adoption in Small and Medium Enterprises (SMEs), *Advances in Economics, Business and Management Research*, Vol. 41, paper delivered at the 4th Bandung Creative Movement International Conference on Creative Industries, Bandung, Indonesia.
- Yamane, T. (1967). *Statistics, An Introductory Analysis*, 2nd Ed., New York: Harper and Row.
- Zeng, W, and Germanos, V. (2019). Benefits and Costs of Cloud Computing Security. Accessed at: <https://www.researchgate.net/publication/335754018>