BOOK CHAPTER | Intention to Use & Security

Perceived Security and its Relationship with Intension to Use Cloud Computing Services by Postgraduate Students of the University of Ibadan, Ibadan, Nigeria

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Abstract

Cloud computing has become one of the most prominent concepts in the present digital era as it employs emerging technologies to carry out all tasks related to the use of computers, smartphones, the Internet and the world wide web. Over the years, in traditional computing, users generally store, create and produce documents on their computer(s). This, means that such created or acquired documents would be accessible on the users' network or personal computer only, but they would not be accessible by other computers and users outside the computer's network. With the use of cloud computing, these limitations are resolved. This study thus investigates how perceived security affects the intention to use cloud computing services among postgraduate students of the University of Ibadan. The study adopts a descriptive survey design. A sample of 360 postgraduate students who were selected using the convenience sampling method, participated in the study. Spearman rank correlation was used to determine the relationship between perceived security and the intention to use cloud computing services. The findings revealed that perceived security had a significant positive relationship with the intention to use cloud computing ($r = 0.719$, $p<0.05$). This shows that perceived security is an important factor that significantly accounts for the intention to use cloud computing services by postgraduate students. The study concludes that people will use cloud computing services more when they perceive that it is safe from intrusion, loss of data and information. The study recommends that cloud computing services be incorporated and made available as an efficient source of data storage by postgraduate students in the conduct of their academic activities.

Keywords: Cloud services, Internet, Postgraduate students, Security

Introduction

Cloud computing is comprised of cloud infrastructure, cloud platforms, and cloud applications. Cloud infrastructure refers to the computational resources, network, storage, and processing that allow the user to tailor the infrastructure based on organisational needs (Paquette, Jaeger and Wilson (2010).

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Cloud computing is a model that allows users on-demand access to resources such as servers, platforms, networks, storage, and applications in which computing resources can be rapidly provisioned and delivered over the Internet (Liu et al., 2011; Mell & Grance, 2011; Paquette, Jaeger and Wilson, 2010). Cloud computing is also scalable to needs with little human interaction with cloud providers (Mell & Grance, 2011; Paquette, Jaeger and Wilson, 2010).

The cloud platform is the provision of computer platforms or software stacks as a service, which allows users to deploy customised or purchased applications (Liu et al., 2011; Mell & Grance, 2011). Cloud applications are services that run on top of cloud platforms and infrastructures, and are made available to the end-users (Paquette, Jaeger and Wilson (2010).

There are challenges of traditional computing and traditional means of storing files and data in many government institutions in Nigeria (Dogo, Salami and Salman (2013). Therefore, there is a need in computing for a high available up-to-date software and hardware that can help to provide access to better and efficient storage facilities. As an important part of cloud computing, cloud storage is an important innovation in technology and the provision of service. To provide data storage services, cloud storage employs software to interconnect and facilitate collaboration between different types of storage devices. Examples of the cloud for storage services are Google Drive, Dropbox, iCloud, IBM Cloud, Oracle Cloud, Microsoft Web Services such as MS Azure, Office 365, One drive, Slide Rocket and others. Organisations like Amazon, Facebook, WhatsApp, Yahoo and some others have also adopted cloud computing to store most of their data.

In an academic environment, there are various departments where lots of students need to access data and information. The potential of cloud computing for improving efficiency, cost and convenience for the educational sector is being recognised by some United States educational establishments (Gollman, 2015). That is, many of these educational institutions have begun their movement to utilise cloud computing by outsourcing their student email provisions. Educational institutions are also beginning to use lower level cloud services for purposes such as data storage. Cloud computing then improved e-learning and m-learning where most academic materials were mainly distributed on the cloud, in which Open Educational Resources were produced, researched and shared by the participants (Almazroi, 2017). Figure 1 shows the cloud architecture proposed for Universities by Mircea & Andreescu (2011).

With applications in the cloud, Software as a Service (SaaS), students and teachers can easily access their data via web browsers from a computer at home, school, library, a student room or some other places, and achieve rapid and efficient communication, collaboration, exchange or share documents, contacts, notes, audios/videos and other data. With the use of Cloud computing, students can create a Cloud Based Personalised Learning Environment. Using services and applications in the cloud, students and teachers can achieve mobility because their educational resources and necessary applications are available via portable computers and internet-connected devices. For example, classes can be implemented outside the school/faculty or students can perform duties at various locations and times (Ogunsola and Adekola, 2021; Almazroi, 2017). In the educational sector in Nigeria, Cloud computing is yet to be recognised and adopted by various institutions and organisations (Dogo, Salami and Salman (2013). According to Dahunsi and Owoseni (2014), the components that make up a cloud computing system, the cloud ecosystem, are still at the infancy stage in developing countries, particularly in Nigeria. This may be due to the different factors which normally otherwise limit the use of IT and its facilities in the country, one of such is perceived security.

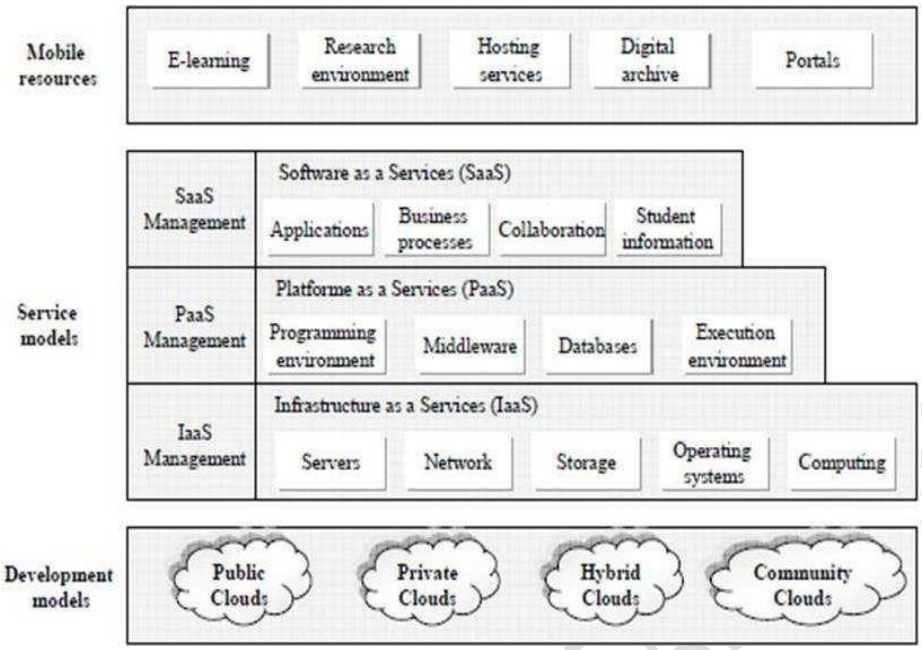

Figure 1: Pictorial Representation of Cloud Architecture for Universities
Source: Mircea & Andreescu, 2011

Perceived security is the most important factor that influences a user's decision to use cloud computing services (Atobishi, Bahna, Takács-György and Fogarassy, 2021). Perceived security is defined as the degree to which an individual believes that using a particular system would be free from threats to his or her privacy (Ambrose & Chiravuri, 2010). In this study, perceived security refers to the degree to which the postgraduate students in the University of Ibadan believe that using cloud computing would be free from threats to their privacy, data and information. It was assumed that if people believe that a particular computing service is secured, users will have the intention to use such service.

Although the intention to use cloud computing, may not necessarily lead to the use of a service, it is significantly related to use and probably the best likelihood measure of implementing innovation at the beginning stage (Morrison, 1979). The intention of using cloud computing for providing services and products was primarily taken from the diffusion of the innovation theory (Rogers, 1995). In this study, intention to use cloud computing refers to the likelihood that users will take advantage of the benefits that using cloud computing might offer to them. The objective of this study is to determine how perceived security affects the intention to use cloud computing services by University of Ibadan postgraduate students. According to Pankowska, Pyszny and Strzelecki (2020), the security of data is an important challenge to be solved by cloud computing service providers. This study, therefore, determined if there is a significant relationship between perceived security and postgraduate students' intention to use cloud computing.

Methodology

A survey design approach was adopted for this study. This study used content and face validity, as well as reliability of the research instrument which was a questionnaire. Copies of the questionnaire were printed and administered physically to all the respondents. A pre-test of the instrument was carried out with 30 postgraduate students of the Federal University of Agriculture, Abeokuta.

The Cronbach Alpha score for Perceived security was 0.85, while the score for the Intention to use cloud computing was 0.70. Data collection for the study took place among the postgraduate students of the University of Ibadan from 22 August – 26 October 2019. 400 copies of the questionnaire were administered, out of which 360 copies were returned and found useable for data analysis. Data were analysed using the Statistical Package for Social Sciences (SPSS) version 20. Spearman rank correlation analysis was used to establish the relationship between Perceived security and the Intention to use cloud services.

Research Findings

The demographic distribution of the respondents is presented in Table 1.

Table 1: Frequency Distribution of Demographic Profile of Respondents

Demographic Variables		
Sex	**Frequency**	**Percentage (%)**
Male	224	62.2
Female	136	37.8
Total	***360***	***100***
Age Range	**Frequency**	**Percentage (%)**
18 – 22 years	6	1.7
23 – 27 years	287	79.7
28 – 32 years	67	18.6
33 years and above	-	-
Total	***360***	***100***
Level of Study	**Frequency**	**Percentage (%)**
Masters	312	86.7
M.Phil.	48	13.3
Total	***360***	***100***
Years of Using Computer	**Frequency**	**Percentage (%)**
< 1 year	9	2.5
2 – 4 years	18	5.0
5 – 7 years	45	12.5
8 – 10 years	51	14.2
11 years and above	237	65.8
Total	***360***	***100***
Years of Using Internet	**Frequency**	**Percentage (%)**
< 1 year	18	5.0
2 – 4 years	-	-
5 – 7 years	-	-
8 – 10 years	12	3.3
11 years and above	330	91.7
Total	***360***	***100***

Table 1 presents the frequency distribution of the demographic profile of the respondents. Findings revealed that out of the 360 respondents, 224 which is 62.2% were males while 136 (37.8%) were females. Also, 6 (1.7%) respondents were between the ages of 18 and 22years, 287 (79.7%) were between 23 and 27 years, while 67 (18.6%) were between 28 and 32 years. This revealed that the majority of the respondents were between the ages of 23 and 27 years. More so, the table shows that 312 (86.7%) were master's degree students, while 48 (13.3%) were Master of Philosophy (M.Phil.) degree students.

It was further revealed in Table 1 that 9 (2.5%) respondents have been using the computer for less than a year, 18 (5.0%) have been using it for between 2-4years, 45 (12.5%) for between 5-7years, 51 (14.2%) for between 8-10years, while 237 (65.8%) have been using it for 11years and above. Likewise, the table revealed that 18 (5.0%) respondents have been using the internet for less than a year, 12 (3.3%) have been using it for between 8-10years while 330 (91.7%) have been using it for 11years and above.

Relationship between perceived security and intention to use cloud computing services by postgraduate students

Spearman's rho correlation analysis was performed to test the relationship between perceived security and intention to use cloud computing services by postgraduate students'. Table 2 presents the correlation analysis test result.

Table 2: Relationship between Perceived Security and Intention to Use Cloud Computing Services by Postgraduate Students'

Variables	Intention to Use Cloud Computing	
Perceived Security	Correlation Coefficient	.719
	Sig. (2-tailed)	.000
	N	360

Table 2 shows that there is a significant strong positive relationship between perceived security and intention to use cloud computing services by postgraduate students' ($r = .709$, $p < .05$). This indicates that an increase in perceived security leads to an increase in postgraduate students' intention to use cloud computing services. This agrees with Pankowska, Pyszny and Strzelecki (2020), that perceived security positively impacts the intention to use cloud computing services.

It is believed that the understanding of the impending risk of losing data not stored in the cloud and the guarantee of data protection in the cloud is enough to drive postgraduate students' intention to use cloud computing services. Egea and Gonzalez (2011) stated that trust and risk factors were believed to be relevant determinants that influence users' acceptance of new technology implementation. Data security in some sectors come firstly to the mind of decision maker when they think about cloud computing. Liana, David and Wang (2014) also noted that protecting sensitive information is a very important issue when offering cloud computing services to healthcare organisations. Therefore, this study confirms that perceived security is an important factor affecting the intention to use cloud computing by the postgraduate students of the University of Ibadan.

Conclusion and Recommendations

According to the findings, there exists a strong positive significant relationship between perceived security and intention to use cloud computing services by postgraduate students. Therefore, an increase in the security of cloud computing services and applications will make more postgraduate students adopt their uses. This study thus recommends the following:

1. Tertiary institutions in Nigeria should incorporate cloud computing technology into their academic activities. This would in turn improve the number of people utilising cloud computing technology among postgraduate students in tertiary institutions in Nigeria.
2. Stakeholders (such as academic heads, vice-chancellors, heads of technology and so on) in tertiary institutions should provide more facilities and infrastructure that would encourage students to adopt and use cloud computing services. This could be through the creation of computer laboratories and the development of high speed internet facilities in the schools which would encourage students to use such facilities for their cloud computing activities such as storage of their school work and so on.

3. Cloud service providers such as Google, Oracle, Microsoft and so on may be contacted and deals can be struck where they would provide cloud storage facilities for institutions at a subsidised rate. In addition to this, Universities and tertiary institutions may develop their technology for cloud computing services such that they would not depend on any other organisation for their cloud storage facilities and so on.
4. Cloud infrastructure should be put in place to handle any lapses that may occur during the adoption, implementation and use of cloud computing services by universities and other tertiary institutions.

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