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INVESTIGATION OF FACTORS AFFECTING CLOUD COMPUTING ADOPTION IN NIGERIA

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ABSTRACT

Cloud computing is a viable alternative for meeting the technological needs of many enterprises with the benefits of instantaneous computing resource fulfillment, technology expenditures at lower costs, common technology platforms that can facilitate standardization and decreased need for internal technology support personnel. This paper examined the behavioral intention to adopt cloud computing services in large and small organization using an Enhanced Technology Acceptance Model (ETAM). The aim is to investigate the factors affecting cloud computing adoption in Nigeria. The model includes variables that other research has found related to adoption of new computing services and technologies. Regression Analysis was then deployed to test the research hypotheses. The result of regression analysis revealed that attitude and adopters ability to use cloud computing (self-efficacy) were better predictor of intention; perceived usefulness and perceived ease of use of cloud computing were better predictor of attitude; perceived ease of use and the relevant of cloud computing to adopters' work (job relevance) were the predictor of perceived usefulness.

Keywords: attitude, cloud computing, intention, TAM, adoption and self-efficacy

INTRODUCTION

Technological advancements in system virtualization, system resource management, and the internet have led to cloud computing emergence. It is a viable alternative for meeting the technological needs of many enterprises with the benefits of instantaneous computing resource fulfillment, technology expenditures at lower costs, common technology platforms that can facilitate standardization and decreased need for internal technology support personnel. Cloud computing is a subscription-based service where you can obtain networked storage space and computer resources. Nevertheless, despite the touted advantages of this new technology, evidence suggests that not all organizations are leaping into the cloud; the use of IT in some developing countries like Nigerian is growing at a rather slow rate, which is largely due to the cost involved in the purchase and maintenance of IT equipment and the poor power supply in the country (Ume *et al.*, 2012). Adopting the cloud computing technology will help to manage the limitations to the slow pace of IT growth better because the cloud technology reduces the cost of delivering IT services and takes away the burden of having to purchase and provide maintenance to the high technology equipment needed to meet the IT needs of organizations, it is essential for better service delivery (Gital *et al.*, 2011). Cloud computing being a new initiative,

there is need for formal scientific research to study the factors affecting the adoption of its services by personal users and large organizations particularly in Nigeria.

COSO (2013) defined cloud computing as a computing resource deployment and procurement model that enables an organization to obtain its computing resources and applications from any location via an Internet connection.
Previous researches identify key variable of cloud computing services and other technology adoption. However, the relevance of these variables to show uptake rate of cloud computing service is unknown. An explanatory model of determinant of cloud computing service adoption would highlight the barriers and correlation of cloud computing adoption by corporate organization.

This research is important in that the study might result to increased understanding of the relationships of the determinants of cloud computing services adoption thereby allowing cloud computing service provider to better understand how to show consumers the value of their offering and assist them in shaping a marketing strategy, specifically attuned to business conditions. In addition, it enables the cloud computing service providers to gain insights from the finding of this research and adjust their product road map or product releases, in line with user enterprise market uptake.

This work aimed at studying the behavioural intent of adoption of cloud computing services in large and small organization and hence develop a model which include variables that other research has found related to adoption of cloud computing services and other external variables such as social influence, complexity of understanding, cost, security, self-efficacy, etc. The proposed model was tested in an attempt to make the model more relevant to the cloud computing market place and great prediction of conditions for adoption of cloud computing services were achieved especially for organizations.

The rest of this paper is organized as follows; section II is the general concept of cloud computing, Section 3 presents the research model and hypothesis. Section 4 discusses the research design and methodology. Section 5 presents the discussion and conclusion.

Concept of cloud computing

Cloud computing as a concept is the result of the natural evolution of our everyday approach to using technology delivered via the Internet. Many researchers defined cloud computing in different ways. NIST (2013) described cloud computing as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics**,** three service models, and four deployment models. According to this definition, *on-demand self-service, broad network access, resource pooling, rapid elasticity,* and *measured service* are essential characteristics of cloud computing. *On-demand self-service* allows users to increase the amount of computing resources that they use without any human interaction from cloud provider's side. *Broad network access* allows users to access the service over the network using any device (e.g. cell-phones, laptop, desktop) that is capable of connecting to the network (e.g. Internet). Using a multi-

tenant model allows computing resources to be pooled by customers. This *Resource pooling* enables providers to serve multiple users by same computing resources. *Rapid elasticity* allows customers to use as much resource as they want based on their demands. *Measured service* allows customers and providers to have access to accurate resource usage. Providers and users are able to monitor, control and report their usage easily (Mell *et al*., 2011). Cloud computing uses this type of computing to reduce the resource costs and finally be a scalable and flexible system (Wang *et al.,* 2010).

Cloud computing uses distributed computing resources to accomplish the objective of the application which is similar to grid computing, Virtualization is the basic technology on which cloud computing has been shaped, it allows customers to pool resources and virtually access resources on an on-demand basis which makes it possible to achieve its required objective. In cloud computing, everything is delivered *as a Service* (*XaaS*), from testing and security, to collaboration and meta-modeling. Cloud computing uses the Internet as its backbone to provide flexible on-demand and dynamically scalable computing infrastructure for many applications using any of its four deployment models: private, public, community, or hybrid cloud and its three-service delivery models: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). It provides computing resources on demand on a pay-per-use basis via a cloud service provider and is a powerful tool that can deliver sustainable advantage (Shimba, 2010). Cloud computing can effectively re-design the way businesses and organizations approach and accomplish their tasks on daily basis, it is more of a comprehensive infrastructure that allows for increased streamlining of inter-office activities (Safiya *et al.,* 2014).

Technology acceptance model

The technology acceptance model (TAM), has been validated as a powerful framework to explain the adoption of IT by the users. It has become a widely used model to explain the acceptance of technological products and services. Davis (1989) stated that the success of a system can be determined by user acceptance of the system, measured by three factors: perceived usefulness (PU), perceived ease of use (PEOU), and attitudes towards usage (ATU) of the system. If a system is not easy to use then it will probably not be perceived as useful. According to the model, a user's perceptions about the system's usefulness and ease of use result in a behavioural intention to use (or not to use) the system (Davis, 1989). Thus, this study examined the relationship of user's behavioral intention to adopting cloud computing services with selected factors of perceived usefulness (PU), perceived ease of use (PEOU), and attitude towards usage (ATU), with the following added determinant (external variables) for cloud computing adoption. These determinants are:

Social influence: how does social influence (mass media, expert's opinion, and word of mouth) affect the adoption of cloud computing services?

Security: How does security of personal record or other sensitive data affect the adoption of cloud computing?

Complexity: what effect does lack of understanding or complexity of understanding have on adoption of these services?

Self-efficacy: How does self-assured skill to use a system and internet affects the adoption of cloud computing?

Cost: How does cost saving influence the adoption of cloud computing services.

Job relevance: is defined as "an individual's perception regarding the degree to which the target system is applicable to his or her job".

RESEARCH MODEL AND HYPOTHESES

The proposed research model for this work is the Enhanced TAM. The model includes variables that other research has found related to adoption of cloud computing services and other determinants as identified in the literature. The proposed model is shown in the fig. 1 below:

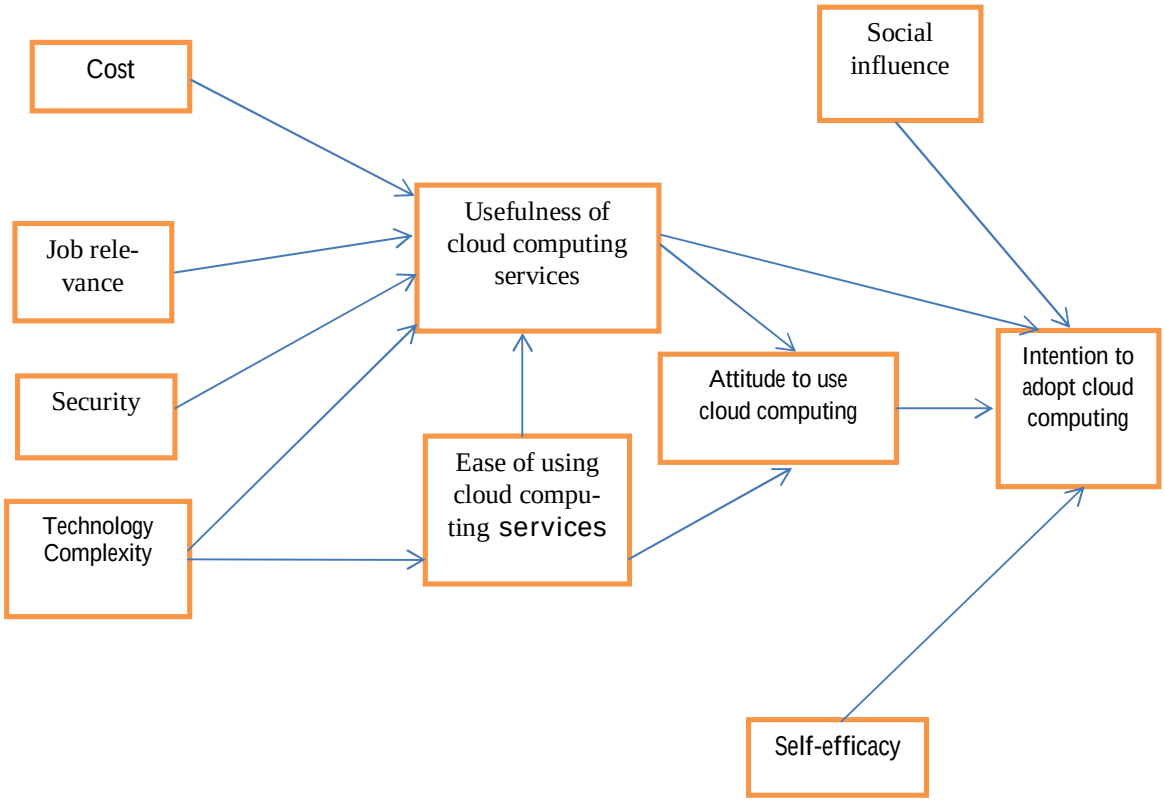

Fig. 1: Enhanced Technology Acceptance Model

The proposed research model and the theory each constructs belongs to were discussed, then related hypotheses were introduced based on their relevance to cloud adoption.

Research Hypotheses

Attitudes towards cloud computing

Attitude, being identified as a cause of intention was first noted by Lancaster in 1996 as the driver of consumer utility or attributes. It was also described by Triandis (1980) as an individual's positive or negative behaviour towards innovation adoption. TAM suggested that attitude is based on the most important beliefs that a person has about the consequences of a given behaviour and his or her evaluation of those consequences. As a result of this, attitude is the construct that receives most attention in consumer research and is used most widely for predicting user's likelihood to adopt a new technology. Research on attitude toward using cloud computing and identification of its relationship with intention to use is more suitable and practically valuable for predicting usage behaviour. It is therefore hypothesized that:

H1: Attitude towards cloud computing will have a large effect on intention to use cloud computing.

Perceived usefulness of cloud computing

Perceived usefulness is defined "as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context, thus having an indirect effect on user's technology acceptance. Perceived usefulness (PU) in the TAM model originally referred to job related productivity, performance, and effectiveness (Davis, 1989). This is an important belief that was identified as providing an insight into how user attitudes toward using (and intention to use) a technology is influenced; perceived usefulness has a direct effect on intentions to use over and above its influence via attitude (Davis, 1989; Taylor & Todd, 1995). Past research was inconsistent on whether perceived usefulness was a stronger determinant. Chao *et al.,* (1997) and Frank (2010) found that behavioral intention was largely driven by perceived usefulness. In regards to cloud computing acceptance, this study found out if attitude towards using cloud is determined by perceived usefulness. Thus the research tests the following hypotheses:

H2: Perceived usefulness of cloud computing will have a significant positive effect on attitude towards using cloud computing.

H3: Perceived usefulness of cloud computing will have a significant positive effect on intentions to use cloud computing.

Perceived ease of use

The degree at which individual believes that using a particular system would free him from physical and mental effort was coined Perceived ease of use (PEOU) (Davis, 1991). An application perceived to be easier to use than another is more likely to be more acceptable by users. Perceived ease of use has been established from previous research to be an important factor influencing user's intention to use and usage behavior of information technologies (Igbaria *et al.,* 1995).

There exists a direct effect of perceived ease of use on perceived usefulness. In other words, between two systems offering identi-

cal functionality, a user should find the one that is easier to use and more useful. Davis et al. (1993) expressed that since some of the users' job content includes use of a computer *per se,* if a user becomes more productive via ease of use enhancements, then he or she should become more productive overall. Perceived usefulness is not hypothesized to have an impact on perceived ease of use. However, it is proposed that perceived ease of use is also an antecedent of perceived usefulness.

Perceived ease of use is a major determinant of attitude toward use in the TAM model. This internal belief ties to an individual's assessment of the mental effort involved in using a system (Davis, 1989). Perceived usefulness and perceived ease of use are distinct but related constructs. Improvements in perceived ease of use may contribute to improved performance. Since improved performance defines perceived usefulness, perceived ease of use would have a direct, positive effect on perceived usefulness. Perceived ease of use is an important determinant of users' attitude towards use and then behavioral intention. Consequently to better explain perceived usefulness and attitude towards using cloud computing, we propose the following propositions:

H4: perceived ease of using cloud computing services will have a significant effect on attitude towards using cloud computing.
H5: perceived ease of using cloud computing services will have a significant positive effect on perceived usefulness of cloud computing.

Social influence

In Taylor and Todd's (1995) study, social influences were equated with subjective norms and defined as other people's opinions, the influence of superiors, and peer influence. Venkatesh and Davis (2000) later expanded social influences to include image as well as subjective norms. Image is the "degree to which use of an innovation is perceived to enhance one's status in one's social system". So the variable 'image' is not the image of the technology, but the image of the person that uses it. The notion of image is derived from the research on diffusion of innovations. Moore and Benbasat (1991) defined it as the extent to which use of an innovation is perceived as enhancing one's status in a social system. Social influence is more concerned about his perceptions of what most people who are important to him think he should or should not perform the behavior in question. Davies *et al.,* (1989) believed that in some instances people might use an innovation just to comply with others mandates rather than their own feelings and believes. Empirical supports for the relationship between social norms and behavior can be found in many studies (e.g. Venkatesh and Davies, 2000) the pressure of competing along with other firms in specific industry that the company operates in could affect the intention to switch to cloud. Accordingly, social influence has a positive influence on usage intention and users will comply to use cloud computing services due to social influence. So we propose considering the possible social influence on cloud computing users that:

H6: Social influence will have a significant effect on intention to adopt cloud computing

Security and privacy

In the context of cloud computing, security and privacy is defined as "the degree to which cloud computing is perceived as being more secure than other computing para-

digms". Cloud providers claim that they are able to protect companies' data more securely than the companies themselves. A security breach is an incident in which a company or a government agency loses information, personal records or other sensitive data (Bhaskar *et al.,* 2011). Moving to the cloud adds new layers of complexity for securing data and will thus influence the firms' decision to adopt the innovation. Hence Security of the cloud refers to many issues such as privacy, confidentiality of the cloud (Zhang *et al.,* 2010). Other researchers argue that security-related issues of cloud computing are related to third parties' access to their data; or the issues regarding the data transmission and data storage (Kottemann & Davis, 1991). There are different perspectives about the security of the cloud. In a study conducted by Repschlaeger *et al*. (2012) managers of 30 companies participated in a survey. The finding of their survey show that 83% of managers ranked security and compliance as high importance.

Some believe the cloud is not secure, while others believe it is more secure than other types of computing.

Current businesses are so reliant on their Information Systems, that in many cases the more decision makers perceive cloud computing as being secure, the more it affects the perceived usefulness of cloud computing services. In regards to cloud computing acceptance, we will see if security determines the perceived usefulness. Thus we propose the following

H7: security of the cloud will have a positive effect on perceived usefulness of cloud computing.

Self-efficacy

Self-efficacy is the judgment of one's' capability to use computer or an innovation. Compeau *et al.,* (1995) defined computer self -efficacy as an individual's perception of his or her own ability to use computer in the accomplishment of a task, rather than reflecting simple component skill. An individual with self-assured skill to use a computer and the internet is more inclined to adopt cloud computing. Self-efficacy does not focus on the skills one has, rather the judgment of what one can do with his or her skills. This component then refers to comfort with using the innovation. A higher level of self-efficacy will lead to higher intention to adopt and use innovation. In the other word, high level of self-efficacy will lead to a high level of intention to adopt and use IT innovation (Compeau & Higgins, 1995; Agarwal *et al,* 2000). We expect that if SME owners believe that they have the skill and ability to use IT innovation, they would have a higher intention to adopt and use IT innovation. Therefore, the study hypothesizes from the above argument.

H8: self-efficacy will have a direct effect on intention to adopt cloud computing.

Complexity

Complexity is another factor adapted from Rogers (2003). He defined complexity as the degree to which an innovation is perceived as relatively difficult to understand and use. In the context of cloud computing, complexity is defined as the degree to which cloud computing is perceived as being relatively difficult to understand and use. The impact of an innovation characteristic has been widely recognized in technology user acceptance research. Davis *et al.* (1989) for instance proposed that system characteristics exhibit indirect effect on usage intentions or behaviors through their relationship with

perceived usefulness and perceived ease of use. This impact of system characteristic has been tested and supported across a number of studies. To be more specific, a technology that is difficult to understand and use is considered to be complex. Furthermore, a technology is considered to be complex if it takes too much time and effort to be learnt; or the user spends too much time to perform its normal duties. Cloud computing system complexity can be in terms of interoperability i.e. the ability of software and hardware on different machines from different vendors to share data. Therefore, it is hypothesized that in the context of cloud computing the level of complexity of the system has a negative influence on adoption of cloud computing:

H9*:* The perceived level of complexity of the cloud computing has a significant impact on perceived usefulness of cloud computing.

H10: Technology complexity will have effect on perceived ease of using cloud computing services

Cost

In this work, cost of cloud computing is defined as the degree to which decision makers perceive the total cost of using cloud computing lower than other computing paradigms. So, in the context of cloud computing the decision makers' who perceive cloud computing as being less costly than other computing paradigms are more likely to adopt cloud computing. Cervone (2010) expressed that cloud computing creates an opportunity to increase IT innovation and lower capital expenditure, which indicate the usefulness of adopting cloud computing services. By adopting cloud computing, a firm can reduce the time devoted to system maintenance and routine upgrades. As an enabler, cloud computing offers cost effective ways to transform businesses by re-inventing the way in which goods and services are sold and consumed. Hence,

H11: Cost saving will positively influence perceived usefulness of cloud computing.

Job relevance

Job relevance is a key component of the matching process in which a potential user judges the effects of using a particular system on his job. Venkatesh *et al.,* (2000) defined it as an individual's perception regarding the degree to which the target system is applicable to his job. It is seen as a perception judgment that directly impacts perceived usefulness which do not originate from the subjective norm. If users clearly understand the knowledge and tools that are related to their work, implementing the system on the work will increase work efficiency. After the users believe that the technology system has satisfied the basic mission requirements, whether the technology system will do a better job and achieve the work goal shall be the next consideration. It is found that the interaction of job relevance to perceived usefulness was significant in all case studies by Venkatesh. Thus the study hypothesized that:

H12: In the context of cloud computing, job relevance has influence on perceived usefulness.

RESEARCH DESIGN AND METHODOLOGY

Measure of constructs

This study is a predictive research which follows a deductive strategy. It investigates the factors that influence decision to adopt cloud computing by enterprises in Nigeria.

The instrument for data collection was a well-structured questionnaire that aimed at capturing respondents' opinion about cloud computing and other factors that may influence their decision to adopt cloud computing. Items were developed based on a 5-point Likert scale to measure each construct ranging from ''strongly disagree'' (1) to ''strongly agree'' (5). The first part of questionnaire was intended to obtain information about the decision makers, such as their cloud knowledge. Other questions were designed to obtain the participants' views toward cloud computing. A pilot study was conducted on 16 respondents who were IT decision makers of companies. A reliability test was performed on the pilot sample in order to evaluate the reliability of the construct used in the questionnaire (the reliability analysis measured the internal validity and consistency of items used for each construct). Cronbach's alpha reliability coefficient of above 0.7 was obtained for all factors except social influence (see Table 1) indicating that all measures employed in this study demonstrated a satisfactory internal consistency. Table 2 lists the items used for survey in this study.

Table 1: Reliability Test 1

Construct	Items	Cronbach's alpha
Perceived Usefulness	3	0.810
Perceived Ease of Use	4	0.876
Social influence	4	0.541
Cost	3	0.813
Complexity	3	0.805
Security	4	0.833
Self-efficacy	3	0.874
Job Relevance	3	0.768
Attitude	4	0.832
Intention	4	0.846

The validity of the various scales of the construct was assessed and ambiguous items were identified. Items were added, reworded and deleted in this pre-test; a total of three sorting rounds were conducted till items were stable and a high item placement ratio (the percentage of items placed correctly in each construct) was achieved. Therefore, the survey is considered a reliable measurement instrument.

Table 2: Items used for survey

Construct	Items
Perceived Usefulness	I think using cloud computing would enable me to accomplish my organizational tasks more easily. Cloud computing enhances my effectiveness in my job. Overall, cloud computing services are advantageous.
Perceived Ease of use	I think learning to use cloud computing services is easy. I think cloud computing integrates easily into IT infrastructure. I feel becoming skillful at using cloud computing services is easy.
Social Influence	People around me think it is a good idea to use cloud computing. People around me have encourage me to use cloud computing. The media encourage me to use cloud computing.
Cost	Cost of service decreases our capital expenditure. The cost of adopting Cloud computing are greater than its benefits. The overall cost of using cloud computing is less than the cost of installing, developing and maintaining technology in house.
Complexity	Working with cloud computing is complicated. The use of cloud computing requires a lot of mental effort. Using Cloud computing to do my normal duties takes too much time.
Security	Cloud computing provides a secure Service. Cloud providers' servers and data centers are secure. The media that is used to transmit our data to cloud providers' data center is secure. Overall I do not have any concern about the security and privacy of cloud computing services.
Self-efficacy	I would feel comfortable using the cloud computing services on my own. I would be able to use the cloud computing services reasonably well on my own. Overall, I have confidence to use cloud services
Job Relevance	Cloud computing setup will be relevant with the way my company works. For future work in my company, cloud computing is important. Cloud computing fits into my companies working style.
Attitude	I feel cloud computing is a wise idea. I feel cloud computing is a good idea. I like to use cloud computing. Using cloud computing is a pleasant idea
Intention to use	I intend to use cloud computing in the nearest future. I plan to use cloud computing. I expect to use cloud computing in near future I am determined to use cloud computing soon.

Data collection and analysis method

After removing the items that negatively influenced the reliability of the questionnaire, the reliability of the final instrument was evaluated by checking the Cronbach's alpha and inter-items correlations of items that measure constructs. Table 4 summarizes the reliability test of our final questionnaire. Number of cases, the Coranbach's alpha, and inter-item correlations were summarized in this table. Cronbach's value of above 0.7 is acceptable, while the inter-item correlation should be more than 0.3 in order to consider it as acceptable. The survey was administered to 110 individuals who were working for IT firms and were familiar with the concept of cloud computing to participate in the study. Participants were asked question at the beginning of the survey to indicate how much they know about cloud computing. Those who answered "no information" about cloud computing were not allowed to participate in the study. After filtering those that were not eligible and those who did not correctly answer the questions, the survey was left with 104 completed samples.

Construct validity and reliability have been tested to ensure that the results are reliable and consistent. The reliability analysis measured the internal validity and consistency of items used for each construct. Calculating Cronbach's alpha coefficient tested the factor reliability. This measures the internal consistency by indicating how a set of items are closely related as a group. Nunnally (1967) suggested that a Cronbach alpha value of 0.7 is acceptable, with a slightly lower value might sometimes be acceptable. Cronbach's alpha values for all factors are above 0.7 (see Table 4) indicating that all measures employed in this study demonstrated a satisfactory internal consistency. Therefore, the survey is considered a reliable measurement instrument.

Factor Analysis

Since the measurement model exhibited a satisfactory internal consistency with the data collected. We could therefore proceed to evaluate the psychometric properties of the measurement model in terms of reliability, convergent validity, and discriminant validity. Hair *et al.,* (2010) described convergent validity as the extent to which the indicators of a specific construct converge or share a high proportion of variance in common. In other words, Convergent validity is used to determine whether items that intend to measure one construct actually measure that specific construct. Convergent validity can be checked by performing reliability test and factor analysis. Discriminant validity is defined as the extent to which a construct is truly distinct from other constructs both in term of how much it correlates with other constructs and how distinctly measured items, measure a single construct (Hair, *et al.,* 2010). In other word, discriminant validity defines whether each item is measuring only one construct and no more. Each constructs should be different than other constructs. Factor analysis is not only used to check the convergent validity but also to check the discriminant validity of the questionnaire. In this research, PCA (Principal Component Analysis) is used to investigate the convergent and discriminant validity of our questionnaire. It is one of the most commonly used analysis methods used to investigate the discriminant and convergent validity of an instrument (Sugianto & Tojib, 2011). Factor loading shows the correlation between each item and the related constructs. The minimum acceptable factor loading should have value of at least 0.3; but in general factor loadings above 0.5 are considered as significant.

Table 4: Main Survey Reliability

Construct	Number of Observation	Item-total correlation	Cronbach's Alpha
Perceived Usefulness			0.861
PU1	104	0.749	-
PU2	104	0.708	-
PU3	104	0.785	-
Perceived Ease of Use			0.878
PEOU1	104	0.819	-
PEOU2	104	0.833	-
PEOU3	104	0.733	-
PEOU4	104	0.587	-
Social Influence			0.786
SOCINF1	104	0.824	-
SOCINF2	104	0.802	-
SOCINF3	104	0.393	-
Cost			0.786
CS1	104	0.664	-
CS2	104	0.702	-
CS3	104	0.544	-
Complexity			0.812
CX1	104	0.702	-
CX2	104	0.540	-
CX3	104	0.756	-
Security			0.770
SC1	104	0.610	-
SC2	104	0.801	-
SC3	104	0.554	-
SC4	104	0.492	-
Self- Efficacy			0.901
SEFF1	104	0.801	-
SEFF2	104	0.764	-
SEFF3	104	0.858	-
Job Relevance			0.899
JREL1	104	0.795	-
JREL2	104	0.818	-
JREL3	104	0.810	-
Attitude			0.962
ATT1	104	0.918	-
ATT2	104	0.885	-
ATT3	104	0.942	-
ATT4	104	0.892	-
Intention to Use			0.952
INT1	104	0.847	-
INT2	104	0.909	-
INT3	104	0.949	-
INT4	104	0.834	-

The statistical software used in this study is SPSS version 20 and PCA was performed using Component extraction method based on Eigenvalues greater than 1 and Varimax rotation method. The analysis is done usingA factor reduction. The eigenvalue greater than one is significant (implies that each item account for the variance of at least a single construct). The orthogonal rotation method (Varimax) maximizes the sum of variances of the factor matrix and factor analysis was used to check the convergent and discriminant validity of questions. The minimum sample size to perform factor analysis is 50 and the number of samples should be greater than the number of constructs. At least five observations are required for each constructs; and the acceptable ratio is ten to one. Based on this rule of thumb, the sample size is sufficient to perform factor analysis. 34 items were fed into SPSS. Sample size plays an important role in the significance of factor loading. Smaller sample sizes require higher factor loading. Hair *et al.* (2010) indicated that for 100 observations, factor loading of 0.55 and higher is significant. Therefore constructs which have factor loadings less than 0.55 were suppressed. In order to complete the research, the collected data needs to be analyzed. At first stage, Factor Analysis (FA) was used to assess the construct validity of the theoretical model that is proposed. On the other hand, in order to test the hypotheses, regression analysis was performed. This method helps to predict the factors that are important in predicting the adoption of cloud computing. Since our dependent variable is a binary variable; and has two distinct value, logistic regression was used to test the hypotheses. One way to measure the appropriateness of the factor analysis is Bartlett's test of sphericity which is based on the correlation between items. The significance level of Bartlett's test of sphericity shows that there are adequate relationships between items; and that factor analysis is appropriate. As it can be observed in Table 5, the Bartlett's test is significant in this research; it proves the suitability of performing factor analysis. Another value which is indicated in Table 5 is the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, which is the summary of partial correlation among the items that are included in factor analysis. The KMO value is 0.625, which is considered as good (Kaiser, 1974). This value means that the degree of correlation among factors is sufficient to perform a factor analysis.

Table 5. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.625
Bartlett's Test of Sphericity	Approx. Chi-Square	2.950E3
	Df	561
	Sig.	.000

Table 6, shows the preliminary results of factor analysis. Ten (10) different factors were identified which is consistent with our conceptual model, the factors are:

i. Perceived usefulness (PU)
ii. Perceived ease of use (PEOU)
iii. Social influence (SOCINF)
iv. Cost (CS)
v. Complexity (CX)
vi. Security (SC)
vii. Self-efficacy (SEFF)
viii. Job relevancy (JREL)
ix. Attitude (ATT)
x. Intention to use (INT)

Table 6: Results of factor analysis

	1	2	3	4	5	6	7	8	9	10
PU1							0.880			
PU2							0.842			
PU3							0.912			
PEOU1			0.877							
PEOU2			0.882							
PEOU3			0.847							
PEOU4			0.697							
SOCINF1										0.912
SOCINF2										0.905
SOCINF3										0.586
CS1									0.856	
CS2									0.858	
CS3									0.751	
CX1								0.877		
CX2								0.774		
CX3								0.866		
SC1						0.778				
SC2						0.885				
SC3						0.725				
SC4						0.682				
SEFF1				0.887						
SEFF2				0.873						
SEFF3				0.933						
JREL1					0.886					
JREL2					0.915					
JREL3					0.913					
ATT1	0.907									
ATT2	0.877									
ATT3	0.951									
ATT4	0.938									
INT1		0.909								
INT2		0.940								
INT3		0.963								
INT4		0.888								

Table 7. Significant level of each eigenvalue

Factors	1	2	3	4	5	6	7	8	9	10
Initial Eigenvalues	4.907	4.021	3.074	2.848	2.668	2.396	2.298	1.875	1.615	1.504
Variance	14.907	11.827	9.041	8.375	7.847	7.048	6.759	5.514	4.749	4.423

All remaining factors have factor loading above the significance level (0.55). As it can be seen in the last two rows of Table 7 that all ten identified factors have eigenvalue above one. Together these ten factors account for 80 % of total variance of all the variables in the research which is an acceptable level of variance. Factors one and two, which respectively account for 14.5% and 11.1% of total variance in explaining the total variance, play an important role. The significance of Bartlett test if Sphericity and the value of KMO measure of sampling adequacy (0.625) indicates that the factor analysis is appropriate. Communality of the items was checked and all of them had acceptable value (value more than 0.5). Because of the sample size, factors that have loading of 0.55 were considered. The results of factor analysis determined ten different factors. According to table 7, factor 1 is defined as *Attitude towards cloud computing*; factor 2 is defined as *Intention to adopt cloud computing*; Factor 3 is defined as *Perceived Ease of Use*; factor 4 is defined as *Self-Efficacy*; factor 5 is defined as Job Relevance; factor 6 is defined as *Security of Cloud*; factor 7 is defined as the *Perceived Usefulness*; factor 8 is defined as the *Complexity*; factor 9 is defined as *Cost* and finally factor 10 is defined as *Social Influence*.

Regression analysis

The hypotheses were tested by the Statistical Package for Social Sciences (SPSS) software. The total number of valid surveys is 104, giving a response rate of around 96%. The majority of the respondents' age varied between 25 and 35, and 94.2% of the respondents were males and 5.8% were female.

H1: *Attitude* (ATT) as an independent variable and *intention to use* (INT) as dependent variable.

Table 8. H1. Dependent variable: Intention

Variable entered	R	R-Square (R^2)	Adjusted R Square	Sig
Attitude	0.883	0.780	0.780	0.000

The p-value 0.000 (sig) is less than 0.05 and R (Pearson Correlation Coefficient) of 0.391, the independent variables (PEOU) reliably predicts the dependent variable (ATT). So hypothesis H4 was accepted.

Table 12. H5. Dependent variable: Perceived Usefulness

Variable entered	R	R Square	Adjusted R Square	Sig
Perceived Ease of Use	0.570	0.325	0.324	0.010

The p-value 0.010 (sig) is less than 0.05 and R (Pearson Correlation Coefficient) of 0.570, the independent variables (PEOU) is a good predictor of the dependent variable (PU). Therefore, hypothesis H5 was accepted.

Table 13. H6. Dependent variable: Intention

Variable entered	R	R Square	Adjusted R Square	Sig
Social influence	0.132	0.017	0.017	0.232

The value 0.232 is greater than 0.05 and a low R value 0.132, which shows a low relationship between the two variables and that Perceived usefulness is not a better predictor of intention, so hypothesis H6 was rendered a null hypothesis.

Table 14: H7. Dependent variable: Perceived usefulness

Variable entered	R	R Square	Adjusted R Square	Sig
Security of cloud	0.329	0.108	0.108	0.201

The value 0.201 is greater than 0.05 and a low R value 0.329, which shows low relationship between the two variables and that Perceived usefulness is not a good predictor of intention, so hypothesis H7 was rendered a null hypothesis.

Table 15. H8. Dependent variable: Intention

Variable entered	R	R Square	Adjusted R Square	Sig
Self-Efficacy	0.387	0.149	0.149	0.000

The Pearson Product Moment Correlation Coefficient, R is 0.883 which shows a strong correlation between the two variables. R-Squared is the correlation between the observed and predicted values of dependent variable (the proportion of variance in the dependent variable (Intention) which can be predicted from the independent variable (Attitude). This value indicates that 78.0% of the variance in Intention can be predicted from the variable Attitude. Note that this is an overall measure of the strength of association, and does not reflect the extent to which any particular independent variable is associated with the dependent variable. The p-value was less than 0.05, then it can be inferred that the independent variable shows a statistically significant relationship with the dependent variable, or that the independent variables reliably predict the dependent variable. Therefore hypothesis H1 was accepted. Tables 9-19 summarized the result of regression used to test hypothesis H2 to H12.

Table 9: H2. Dependent variable: Attitude

Variable entered	R	R Square	Adjusted R Square	Sig
Perceived Usefulness	0.736	0.542	0.532	0.000

The p-value 0.000 (sig) is less than 0.05 and R (Pearson Product Moment Correlation Coefficient) of 0.736 which shows a strong correlation between the two variable, the independent variables (PU) reliably predicts the dependent variable (ATT). So hypothesis H2 was accepted.

Table 10. H3. Dependent variable: Intention

Variable entered	R	R Square	Adjusted R Square	Sig
Perceived Usefulness	0.261	0.068	0.068	0.794

The value 0.794 is greater than 0.05 which shows that it is not statistically significant and a low R value 0.261 which shows a low strength of relationship, Perceived usefulness is not a better predictor of intention, so hypothesis H3 was rendered a null hypothesis.

Table 11. H4. Dependent variable: Attitude

Variable entered	R	R Square	Adjusted R Square	Sig
Perceived Ease of Use	0.391	0.153	0.153	0.00

The p-value 0.000 (sig) is less than 0.05 and R (Pearson Correlation Coefficient) of 0.387, the independent variables (SEFF) is a good the dependent variable (INT). The hypothesis H8 was accepted.

Table 16. H9. Dependent variable: perceived usefulness

Variable entered	R	R Square	Adjusted R Square	Sig
Complexity	0.265	0.070	0.070	0.519

The value 0.519 is greater than 0.05 and a low R value 0.265, which shows a low relationship between the two variables and that Complexity is not a better predictor of Perceived usefulness. So, hypothesis H9 was rendered null.

Table 17. H10. Dependent variable: perceived Ease of use

Variable entered	R	R Square	Adjusted R Square	Sig
Complexity	0.343	0.117	0.116	0.310

The value 0.310 is greater than 0.05 and a low R value 0.343, which shows a low relationship between the two variables and that Complexity is not a better predictor of Perceived ease of use. Therefore, hypothesis H10 was declared null.

Table 18. H11. Dependent variable: perceived usefulness

Variable entered	R	R Square	Adjusted R Square	Sig
Cost	0.096	0.009	0.000	0.332

The value 0.332 is greater than 0.05 and a low R value 0.096, which shows a low relationship between the two variables and that Cost is not a better predictor of Perceived usefulness, hence, hypothesis H11 was rendered null hypothesis.

Table 19. H12. Dependent variable: perceived usefulness

Variable entered	R	R Square	Adjusted R Square	Sig
Job Relevance	0.696	0.484	0.484	0.000

RESULTS AND DISCUSSION

Table 20: Hypothesis Testing Result

HYPOTHESIS	EFFECTS	PATH	REMARKS
H1	ATT ⟶ INT	0.883	Supported
H2	PU ⟶ ATT	0.736	Supported
H3	PU ⟶ INT	0.261	Not Supported
H4	PEOU ⟶ ATT	0.391	Supported
H5	PEOU ⟶ PU	0.570	Supported
H6	SINF ⟶ INT	0.500	Not Supported
H7	SC ⟶ PU	0.329	Not Supported
H8	SEFF ⟶ INT	0.387	Supported
H9	CX ⟶ PU	0.265	Not Supported
H10	CX ⟶ PEOU	0.343	Not Supported
H11	CS ⟶ PU	0.096	Not Supported
H12	JREL ⟶ PU	0.696	Supported

The aim of this study is to identify the factors that impact the intention to adopt cloud computing. Linear regression was used to distinguish the difference between adopters and non-adopters. Table 20 summarizes the results of our linear regression. It shows the hypotheses, whether they were statistically supported or not. The results of our regression analysis support the strong relationships between the original TAM constructs (PU, PEOU and ATT) when predicting intention to adopt cloud computing as seen in H1, H2 & H4 of table 20. Perceived ease of use and perceived usefulness are important constructs when determining a user's attitudes towards cloud computing which is supported in our study as seen in H2 & H4; attitudes in turn, strongly predict intention to use cloud computing as seen in H1. However, two additional constructs, Self-efficacy and job relevance, were found to strongly support the validity of the adoption of cloud computing shown in H8 & H12 which confirms the enhanced TAM presented in this study. The remaining six factors do not have a statistically significant impact on the decision to adopt cloud computing.

CONCLUSION

Cloud computing is a new computing paradigm which is advantageous for both companies and individuals. Cloud computing differ from other types of computing paradigms in many ways. It allows users to access and use the most sophisticated technologies without being required to pay enormous amounts of money to purchase the system or develop it in house. Similar to any innovation, the adoption of cloud computing is not a simple process; it is influenced by various factors. Numerous papers have been published on the adoption process of various innovations but not many researches have been conduct-

ed in the context of cloud computing most especially in Nigeria. Therefore studying the factors that influence the adoption decision of cloud computing is important, hence the adoption process of cloud computing was investigated in this research. This study utilized an Enhanced Technology Acceptance Model (ETAM) as a theoretical framework to investigate the factors influencing cloud adoption by enterprises in Nigeria. Two specific variables, perceived usefulness and perceived ease of use, were hypothesized to be fundamental determinants of user acceptance. ETAM for cloud computing builds on the original TAM as intention to use, attitude toward using, perceived usefulness, and perceived ease of use, and expands to include new factors. The analysis of the research revealed that attitude and adopters ability to use cloud computing (self-efficacy) were better predictor of intention, perceived usefulness and perceived ease of use of cloud computing were better predictor of attitude, perceived ease of use and the relevant of cloud computing to adopters' work (job relevance) were the predictor of perceived usefulness. Also, the results of the proposed model can be compared to other relevant model and hopefully can add to the existing knowledge of user acceptance.

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