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Cloud Technology and Administration Efficiency of Tertiary Institution in Imo State, Nigeria

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ABSTRACT
The purpose of this study was to investigate the relationship between cloud technology and administrative efficiency of tertiary institution in Imo State, Nigeria. The study used cross sectional survey design. Fifty one (51) principal officers of four tertiary institutions in Imo State was sampled using census. Data was gathered through the administration of questionnaire. Gathered data was analyse using the Pearson Product Moment Correlation Coefficient Statistics and presented with the help of SPSS version 20.0. Results of analyze data showed that, virtual meeting, e-learning and information service positively correlated significantly with the measures of administrative efficiency; cost reduction and quality service delivery. It is therefore, recommended that, Management of tertiary institutions in Imo State should adopt cloud technology service provider as they enhance administrative efficiency through virtual meeting cost reduction & quality service delivery and Management of tertiary institutions in Imo State should adopt e-learning through the adoption of cloud technology as it is cost effective compared to traditional method of teaching.
Keywords: Cloud Technology, virtual, e-learning, Efficiency, Cost Reduction, Service Delivery.

INTRODUCTION

Universities all over the world are looking for easy way by which they can access information from anywhere at any given point in time. The era of computing today is the mobile and the cloud first world which provide a more convenient way for individual and organizations to collaborate in other to carry out their daily operations/activities. Till recently, and now too many organisations, universities and individuals use computers to work alone, inside an office or home by investing on hardware, software and maintenance. But it is the need of today administrators in universities to adopt the cloud technology in their organization. According Haag & Cumming (2010), cloud computing is a technology architecture that combines variety of resources: Application software, processing powers, data storage, back-up facilities, and development tools and delivers them as set of services over the internet. With this, users of these services can get access without having prior operational knowledge. It involves the use of internet for computing needs. It has become a popular topic for discussion, as it offers users access to information as needed by human, anytime, anywhere via the internet, via a simplified user interface (Chiu, 2008).

Cloud technology provides infrastructure sharing, and even more resources can be added for more services, yet costs will not change significantly, which is why cloud computing has become a hot trend in the structure of information technology (IT) currently used in many fields. Cloud computing is the utilization of vacant resources of computers to increase efficiency through improving utilization rate and

reducing energy consumptions, one of the solutions to reducing the greenhouse effect (Zhang et al., 2010). Various cloud architectures have been implemented in several fields. Cloud architecture can also be tailor-made and used according to user requirements. The cloud platform has been proved significant in the development of various sectors, with the integration of required features with existing technology to present a new innovation in the cloud architecture (Dutta, Peng, and Choudhary, 2013; Eunjeong, 2013). There are various uses of cloud that provide scope for implementing data collection and distribution on a wide platform. Apart from data processing, cloud presents the platform for application and software development along with online usage over a wide range of domains.

Administrative efficiency is a common concept used on a daily basis by all economic agents. However, there is no precise and a universally acceptable definition of the term. It has a variety of meanings attached to it. Nonetheless, there is still a common reference point by all users of the concept. It is used mainly in reference to governmental actions that are geared to serve the interest and ensure the wellbeing of the citizenry through proper management of both human and material resources, (De-Marcos, 2016).

Administrative efficiency is the judicious utilization of resources, proper conduct and management of affairs at the general level to facilitate administrative effectiveness. Administrative efficiency connotes complying with due process, responsiveness to local needs, transparency, accountability and adhering to budget provisions. Efficiency is doing things rightly, that is, using minimum inputs to achieve maximum outputs, (Longe and Durosaro, 2017).

Virtual Meeting And Administrative Efficiency

Lu & Peeta (2009) found that the context within which a meeting is conducted has a considerable influence on the choice of media. Their study findings indicate that videoconferences are adequate for contexts such as information exchange, management meetings, training and consulting, while face-to-face meetings are best suited for negotiations, business discussions, and marketing demonstrations. Likewise, Arnfalk & Kogg (2003) stress that meetings always take place in a context. The results from their study reveal that personal meetings are preferred in the beginning and the end of a project, whereas virtual meetings are sufficient for follow-up and information tasks as well as for short and repetitive meetings.

Similar results were reported by Lian & Denstadli (2004), who found that face to face (FTF) meetings often involve negotiations and unstructured contact, while VCs have less complex content. Research also advocates cost and time savings as key factors in deciding on the most appropriate meeting form (Parsons & Adhikari, 2016; Weinstein, 2012; Räsänen et al., 2010; Panteli & Dawson, 2000). It is acknowledged that VC technology helps companies to reduce business travel expenses which come in the form of direct costs such as transport to and from the airport, flight, car services, hotels, meals, and client entertainment (ibid.). Moreover, using VC can reduce employee time lost in travelling, which comes in form of salaries as company´s indirect cost (Douglas et al., 2013). According to Räsänen et al. (2010) travelling to meetings is a time-consuming activity that also influences the employees´ lost productivity.

E-Learning And Administrative Efficiency

Fischer et al. (2015) studied how proceedings of scientific conferences can be used for trend studies in the field of e-learning. They examined the abstracts of 427 scientific articles of leading German-speaking e-learning conferences published from 2007 to 2013. The study was conducted at German-speaking conferences and, thus, reflects the situation in Germany, Switzerland and Austria. Fischer et al. (2015) made an important contribution to the diffusion of digital media in higher education. The researchers found that the detailed analysis of the frequency distribution over the seven years reflects the intensity of scientific discussion towards e-learning trends, and conclusions about the didactical or technical potentials of innovations can be introduced. Specifically, they found the development potential of learning management, mobile learning, virtual worlds, e-portfolio, social media and Massive Open Online Courses are crucial for e-learning in German higher education. Moravec et al. (2015) showed how e-learning tools impact students' achievement. The study was attended by nearly 2000 students. According to Moravec *et al.* (2015), the study compares the results of questions from the area of law where the tool

was provided in a pilot version with the results of questions, where the e-learning tool was not provided. The researchers found that the e-learning tools have affected the students' results. Nevertheless, the belief of the e-learning tool may possibly have a negative effect on students who will depend on given materials was disproved.

1.2 Statement of the Problems

Cloud Technology (CT) is considered a critical tool in preparing and educating students with the required skills for the global workplace. It educates students so that they can continually adapt to a work world of continuous technological innovations. The ability to become lifelong learners within a context of collaborative environment and the ability to work and learn from experts and peers in a connected global community are major flexibilities offered by cloud technology. Cloud Technology (CT) is a versatile tool for running a smooth and efficient university system, giving support in areas such as lecture delivery, private studies, information disseminations, program (conferences and seminars) planning and execution, communication at different levels, crisis prevention and management. Unfortunately, the recurring global economic meltdown (GEM) and national financial hiccups currently embattling the developing countries continue to pose a serious threat to the survival of quality education as governmental institutions and university administrators helplessly fight the provision of unlimited fundamental cloud Technology (CT). Cloud technology facilities and support tools, services and applications needed to facilitate effective teaching and sustainable educational research and development (SERD) activities in universities. Furthermore, developing countries generally face challenges in terms of human and financial resources needed to harness the potential of Cloud Ttechnology (CT) successfully and effectively in education. As much as the adoption of it in education becomes imperative, cost of owning of the required Cloud Technology (CT) infrastructures, licensing, standards requirement, cost of maintenance, electrical power supply and physical security of these facilities come at a great financial expense. The availability and accessibility to Cloud Ttechnology infrastructures and services by staff and students in universities in most developing economies are limited or non-existent. Inadequate funding of universities by the government at all levels, erratic power supply, operational cost, high cost of equipment renewal, cost of maintenance and bandwidth, lack of maintenance practice and lack of Cloud Technology ICT budget by the universities are the major factors responsible for the failure of the survival of Cloud Technology in universities. Effective teaching-learning process, research and development activities have been hampered as a result of these menaced. For instance, when power is rarely supplied, the admirable goals of transforming education with Cloud Ttechnology and taking a paradigm shift in education is all a dream; having access to educational resources on demand, anytime, anyhow and anywhere is a story and e-learning would not be sustained either. Sequel to these challenges, the adoption of cloud computing, a service-oriented alternative to ICT provisioning and deployment, with the potential to yield low cost, improved efficiency and availability become imperative in universities. Therefore, this study intends to investigate the relationship between cloud technology and administrative efficiency of tertiary institution in Imo State, Nigeria. Specifically, the study sought to examine:

i. How virtual meeting influence administrative efficiency in tertiary institution in Imo State, Nigeria.
ii. How E-learning influence administrative efficiency of tertiary institution in Imo State, Nigeria.

The following research questions were structured to guide the study:

i. To what extent does virtual meeting enhance administrative efficiency of tertiary institution in Imo State, Nigeria?
ii. To what extent does e-learning enhance administrative efficiency of tertiary institution in Imo State, Nigeria?

Hypotheses

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

H_{01}: There is no significant relationship between virtual meeting and cost reduction of tertiary institution in Imo State, Nigeria.

H_{02}: There is no significant relationship between virtual meeting and service quality of tertiary institution in Imo State, Nigeria.

H_{03}: There is no significant relationship between e-learning and cost reduction of tertiary institution in Imo State, Nigeria.

H_{04}: There is no significant relationship between e-learning and service quality of tertiary institution in Imo State, Nigeria.

METHODOLOGY

The research study adopted a descriptive research approach through the adoption of the cross sectional survey design., The population of the study comprises of 51 management staff of the tertiary institutions, in Imo State, Nigeria. This study covers the entire fifty one (51) study population, since the population is manageable. The instrument for data collection was done through administration of questionnaire. The instrument design for this study was designed in two sections. The first section was design to generate the demographic data of the respondents; the second section was structured to obtain data on the dimensions of cloud technology and measures of administrative efficiency. The questionnaire use four points Likert scale of four options: VHE = Very High Extent (4); HE = High Extent (3), LE = Low Extent = 2, and VLE = Very Low Extent (1). The reliability of the study variables is anchored on the Cronbach Alpha, as only variables with the return above 0.72. The purpose of the study is to investigate the relationship between two variables, (cloud technology and administrative efficiency in Imo State), the Pearson's Product Moment Correlation Coefficient was used to analyze the data. Below is the Pearson's Product Moment Correlation Coefficient formula.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{\left(n\sum x^2 - \sum x^2\right)\left(n\sum y^2 - \left(\sum y\right)^2\right)}}$$

RESULTS

Test of Hypotheses

H_{01}: There is no significant relationship between virtual meeting and cost reduction of tertiary institution in Imo State, Nigeria.

H_{02}: There is no significant relationship between virtual meeting and service quality of tertiary institution in Imo State, Nigeria.

Table 1. Correlations matrix of virtual meeting and administrative efficiency

		Virtual meeting	Cost Reduction	Quality Service Delivery
Virtual Meeting	Pearson Correlation	1	.983**	.978**
	Sig. (2-tailed)		.000	.000
	N	45	45	45
Cost Reduction	Pearson Correlation	.983**	1	.987**
	Sig. (2-tailed)	.000		.000
	N	45	45	45
Quality Service Delivery	Pearson Correlation	.978**	.987**	1
	Sig. (2-tailed)	.000	.000	
	N	45	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data, 2020

The table 1 shows the correlation of hypotheses one and two; the hypothesis one show a significant correlation at r = .983** where P-value = .000 (P<0.001). This implies a strong and significant relationship between both variables at 95% level of confidence. We therefore reject the null hypothesis (Ho_1), and upheld the alternate and restated, thus, there is a significance relationship between virtual meeting and cost reduction of administration in tertiary institution in Imo State, Nigeria.

The hypothesis two show a significant correlation at r = .978** where P-value = .000 (P<0.001). This implies a strong and significant relationship between both variables at 95% level of confidence. We therefore reject the null hypothesis ($Ho:_2$), and upheld the alternate and restated, thus, there is a significance relationship between virtual meeting and quality service delivery in tertiary institution in Imo State, Nigeria.

H_{03}: There is no significant relationship between e-learning and cost reduction of tertiary institution in Imo State, Nigeria.

H_{04}: There is no significant relationship between e-learning and service quality of tertiary institution in Imo State, Nigeria.

Table 4.16 Correlations matrix of E-learning and administrative efficiency

		E-learning	Cost Reduction	Quality Service Delivery
E-learning	Pearson Correlation	1	.973**	.983**
	Sig. (2-tailed)		.000	.000
	N	45	45	45
Cost Reduction	Pearson Correlation	.973**	1	.987**
	Sig. (2-tailed)	.000		.000
	N	45	45	45
Quality Service Delivery	Pearson Correlation	.983**	.987**	1
	Sig. (2-tailed)	.000	.000	
	N	45	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data, 2020

The table 2, shows the correlation of hypotheses three and four; the hypothesis three show a significant correlation at r = .973** where P-value = .000 (P<0.001). This implies a strong and significant relationship between both variables at 95% level of confidence. We therefore reject the null hypothesis (Ho_3), and upheld the alternate and restated, thus, there is a significance relationship between e-learning and cost reduction of administration in tertiary institution in Imo State, Nigeria.

The hypothesis four show a significant correlation at r = .983** where P-value = .000 (P<0.001). This implies a strong and significant relationship between both variables at 95% level of confidence. We therefore reject the null hypothesis (Ho_4), and upheld the alternate and restated, thus, there is a significance relationship between e-learning and administrative quality service delivery in tertiary institution in Imo State, Nigeria.

The empirical findings revealed a positive and significant relationship between cloud technology and administrative efficiency using Pearson Product Moment Correlation Coefficient formula at 95% confidence interval, through Statistical Package for Social Science (SPSS) version 20.0. This findings support the study of Song (2017), who advocates that, computing as a service has seen a phenomenal growth in recent years. The primary motivation for this growth has been the promise of reduced capital and operating expenses, and the ease of dynamically scaling and deploying new services without maintaining a dedicated compute infrastructure. Hence, cloud computing has begun to rapidly transform the way organizations view their Internet Technology (IT) resources. From a scenario of a single system consisting of single operating system and single application, organizations have been moving into cloud

computing, where resources are available in abundance and the user has a wide range to choose from. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with service provider interaction or minimal management effort Verma et al., (2013). And the study of Longe & Durosaro (2017), asserted that, administrative efficiency is doing things rightly, that is, using minimum inputs to achieve maximum outputs.

Virtual meeting and administrative efficiency of tertiary institution in Imo State, Nigeria

The first and second hypotheses shows that, there is a strong positive relationship between virtual meeting and measure of administrative efficiency cost reduction and quality service of which the significant is based on r=0.983; p= 0.000 <0.05., and r=0.978; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:1}$) and ($H_{0:2}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between virtual meeting and cost reduction and quality service. This study findings support the empirical findings and the statement asserted by Poor (2008), that information communication technology (ICT) provides several facilities and possibilities for educational administrators to do their tasks. He mentioned that communication and information systems have changed the very nature of higher education. He had also noted that there is an increase in effectiveness and efficiency of management through the use of ICT. It was also mentioned that ICT was utilized by head of faculties for planning, and evaluation of academic affairs, financial affairs, and administrative affairs such as holding of meetings etc.

E-learning and administrative efficiency of tertiary institution in Imo State, Nigeria

The three and four hypotheses shows that, there is a strong positive relationship between e-learning and measure of administrative efficiency cost reduction and quality service delivery of which the significant is based on r=0.973; p= 0.000 <0.05., and r=0.983; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:3}$) and ($H_{0:4}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between e-learning and cost reduction and quality service delivery. This study findings support the empirical findings of Cavadas, Villanueva, & Gérvas, (2010) in a study on the use of ICT in Singapore universities. They concluded that ICT enable teaching and learning and also reported that for students, activities such as course applications, course and examination registration, viewing of examination results, access to timetable and payment of university fee can be done through various internet-based application. It was also mentioned that staff members use ICT for services such as leave applications, e-forms for various purpose, and personal financial information related to the university.

CONCLUSIONS

In this study, the relationships between virtual meeting, e-learning, and information service have been investigated. A survey seeking for the relationships has been conducted on a sample of 51 management employees of tertiary institution in Imo State, Nigeria. The study results shows significant relationships between the variables hypothesized in the research conceptual framework. Accordingly, the study strategy and methodology was designed in a way that points towards the achievement of the study objectives. The study concluded that cloud technology through the use of virtual meeting, e-learning and information service significantly influences administrative cost reduction and quality service delivery. A scattered plot diagram was also plot to see the relationship between the predictor variable (cloud technology) and the criterion variable (administrative efficiency). The scatter plot graph shows at R^2 linear value of (0.966) depicting a strong viable and positive relationship between the two constructs. The implication is that an increase in cloud technology simultaneously brings about an increase in the level of administrative efficiency in tertiary institution.

RECOMMENDATIONS

The recommendations of this study are deduced from the empirical findings and conclusion drawn. Therefore, the following recommendations are hereby made:

i.) Management of tertiary institutions in Imo State should adopt cloud technology service provider as they enhance administrative efficiency through virtual meeting cost reduction & quality service delivery.

ii.) Management of tertiary institutions in Imo State should adopt e-learning through the adoption of cloud technology as it is cost effective compared to traditional method of teaching.

REFERENCES

Ahmed Y., & Manal A., (2011). Security issues in cloud computing, in the GSTF *International Journal on Computing* , 1(3), 67 – 75.

Alireza, A. S., & Mahdi, A. (2012). Target and kaizen costing. *International Journal of Social, Behavioural, Educational, Economic, Business and Industrial engineering, 6*(2), 171 - 177.

Cavadas, L. F., Villanueva, T., & Gérvas, J. (2010). General practice innovation: A Portuguese virtual conference. *Journal of Medical Education,* 44(5), 514–515.

Collier, P. M. (2015). Accounting for managers: Interpreting accounting information for decision making.(5ed.). Southern Gate, UK: John wiley & Sons Ltd.

De-Marcos, L., (2016). On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification and social networks. *Computers and Education,* 95(6), 99 –113.

Dillon T., & C. Wu & E. Chang, (2010). Cloud computing: Issues and challenges, 24th IEEE International Conference on Advanced Information Networking and Applications.

Douglas, A., Lubbe, B. & Fabris-Rotelli, I. (2013). Travel or technology? Business factors influencing management decisions. *South African Journal of Economic Management Science,* 16(3), 279-297.

Ebadi, S., & Zamani, G. (2018). Predatory publishing as a case of symbolic violence: A critical English for academic purposes approach. *Cogent Education,* 5(1), 1–25.

Dutta, S. Chaulya, S.K., Singh, A.K., & Prasad, G.M., (2013). Cloud computing: A new era in IT industry, *International Journal of Computer Technology and Electronics Engineering,* 3(2), 18 – 28.

Fischer, H., Heise, L., Heinz, M., Moebius, K., & Koehler, T. (2015). How to identify e- learning trends in academic teaching: Methodological approaches and the analysis of scientific discourses. *Interactive technology and smart education,* 12(1), 31 – 43.

Hall, N. (2015). Delineating the learning process in generating a research culture among undergraduate social work students: A case study of student participation in an academic conference. *Social Work Education,* 34(7), 829–845.

Longe, R. S., & Durosaro, D. O. (2017). Analysis of international efficiency of secondary education in Nigeria: A case Study of Edo State. *AJEM,* 2(2), 107-114.

Lally, E. (2001). A researcher's perspective on electronic scholarly communication. Online *Information Review,* 25 (2), 80 – 87.

Lian, J. I. & Denstadli, J. M. (2004). Norwegian business air travel-segments and trends. *Journal Air Transport Management,* 10(8), 109-118.

Lu, J.-L. & Peeta, S. (2009). Analysis of the factors that influence the relationship between business air travel and video conferencing. *Transportation Research Part A,* 43(8), 709-721.

Hong, H. Y., & Chiu, C. H. (2016). Understanding how students perceive the role of ideas for their knowledge work in a knowledge-building environment. *Australasian Journal of Educational Technology,* 32(1), 32 – 46.

Moravec, T., Stepanek, P., & Valenta, P. (2015). The influence of using e-learning too the results of students at the tests. *Procedia Social and Behavioural Sciences,* 17(6), 81 – 86.

Parsons, D., & Adhikari, J. (2016). Bring your own device to secondary school: The perceptions of teachers, students and parents. The Electronic Journal of e-Learning, 14(1), 66 – 80.

Panteli, N. & Dawson, P. (2001). Video conferencing meetings: Changing patterns of business communication. *New Technology, Work and Employment,* 16(2), 88-99.

Rof, M. L., (2012). Kaizen costing method and its role in the management of an entity. *Young Economics Journal*, 5(1), 104 – 109.

Raza M.A., Siddiquei A.N., Awan H., Bukhari K., (2012). Relationship between service quality, perceived value, satisfaction and revisit intention in hotel industry. Interdisciplinary Journal of contemporary research in business, 4(8), 788-805.

Räsänen, M., Moberg, Å., Picha, M. & Borggren, C. (2010). Meeting at a distance: experiences of media companies in Sweden. *Technology in Society,* 34(4), 264-273.

Sriram S., Chintagunta P.K., Machanda P., (2015). Service quality variability and termination behaviour. *Management Science,* 61(11), 2739 – 2759.

Segoro W., (2013). The influence of perceived service quality, mooring factor, and relationship quality on customer satisfaction and loyalty. Procedia – Social and Behavioral Sciences, 81(9), 306 – 310.

Shea, R.H. (2002). E-learning today as an industry shakes out; the survivors offer no-frills education for grown-ups. U.S. News & World Report.

Sun, P.C., Tsai, R.J., Finger, G., Chen, Y.Y. & Yeh, D. (2008). What drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction, *Computers & Education* 50(6), 1183 – 1202.

Saura I.G., Francés D.S., Contrí G.B., & Blasco M.F., (2008). Logistics service quality: A new way to loyalty. Industrial Management and Data Systems, 108(5), 650-668. Retrieved from http://www.scopus.com/inward/record.url?

Swanson T, Green J (2011). Why we are not google: Lessons from a library website usability study. *The Journal of Academic Librarianship, Elsevier Inc.,* 37(3), 222 – 229.

Stover, M. (2000). Technological concerns for library managers. Library Management, 21 (9), 472-482.

Safar, A.H. (2018). BYOD in higher education: A case study of Kuwait University. *Journal of Educators Online,* 15(2), 1-13.

Thai V.V., (2015). The impact of port service quality on customer satisfaction: The case of Singapore. Maritime economics & logistics, 3(6), 1 – 23.

Tihanyi, L., & Roath, A. S. (2002). Technology transfer and institutional development in Central and Eastern Europe. *Journal of World Business,* 37(3), 188 – 198.

Vera J., & Trujillo A., (2013). Service quality dimensions and superior customer perceived value in retail banks: An empirical study on Mexican consumers. *Journal of Retailing and Consumer Services,* 20(6), 579 – 586.

Wu, H., Tennyson, R. D., & Hsia, T. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers and Education,* 5(5), 155 –164.

Weinstein, I. M. (2012). The business case for pervasive video conferencing. Winehouse research. Retrieved fromhttp://www.wainhouse.com/files/papers/wr-bc4pervasive- vc.pdf

Yeo G.T., Thai V.V., Roh S.Y., (2015). An analysis of port service quality and customer satisfaction: The case of Korean container ports. *Asian Journal of Shipping and Logistics*, 31(4), 437 – 447.