E-Government, Information and Communications Technology Support and Paperless Environment in Nigerian Public Universities: Issues and Challenges

Abdulkareem Abdulrazaq Kayode[1*], Bello Muhammed Lawan[1], Ishola Abdulrasaq Ajadi[1] Jimoh Adams Lukman[2]

[1]Department of Public Administration,
University of Ilorin, Ilorin, PMB 1515, Ilorin, NIGERIA

[2]Department of Industrial Relations and Personnel Management,
University of Ilorin, Ilorin, PMB 1515, Ilorin, NIGERIA

*Corresponding Author

Abstract: The move toward a paperless environment has become the driving force behind sustainable development and e-government usage in many public sector institutions. It is equally at the heart of the government campaign to make service delivery in public institutions cost effective, seamless, and efficient. The universities are supposed to be at the front-line of this campaign due to their operations which involves the heavy usage of papers at huge costs. Thus, making it important for university management to provide ICT support in order to promote paperless exchange of information and presentations. It is however, understood recently, that there are issues which surround the low usage of ICT among university managements and ultimately, paperless environment. The purpose of this paper is to discuss the main issues and challenges that hinder the implementation of paperless environment in Nigerian universities. The paper highlights the cyclical order of document generation, document management and document sharing as the process in which a paperless environment can take place within both the academic and the administrative settings in the university. The paper highlights and discussed the challenges hindering the attainment of paperless environment among which are infrastructural gap, inadequate ICT support and attitudinal challenge. It is recommended that for smooth operation of paperless environment, government must show strong political will, bridge the infrastructure gap especially electricity as well as train staff on the path to ICT usage.

Keyword: Paperless environment, ICT support, ICT Usage, e-government, University

1. Introduction

The dire need to improve, balance, and sustain the environment has propelled numerous researches in the academia over the years. Reports from those studies have mostly been complementary. At the same time, some recommended a considerable reduction in the use of plastic materials that have continued to litter our lands and seas, and others preached against the steady depletion in the forest through persistent tree felling. From time immemorial, the consumption of paper

has driven most of human's sensitive and critical needs remarkably in the areas of education, economy, sanitation, social engagements, and communication (Environmental Paper Network, 2018). The demand for paper over the years has noticeably increased due to the pressure of population and socio-economic prosperity. Also, the durability and flexibility characteristics of paper have made it indispensable in our daily consumptions (Suhr, Klein, Kourti, Gonzalo, Santoja, Roudier, & Sancho, 2015 and Berg & Lingqvist, 2018). The tree perspective has a lot to do with the need to reduce the use of papers in the running of public and private businesses. The continuous dependence on the use of paper will have a negative impact on the environment in the future. The only alternative means of information management and sharing apart from the use of papers is the usage of Information Technology (IT). Some businesses and organization have already adopted the use of IT such as e-business and e-commerce to interact with their respective clients and other relevant stakeholders. The resulting effect of this adoption does not only mitigate the negative impact of environmental degradation, it will as well build trust, transparency and efficient service delivery (Iqbal & Ahmad, 2015).

 In a separate pursuit, the paucity of fund that has plagued developing countries most especially, gave rise to the quest for a cost-effective and the most efficient means of governance, in this search, e-government was developed. Egovernment refers to the use of Information and Communication Technologies (ICT) in the delivery of public services, coupled with other socio-economic deliverables. The increase in the popularity of IT usage in public service became more pronounced in the last three decades sequel to the progress recorded in technology development on the one hand and the fall in national income of oil-producing countries like Nigeria on the other.

The significant role played by the Nigerian Public Universities in the area of teaching, research, and community service, as well as internal administration, afford them to work majorly with paper where there is no access and support to the use of technology. With the recent surge in population and proliferation of internet usage, the number of internet users in sub-Saharan Africa has increased, as 1 in 5 in sub-Saharan Africa used the internet in 2017. While internet access in sub-Saharan Africa has grown rapidly in recent years, access rates are still below the world average (World Bank, 2018). Narrowing down to Nigeria, according to the National Communications Commission (2019), as of December 2018, the number of internet users in Nigeria have surged to 111.6 million of close to 200 million population.

The implementation of e-government in Nigeria was made possible with ICT revolution which started in the early 2000s. The objective was to place government services online to enable efficiency, effectiveness, transparency and accountability. Since its adoption, Ministries, Department and Agencies (MDAs) of the government most especially at the Federal level have ventured into it, using it to improve on their internal bureaucracy as well as service delivery to the external stakeholders i.e. citizens and businesses. ICT diffusion, usage, and acceptance in the public sector are growing in Nigeria, which signals the potential of the country becoming an ICT hub in sub-Saharan Africa (Abdulkareem & Ishola, 2016, and Oni, Okunoye, & Mbarika, 2016). For instance, the United Nations e-government survey shows that Nigeria was ranked 162nd in 2012 and 143rd in 2018 among the United Nations member states. Also, within the context of Africa, Nigeria was ranked 30th in 2012 and 21st in 2018 (United Nations, 2012, 2018). Similarly, the Network Readiness Index, shows that Nigeria was ranked 111th in 2012 and 117th in 2016 (World Economic Forum, 2016).

The basic idea of going paperless in Nigerian universities still has a fictional effect on actors such as staff, students, and management. However, emerging environments with a lower amount of paper usage are becoming more realistic by the day. Advocating for the use of ICT in place of paperbound tasks is currently not enough. Instead, the need for ICT, its importance, and acceptability must be encouraged through support from the universities' management. It therefore, places the higher education outfit on the front-burner for paperless environment adoption. This adoption will not only fit for sustaining the environment but also cut down the huge fund expended by the government in running the day-today activities of the over 50 public universities in Nigeria. The use of ICT in public service delivery thereby creates a convergence for the need to sustain the environment with the quest to reduce the cost of governance. With a cue from the preceding discussion, this paper hereby seeks to synthesize ICT access and support for its usage in public universities in Nigeria to achieve a paperless working environment.

2. Information and Communication Technology (ICT) and E-Government

In the 21st century, advancement in ICT has greatly influenced citizens' behaviour and conduct as it has fundamentally challenged how people work and communicate (Wirtz & Daiser, 2015) as well as how governments perform. The concept of e-Government has been a cogent subject of discussion in public service delivery literature for over two decades (Heeks, 2006; Fountain, 2001; Garson, 2003 and West, 2005). However, e-government is not constrained to the field of public administration alone; instead, it is multidisciplinary as it covers fields like Information Systems, Political Science, Public Administration, and Computer Science. E-Government is still a new phenomenon where ideas are still pouring from scholars and practitioners. Thus, it is devoid of a standard and universal definition (Reddick, 2010).

The term "e-government" can be simply described as summing up 'government-as-usual plus ICT.' E-government is a definite move away from the status-quo, as it is not about business as usual; instead, it redirects focus to the use of ICT to rebrand the structures and procedures of governance (Alshehri, & Drew, 2010). However, elaborate research into the definitions of e-government shows that there are variations in the submissions of scholars as a number of them view e-government as an end in itself, while many others see it as a means to an end. To the later, one of the cardinal duties of

government is service delivery efficiently and effectively, and e-government provides the platform to do that. Thus, the successful implementation of e-public service delivery marks the realization of the prominent objectives of the government. As such, e-government becomes a means to an end (Yildiz, 2007).

The European Commission (2003) posits that e-government is the use of ICT in public administration combined with structural and skills improvement in order to enhance public services, promote democratic dividends and strengthen support for public policies. Similar to the European Commission's view is the perception of Denhardt & Denhardt (2009) and Olowu (2004). They conceptualize e-government as a tool for service delivery. i.e., the adoption of all the information and communication technology platforms and applications in the public sector or the use of the internet for delivering government information and services to citizens. To buttress this perspective, Adah (2015) described e-government as a double-lane communication process that deals with the use of ICT to deliver public services while ensuring unfettered access to such services to citizens. Practically, e-government entails the adoption of new leadership orientation, mechanism of decision making and investment, new ways of making social services available to citizens, a genuine way of listening and responding to the needs of the public in addition to new ways of organizing and delivering public information and services. Dhamodharam & Saminathan (2011) termed e-government as the government's use of ICT tools, specifically web-based internet applications, to facilitate access to and delivery of public information and service to citizens, businesses, and government departments. In the words of Jalali & Khorasani (2012), the idea of e-government depicts service delivery and information exchange both within the organizations (Intra-Governmental) and outside them (Inter-Governmental) that are observed using various technical tools and is seen as a mutual engagement between government and citizens, non-profit organizations, business persons, employees and the government itself is enhanced. Khalid & Lavilles, (2020) ascribed the ability of transforming "the relations among citizens, businesses and other arms of government" to e-government.

The above conceptualizations of e-government often lead to the idea that e-government is a double-edged sword which on the one hand, serves as a machinery to improve on the internal working mechanism of the government through the restructuring of the back-end office, improve the communication relationship between and among various agencies of the government as well as making government accountable. On the other hand, e-government helps to improve the government relationship with citizens through the development of public trust, enable citizens participation in decision making, enhance the effective and efficient delivery of services, achievement of equity and transparency.

3. Paperless Environment

Obviously, and like the idea sounds, it implies living and working in an environment where the use of paper is eliminated, or paper will hardly be in use, whether at home or in office (Gupta, 2015). That requiring paper neither to convey nor to record and store information. To go paperless is to "GO GREEN" as the trending movement goes. In today's world, paper has become indispensable. At the break of the day, newspaper vendors are already at our doors, streets, and offices, calling our attention to trending news. The news is valuable, but how about the volume of papers involved?

As a consequence of this, millions of trees are felled yearly to produce more paper, and this leads to environmental degradation considering the invaluable support trees give to our environment. Sequel to this, people all over the world are jumping on the eco-friendly bandwagon to keep the planet healthy. For some, this means eating organic fruit; for others, it means driving a hybrid car. Among the concepts that fit the green school of thought is the idea of going paperless.

Previous researches reveal that three objectives are bound in the achievement of implementing a paperless environment. First, we must understand what the sources of paper production in the current environment are, secondly, is to understand the nature in which paper has been able to support the current system and, lastly, what ICT facility, equipment, and support needed to aid the paperless environment. Similarly, Young (2002), highlighted that the most important precondition that will facilitate the movement from a paper-based system to a paperless system is the cultural attitude and importance attached by the adopters. Shifting administrative and academic activities is not an easy task, therefore, the willingness of the users must be positive.

Marshall (2003) raised a concern on access and support for ICT if truly an organization is to migrate into a paperless environment. Given the fact that majority of what is being read or what people care to read about today is digitalized, it raises the concern of how can it be ensured that there is immediate and unfiltered access to those documents as well as the ability to read them? He further argued, "that paper documents possess some important characteristics which in some situations and for some activities, make the paper too malleable and too useful to replace".

According to Mushhad, Gilani, Ahmed, & Abbas (2009), a model paperless situation consists of three tiers or layers: document generation, document management, and document sharing. At the stage of document generation, documents are created through the initiation of interactivity either through scanning or direct typing. At the second stage, which is the document management stage, the document exhibits a form of flexibility and accessibility before sharing to every respective user, which involves some level of mobility at the third stage. This process is cyclical, and no stage exists in

isolation. According to them, all electronic documents used in an organization must pass through the three-stage and maintain those characteristics.

The paperless environment is a new instructive method where most of the educational activities are reliant on ICT equipment and facilities. Activities in this environment are quite distinct from the traditional paper-based system. The paper-based environment involves the use of "electronic books, an e-learning campus, digital libraries, computerbased learning, data-base management systems, video conferences, distance learning, smart card applications, web mail, teleconference and web-based applications" (Iqbal et al., 2015). The adoption of paperless environment reduces the times an individual work on paper documents, as well as increases the efficiency of the work done through retrieval, archival and sharing of documents (Reaz, Hussain & Khadem, 2007).

3. Document Management in the Universities

The university is one of the educational institutions where document management is critical. The university system is mainly made up of two distinct environments working within the same system – the related administrative activities as well as the academic-related activities. There are three main channels of document management in the related administrative activities, and they are document archival, document communications, and document advertisement. Archival documents are information related activities that remain for an extended period (Kassab, Abu-Naser, & Al Shobaki, 2019). Their relevance is not tied to current activities, for example, results, registration forms, enrolment forms, transcripts and degree, employee records, etc.

Communication documents relate to the sharing of information between employees and the university management, and students, as well as communication between the university and the external environment. Examples of such are memos, official letters, notifications of meetings, notification of appointments, office notes etc. These documents are primarily used as a channel for information flow. They exist for a short period, and these are associated with current activities. Most of the manpower is being utilized for drafting these documents. Advertisement involves documents that are for public access, for example, prospectus, notices displayed on multiple noticeboards etc. Technological alternatives are required to display these documents in digital format. Academic documents are typically used for conducting education; it includes lectures, notes, assignments, quizzes, and books. These documents can be transformed into paperless by introducing modern education systems like e-learning. E-learning has emerged as a solution to distance learning. However, its activities are a real example of a paperless education system.

4. ICT and Paperless Environment in Universities

Advances in technological facilities have brought about fundamental changes in the way communication and information flow in our universities. This will go a long way in reducing the barriers posed by the conventional and traditional modes of information and communication dissemination. It is, therefore, ideal to best select the proper channel of communication flow with appropriate feedback mechanisms. Given this, Ramey (2013) posits that *every organization has to use communication technologies to improve on how information flows within that organization. The rate at which information flows within an organization will determine the speed at which decisions are made. If the flow of information is slow in an organization, also the rate at which decisions are made will be slow. Organizations are known for having multiple departments, so it is good to use communication technology tools to accelerate the flow of information from one level to another without affecting daily organizational activities.*

The use of ICT tools in conducting the daily business activities of public universities is not new in the literature. Adzmi & Yahya (2013) noted that the use of IT in place of papers in Malaysian universities has significantly cut down government expenses besides generating financial sustainability in the country. Apart from its cost-effectiveness tendencies as posited above, Anna & Yusniza (2010) stressed that IT facilities guarantee a faster and more reliable means of information sharing to the university system citing the instance of e-filing. More particularly, about the university environment, Brusco (2011) argued that e-filing had eliminated the need for large storage areas for data. In extension, data security is more guaranteed.

Despite the benefits accrued to working paperless in the university environment, literature such as Mohamad, Mohamed, Lamin, Mohaiyadin & Mardzuki (2018) also established that support towards technology adoption is essential. The reason being that employees may have less understanding, ability, and confidence in the use of such technology. As a result, they maintain the use of traditional methods and approaches in operating their works. Sequel to this, studies have submitted that ICT support and management support are part of the significant predictors to promote the intention of the university community towards a paperless working environment (Obeidat, 2015).

Different tools have been used to support the paperless environment, especially in developed countries; for example, Plimmer & Apperly (2007) developed an annotation tool named *pen marked* to correct and mark students' assignments. Their model shows how assignments flow from the student and how the teacher can access them online. The *pen marked* tool is useful for annotating documents. Earlier, the means of grading assignment is typical with the use of red ink on

paper submitted assignments or tutorial exercises. However, with a *pen marked* tool, there is a possibility of reducing the reliance on paper.

A central unit in the university system that is fast turning paperless is the library. Through the efficacy of everevolving internet, university libraries are turning virtual. The library, historically a cornerstone of scholarly endeavour, is reinventing itself in today's networked society to meet the new demands of its users. Rather than remain a physical structure holding books, it has now turned into an electronic portal with a growing global collection of digital content. Library users can now use it virtually to find the best information resources, delivering them to one's desktop or mobile computing device at the push of a button (Babbar & Chandhok, 2008).

Based on the cyclical model of Mushhad et al. (2009) earlier mentioned, the use of ICT in universities either within the administration or the academic setting must follow the document generation, document management, and the document sharing flow. Universities today have created an online student record automation system, where registration and payment for fees are carried out online. The earlier records that were yet to be automated would either be done through scanning into digital format or through manual entry. Similarly, documents such as memos, notification of meetings, etc. are generated through physical typing by clerical, support, and administrative staff. These documents are mostly prepared through a previously prepared layout, and only the contents are most likely to change. This can further be improved by using voice recognition software and Optical Mark Reader software to recognize text and convert it into digital format.

Similarly, within the academic setting, the use of digital or online courseware will help lecturers to eliminate bulky lecture notes to the students. Some universities in the country have started to conduct exams for students through the Computer Based Tests (CBT), where the results are transmitted online. This helps to remove the barrier of time and space needed for the examination. More so, it will remove the burden of marking hundreds of examinations scripts when the lecturers can use them for more productive researches.

When documents are created, they are managed through storage in central servers of the university. At individual levels, documents are stored by both the sender and the receiver for each of them to keep their copies either in their email or on their respective systems for personal records. In the academic settings, online course wares, published journal articles, thesis, conference proceedings, and published materials are usually stored in university repositories. For online course wares, changes can be affected regularly when the need arises. Published journal articles, conference proceedings stored in the universities' repositories can be used regularly for academic and library staff promotion.

The last stage of the cycle is a document sharing stage in contrast to the paper-based system where documents are sent via post or delivered in person. Challenges abound with this kind of system, as memos and letters 'get missing in transit.' ICT, with the current age of the internet, has made document sharing easy through the Local Area Networks, Wireless networks support, and mobile devices. Document sharing revolves around the capacity of the staff sending and receiving to be able to use ICT appropriately. More so, access to ICT facilities by both the sender and the receiver can be of grave concern in the document sharing process.

5. Challenges to Attaining Paperless Environment in Nigerian Universities

Paperless environment in the education sector is dependent on the level of ICT adoption and usage. There are several factors that influence the adoption of ICT in the education sector. Corrales and Westhoff (2006, p. 914) assert that adoption of technology is motivated by infrastructural, cultural, social, political and cognitive factors. They note that adoption happens whenever the users "enjoy the necessary levels of income to afford the technology, as well as the necessary cognitive skills and technological infrastructure to adopt the technology". Therefore, the adoption of ICT in the management of institutional affairs in Nigeria has not had smooth sail due to variety of challenges that can either be at the institutional or individual level. These challenges are similar to those affecting e-government in Nigeria.

5.1 Infrastructural Challenge

One of the challenges that kept surfacing in the literature is the gap in the level of infrastructure to support the 21stcentury model of teaching, learning, and communication (Aduke, 2008). One of the infrastructures needed to support ICT for paperless exchange of ideas in the universities is electricity, which has not received adequate attention in recent years (Abdulkareem, Ishola & Muhammed, 2015). Electricity is a significant power source, a vital infrastructure that is crucial to the support of activities of teaching and learning. Currently, the maximum output of electricity is 5000 megawatts that the country currently generates and distributes (Idowu, Ibietan, & Joshua, 2020). This is less than the required capacity to support ICT equipment and facilities in 170 universities in the country (National Universities Commission, 2019).

Similarly, issues relating to the high cost of telecommunication is also a barrier to the adoption of ICT especially among low income earners and students (Abdulkareem, et al., 2016). Although this factor is also connected to the epileptic electricity factor as most telecommunication base stations are equipped with power generating plants as an alternative source of power for their equipment. Therefore, the cost of procuring these generating plants and their maintenance have added to the operation cost of these companies and as such the final burden will be borne by the final consumers.

As part of the infrastructure gap that has altered the progress of paperless environment is inadequate ease of access to shared and personal ICT facilities. Currently, the challenge of students having access to a laptop is still unresolved. In some institutions, the ratio of a laptop to a student is still at 1 to 50. Although there are varying ratios of a student to a laptop across different universities based on the National Universities Commission (2019) statistics. Less than 5% of the universities have achieved 1:1 student to laptop ratio standard requirement for teaching and learning. Majority of academic staff lack access to ICT facilities and equipment (Tella, Orim, Ibrahim, & Memudu, 2018). Classrooms are not aided with necessary ICT sets to facilitate e-learning as less than 20% of the universities have 24 hours access to Wi-Fi service (National Universities Commission, 2019).

5.2 Attitudinal and Support challenge

This is another barrier that can stall the paperless goal's immediate realization. In some cases, the attitude of various management in and outside universities towards the use of ICT-related facilities such as the internet and computer procurement is slow, and in others, there is inadequate government assistance or support (Aduke, 2008; Ani, Ani, Ugwu, Nwachukwu, Obianuko, Ndaji, & Maduchie, 2016 and Nwankwoala, 2015). Amusa & Atinmo (2016) also described inadequate training support for university staff on the use of electronic resources as one of the constraints for ICT use. The adoption of ICT raises different questions with regards the willingness, capacity and support levels of the political actors, in the implementation of paperless environment (Kyobe, 2011). Organizations with rigid, centralized and autocratic structures have less tendency to adopt technology. Thus, the lack of will of the top management officials who perceive ICT use as a threat that will cut down their authoritarian and bureaucratic powers poses significant challenge.

Similarly, due to the changes brought about by technology, phobia for technology also exist among the support staff. The use of technology aims to breed transparency, many at times, the supporting and the administrative staff use lackadaisical attitudes to frustrate the implementation of the ICT system due to perceived corruption and personal gains from the use of paper-based transactions and businesses.

5.3 Low Digital Literacy among Staff

A successful technological change requires enough ICT skills on the part of the staff that will make use of these facilities in carrying out university business transactions. Digital divide adds to one of the socio-cultural barriers to the adoption of ICT in the universities; meanwhile, digital divide is influenced by other factors such as rural-urban divide, literacy level and costs of internet connection (Van Deursen & van Dijk, 2019). However, this factor still constitutes another significant hurdle for the use of ICT in public universities to ensure a paperless environment. As some lecturers are used to the conventional face-to-face teaching process, as noted by Nwankwoala (2015), they consider the use of ICT in teaching as not useful, quite comfortable, or just a waste of time. Worse still, when ICT training programs are organized to expose them to the use of ICT, they are reluctant to attend because they feel that ICTs are for the younger generation. For example, in a case where an instructor or professor refuses to own a PC because he feels it is not necessary. Olelewe & Okwor (2017) described lecturers' limited ICT skills as a significant challenge hindering the successful use of a non-traditional mode of teaching and learning. Several other researchers have also described low ICT literacy among lecturers as a severe challenge to teaching ICT integration (Agbatogun, 2013, Archibong, Ogbiji & Anijaobi-Idem, 2010 and Hossain, Salam & Shilpi, 2016).

6. Conclusions and Recommendations

This paper sets out to discuss ICT support concerning the achievement of a paperless environment in Nigerian universities. Currently, there are over 150 universities in Nigeria, implementing a paperless environment in these institutions alone will make significant changes in the rate of paper usage and boost the country towards an extensive green economy and eventually assist in the realization of sustainable development. The paperless agenda will also among other benefits earlier stated lead to faster and reliable information dissemination, better results, and help to embrace and boost the 21st century education system. The acceptance and adoption of a paperless system will recreate more jobs, make staff more productive, as well as make the universities more efficient and effective service rendering entities.

This paper covers an array of activities carried out in the universities and how they can be sustainably making use of information technology in the bid to save cost and the environment. However, the implementation cannot be achieved without support from the government and the university management to realize the paperless environment agenda. The most significant solution to achieve implementation success in the adoption of ICT and paperless environment in Nigerian universities is for the political actors to strengthen the level of willingness and commitment both attitudinally and financially. The political institution needs to understand the benefits of moving the universities away from conventional paper-based approach to a paperless environment. Therefore, it becomes imperative for the management support organ of the universities to create enabling environment for paperless operations to run.

Bridging the infrastructural gap that is currently bedevilling the country, most notably in the areas of power and ICT hardware and software is another area of recommendation. Dedicated green power supply such as the use of solar and wind energies can provide alternative source of electricity to universities. Investment in the use of green technology will provide a cheap and sustainable energy to power ICT equipment and facilities to run paperless environment.

Also, it will be essential to highlight that staff training on the path of attaining necessary ICT skills is indispensable. Without a functional and capable human resource that can handle ICT gadgets, the equipment will only become a white elephant project in the end. Therefore, efforts need to be intensified for academics and non-academics in terms of capacity building programmes such as trainings, refresher courses and workshops on the use and operation of ICT equipment especially the internet. This will in the long run reduce time spent in teaching and learning operations as well as increase their levels of their efficiency.

Furthermore, government at every level need to embark a massive scheme to make computers and internet affordable for the citizens especially low-income earners for them to actively adopt ICT. The Right of Way (RoW) levy imposed on telecommunication companies for the development of broadband must be reduced to the barest minimum in order to boost the current low broadband level. The multiplier effect of this reduction will not only reduce the high cost of accessing the internet, but as well improve accessibility. Also, at the institutional levels, decayed and obsolete computers must be replaced with modern, interactive and sophisticated ones to support 21st century teaching and learning.

7. Limitations and Suggestion for Future Studies

This study primarily focuses on highlighting issues and challenges with the implementation of a paperless environment in Nigerian universities through a review of the literature. This study is, therefore, limited in scope and methodology. The scope of the study is limited to public universities in Nigeria only. While the methodology was fundamentally conceptual through a review of literature.

It is, therefore, essential for future studies to centre focus on examining the relational factors between adoption, the ease of use and the implementation of paperless environment among Nigerian public or private universities or a combination of the two. The technology adoption model can be useful here to investigate the relationship quantitatively by administering a questionnaire. Similarly, the challenges can also be studied qualitatively through interview protocol using the design-reality gap. Technology usage and adoption are not only limited to universities, but future studies can also as well extend the investigation to other public institutions or agencies of the government where there is heavy usage of paper.

The implementation of a paperless environment in Nigeria, especially within the public sector is still growing, therefore, there are a few successful case studies around the world that Nigeria can learn from to improve the current paperless system. For example, the University of Lincoln in the United Kingdom has adopted and relied on the Virtual Learning Environment (VLE) to carryout teaching and learning in the university. This adoption has improved the total quality management of the university in terms of its educational operations and management services. The expectation and result achieved were meant to specifically improve the efficiency and productivity of higher education in reliance with the advanced technology and computerized systems (Cobham, Hargrave, Jacques, & Lewak, 2014).

The use of cloud computing to adopt a paperless environment is a famous step used by Canadian universities to improve on communication, storage of records and learning process. Cloud computing in the universities rely heavily on steady internet, dedicated official support system and strong political will. Nigeria can learn from the process used to achieve this through effective collaboration between the government, university management, staff and students. Also, wider consultation among the stakeholders i.e. staff, student, alumni and other relevant stakeholders within the university community should be encouraged. Also, planning deliberate further alternatives for slow adopters, such as constant training and workshops (Babin & Halilovic, 2017).

References

[1]   Abdulkareem, A. K., & Ishola, A. A. (2016). E-government in Nigeria: Progress and Prospects. *Ilorin Journal of Administration and Development, 2*(1)

[2]   Abdulkareem, A. K., Ishola, A. A., & Muhammed, A. (2015). Issues and Challenges of Power Sector in Nigeria: Addressing Policy Gap to Achieve Efficiency. *Ilorin Journal of Administration and Development, 1(1),*

[3]   Adah, B. A. (2015). The Status and Nature of E-Governance in Nigeria. *Second Covenant University Conference on eGovernance in Nigeria (CUCEN 2015)*, June 10-12, 2015, Covenant University Canaan land, Ota Ogun State, Nigeria

[4]   Aduke, A. F. (2008). Usage and Challenges of Information Communication Technology (ICT) in teaching and learning in Nigerian Universities. *Asian Journal of Information Technology*, *7*(7), 290-295

[5]   Adzmi, A. B., & Mohd Yahya, M. A. (2013). The usage of e-journal amongst lecturers at a public university in Malaysia. *The Turkish Online Journal of Educational Technology,* 12(2), 321-329

[6]   Agbatogun, A. O. (2013). Interactive Digital Technologies' Use in Southwest Nigerian Universities. Educational

[7]   Technology Research and Development, 61(2), 333-357. Retrieved from https://link.springer.com/article/10.1007/s11423-012-9282-1

[8]   Alshehri, M. & Drew, S. (2010). e-Government Fundamentals. IADIS International Conference on ICT, Society and Human Beings 2010 http://www.ict-conf.org/2010/

[9]   Amusa, O. I., & Atinmo, M. (2016). Availability, Level of Use and Constraints to Use of Electronic Resources by Law

[10]   Lecturers in Public Universities in Nigeria. JLIS. it, 7(3), 139-172. Retrieved from https://files.eric.ed.gov/fulltext/ED569231.pdf

[11]   Ani, V. A., Ani, E. O., Ugwu, C. O., Nwachukwu, A. I., Obianuko, J. C., Ndaji, G. I., & Maduchie, E. E. (2016). Strategies for Enhancing the Utilization of Information and Communication Technology (ICT)-Based Library Resources in Research. Library Philosophy and Practice, 1

[12]   Anna, A. C. A., & Yusniza, C. K. (2010). Adoption of tax e-filing. A conceptual paper. *African Journal of Business Management,* 4(5), 599-603

[13]   Archibong, I. A., Ogbiji, J., & Anijaobi-Idem, F. (2010). ICT Competence Among Academic Staff in Universities in Cross Rivers State, Nigeria. Computer and Information Science, 3(4), 109-115. Retrieved from http://www.ccsenet.org/journal/index.php/cis/article/download/7050/6119

[14]   Babbar, P. & Chandhok, S. (2008). Paperless Society: A Digital Library Future. Being a conference paper presented at the 6th International CALIBER-2008, University of Allahabad, Allahabad, February 28-29 & March1, 2008

[15]   Babin, R., & Halilovic, B. (2017). Cloud computing e-communication services in the university environment. *Information Systems Education Journal*, 15(1), 55

[16]   Berg, P., Lingqvist, O. Pulp, Paper and Packaging in the NEXT decade (2017). Transformational Change. McKinsey & Company, 2017. Available online: https://www.mckinsey.com/industries/paper-and-forestproducts/our-insights/pulppaper-and-packaging-in-the-next-decade-transformational-change

[17]   Brusco, J. (2011). Trending toward paperless. *AORN Journal,* 94(1), 13-18

[18]   Cobham, D., Hargrave, B., Jacques, K., & Lewak, J. (2014). Promoting paperless approaches to quality assurance and enhancement procedures: a university departmental case study. International Technology, Education and Development Conference 2014

[19]   Corrales, J., & Westhoff, F. (2006). Information technology adoption and political regimes. *International Studies Quarterly*, 50(4), 911-933.

[20]   Denhardt, R. B. & Denhardt, J. V. (2009). *Public Administration: An Action Orientation.* Sixth Edition. USA. Wadsworth

[21]   Dhamodharam, R. & Saminathan, A. (2011). Challenges of E-Government in African Countries: Creating an Enabling Environment in Nigeria. 1st-Africa 2011 Conference Proceedings Paul Cunningham and Miriam Cunningham (Eds) *IIMC International Information Management Corporation,* 2011. Pg.1-8 www.IST-Africa.org/Conference2011

[22]   Environmental Paper Network (EPN) (2018): The State of the Global Paper Industry 2018. Available online: http://environmentalpaper.org/tools-and-resources/reports/

[23]   European Commission (2003). The Role of e-Government for Europe's Future: Communication from the Commission to the Council. Retrieved December 12, 2009

[24]   http://ec.europa.eu/information_society/eeurope/2005/doc/all_about/egov_communication_en.pdf

[25]   Fountain, J. (2001). *Building the Virtual State: Information Technology and Institutional Change.* Washington DC: Brookings Institution Press

[26]   Garson, G. D. (Ed.). (2003). *Public Information Technology: Policy and Management Issues*. Hershey, PA: Idea Group Publishing

[27]   Gupta, S. (2015). Paperless Society - From Vision to Fulfilment. Global Journal of Enterprise Information System Vol. 7, Issue 1 (45-54) www.gjeis.org GJEIS | Print ISSN: 0975-153X | Online ISSN: 0975-1432

[28]   Heeks, R. (2006). *Implementing and Managing E-Government: An International Text.* London; Thousand Oaks, CA: SAGE Publications

[29] Hossain, M. A., Salam, M. A., Shilpi, F., & Officer, A. D. (2016). Readiness and Challenges of Using Information and Communications Technology (ICT) in Higher Education of Bangladesh. The Online Journal of New Horizons in Education, 6(1), 123

[30] Idowu, S. S., Ibietan, J., & Joshua, S. (2020). Debureaucratization of Power in Nigeria. *Global Encyclopedia of Public Administration, Public Policy, and Governance*

[31] Iqbal, H., & Ahmed, F. (2015). Paperless campus: the real contribution towards a sustainable low carbon society. *IOSR Journal of Environmental Science, Toxicology and Food Technology*, 9(8), 10-17

[32] Jalali, F. & Khorasani, F. (2012). The Relationship between E-Government and the Public Trust among the Citizens in District 5, Tehran in *Research Journal of Applied Sciences, Engineering and Technology* 4(23): 5261-5267, 2012 ISSN:

[33] 2040-7467. Maxwell Scientific Organization

[34] Kassab, M. K. I., Abu-Naser, S. S., & Al Shobaki, M. J. (2019). The Role of Policies and Procedures for the Electronic Document Management System in the Success of the Electronic Document Management System in the Palestinian Pension Agency. International Journal of Academic Multidisciplinary Research (IJAMR), 3(1), 43-57

[35] Khalid, S. A., & Lavilles, R. Q. (2019). Maturity Assessment of Local E-government Websites in the Philippines. *Procedia Computer Science*, 161, 99-106.

[36] Kyobe, M. (2011). Investigating the key factors influencing ICT adoption in South Africa. Journal of systems and information technology

[37] Marshall, C.C. (2003). Reading and interactivity in the Digital Library: Creating an experience that transcends paper", Proceedings of the CLIR/Kanazawa Institute of Technology

[38] Mohamad, M.H., Mohamed, H.A.B., Lamin, K., Mohaiyadin, N.M.H., & Mardzuki, K. (2018). Prediction of Information Technology and Management Supports on Intention towards Paperless among Malaysian Public University Staff: A Pilot Study. *International Journal of Academic Research in Business and Social Sciences,* 8(6), 1144-1153

[39] Mushhad, S., Gilani, M., Ahmed, J., & Abbas, M. A. (2009). *Electronic document management: a paperless university model.* Paper presented at the 2009 2nd IEEE International Conference on Computer Science and Information Technology

[40] National Universities Commission. (2019). *Nigerian University Sysem Statistical Digest, 2018*. Retrieved from Abuja:

[41] Nwankwoala, H. N. L. (2015). An Investigation of Lecturers' and Students' Use of ICTs in Nigerian University Education as a Panacea for National Development. IISTE Research on Humanities and Social Sciences, 5(20). 167-176. www.iiste.org

[42] Obeidat, M. A. Q. (2015). Empirical analysis for the factors affecting realization of paperless office. *International Journal of Economics, Commerce and Management,* 3(6), 773-792

[43] Olelewe, C. J., & Okwor, A. N. (2017). Lecturers' Perception of Interactive Whiteboard for Instructional Delivery in Tertiary Institutions in Enugu State, Nigeria. Journal of Computers in Education, 4(2), 171-196. Retrieved from https://link.springer.com/article/10.1007/s40692-017-0077-6

[44] Olowu, D. (2004). Bridging the Digital Divide in Africa: Making the Governance Discourse Relevant. *Africa Networking: Development Information, ICTs, and Governance*, UNECA, Addis Ababa

[45] Oni, A. A., Okunoye, A., & Mbarika, V. (2016). Evaluation of EGovernment Implementation: The Case of State Government Websites in Nigeria. *Electronic Journal of e-Government, 14*(1), 48-59

[46] Plimmer, B. and Apperley, M. (2007) "Making Paperless Work", ACM International Conference Proceeding Series; Vol. 254, Proceedings of the 7th ACM SIGCHI New Zealand chapter's international conference on Computer-human interaction: design centered HCI (2007)

[47] Ramey K. (2013). New Communication Technologies to Improve Organizational Communication. Available: http://www.useoftechnology.com/ communication-technologies/

[48] Reaz, M., Hussain, S., & Khadem, S. 2007. Multimedia university: A paperless environment to take the challenges for the 21st century. *AACE Journal*, 15(3), pp. 289-314

[49] Reddick, C. G. (2010). *Comparative E-Government.* New York: Springer. Vol. 25 (R. Sharda and V. Stefan) (eds.)

[50] Van Deursen, A. J., & van Dijk, J. A. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. new media & society, 21(2), 354-375

[51]   Suhr, M.; Klein, G.; Kourti, I.; Gonzalo, M.R.; Santoja, G.G.; Roudier, S.; Sancho, L.D. (2015) Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board (Industrial Emissions Directive 2010/75/EU; Publications Office of the European Union: Luxembourg, Luxembourg, 2015; p. 906

[52]   Tella, A., Orim, F., Ibrahim, D. M., & Memudu, S. A. (2018). The use of electronic resources by academic staff at The University of Ilorin, Nigeria. *Education and Information Technologies, 23*(1), 9-27

[53]   United Nations. (2012). government Survey (2012) E-Government for the people. *Department Economic and Social Affairs, United Nations, New York*

[54]   United Nations. (2018). *United Nations E-Government Survey 2018: Gearing E-Government to support transformation towards sustainable and resilient societies*. Retrieved from New York:

[55]   West, D. M. (2005). *Digital Government: Technology and Public Sector Performance.* Princeton, NJ: Princeton University Press

[56]   Wirtz, B. W. & Daiser, P. (2015). E-Government Strategy Process Instruments. Germany http://dnb.dnb.de.

[57]   World Bank. (2018).   World Development Indicators | DataBank. Retrieved from http://databank.worldbank.org/data/reports.aspx?Code=SP.POP.TOTL&id=1ff4a498&report_name=PopularIndicators&populartype=series&ispopular=y

[58]   World Economic Forum. (2016). *The Global Information technology Report 2016: Innovating the Digital Economy*. Retrieved from

[59]   Yildiz, M. (2007). E-government research: Reviewing the literature, limitations, and ways forward. *Government information quarterly, 24*(3), 646-665. Young, B. 2002. The paperless campus. *Educause Quarterly*, 25(2), pp. 4-5