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National Information Communication Technology Policy and Teaching Quality in Nigerian Universities

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A B S T R A C T

This study examines national information communication technology policy and its impact on teaching quality in Nigerian universities. This study adopted qualitative research design as it relies on secondary data collected from books, journal articles and internet sources, and were content analyzed in relation to the scope of the study. This study is anchored on Technology Organization Environment model which offers analytical explanations on information communication technology policy implementation and teaching quality in higher educational institutions. The study concludes that the integration of information communication technology into educational system has been identified as a critical catalyst to achieving quality of teaching and learning across the globe, and since academic quality is the primary objective of Nigerian universities and has been pursued traditionally for decades, it thus becomes important to source for role or outcome specific technologies that can be used to substitute or improve the traditional teaching practices. This study therefore recommends among others that Nigeria government should intensify effort to invest more on information communication technology infrastructures aimed at improving teaching quality in Nigerian universities.

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1. INTRODUCTION

Information and communication technology (ICT) has been "described as an accelerator of quality education in the modern age characterized by rapid technological advancement. Digital innovation is fast becoming a yardstick for measuring national development, especially when driven by vibrant information technology policies and guidelines; societies have had to adjust to the growing necessity and inevitability of ICT in order to address emerging challenges in the information" (Yusuf, 2005; Khasawneh, 2015; Musa, Mahmud & Ab-Jalil, 2018: 169). Countries are relentlessly developing and adopting ICT-led solutions to their national and global socio-economic challenges. This realization is responsible for the establishment of the United Nations Information and Communications technologies task force in 2001, an agency whose work was to maximize ICT in achieving the Millennium Development Goals (United Nations, 2001; United Nations, 2004). "The role of digital technology towards sustainable development was also iterated when the United Nations Secretary General's Digital Financing Task Force of the Sustainable Development Goals (SDGs) was established. Its mandate was to identify how digitalization will reshape finance and to propose how best this change will support funding of the SDGs" (Wahlen, 2019: 17).

Globally, "teaching and learning receives enormous attention because of its unmatched importance to global development. Its inevitability is succinctly captured by the United Nations Educational Scientific and Cultural Organization (UNESCO) Education 2030 vision, which seeks to promote access, equity and inclusion, quality, and learning outcomes within a lifelong learning perspective" (Jin & Cho, 2015: 254). Advancements in ICT have "enhanced global interconnectedness and knowledge acquisition. Goal 4 of the SDGs seeks to improve the quality of education and promote lifelong learning opportunities for everyone across different climes" (UNESCO, 2015: 6). Yusuf (2005: 318) opined that "ICT tools and resources have grossly impacted the quality and quantity of teaching, learning and research in traditional and distance education institutions. E-leaning has disrupted the educational sector, replacing the conventional teaching didactics and improving it in other climes". All these are due to the invention and integration of technological solutions in the educational sector (Suryani, 2010). Furthermore, "the introduction of ICT usage, incorporation, and diffusion has jumpstarted an era of scholarly methodologies, with a conspicuous radical move away from the traditional method of information dissemination and usage patterns in the domain as well as more sophisticated, but simplified learning experiences for teachers and learners. Thus, it can be further established that information communication technology is catalytic to skills acquisition, improved learning and teaching, sectoral and global interconnectedness, among others" (Ololube, Ubogu, & Ossai, 2007: 400; Agbetuyi & Oluwatayo, 2012: 44).

Information communication technology plays essential role in all sectors globally. "The educational sector has had to evolve because ICT has created new standards for improvement in quality and efficiency of the teaching and learning process" (Khasawneh, 2015: 173). "The Nigerian educational sector seems to have also evolved along this area but the lapses in the ICT adoption in Nigeria brings to the forefront of investigation, its impact on quality of teaching. Nigeria like many other countries created its national IT policy in 2001. The policy intends to aggressively use ICT for five key purposes. These include education, creation of wealth, poverty eradication, job creation, and global competitiveness. Complimenting these objectives are strategies developed to restructure the education system at all levels to respond effectively to the challenges and imagined impact of the information age and to also allocate special IT development fund to education at all levels. Despite the ambitious nature of the policy objectives and implementation strategies of the national IT policy, the Nigerian

tertiary education system still suffers huge setbacks in proper integration of technology. The Nigerian Universities Commission (NUC) in its ratio distribution of computer ownership prescribed that; there should be one to every four students; one computer to every two lecturers below the Lecturer 1 rank; one personal computer to each senior lecturer; and one notebook per Professor" (Agyeman, 2007: 19). However, there are still universities with as low as 1:30 (computer to student ratio) according to the 2017 NUC statistical digest of Nigerian university system (Nigerian Universities Commission, 2017).

The scenario above begs the question of how Nigerian universities are faring in terms of ICT implementation for quality teaching and learning, such that can be measured with metrics that spread across graduate output (ICT ready graduates), improved learning and teaching system, management system, to mention a few. As an illustration, Iloanusi and Osuagwu (2009: 1333) "categorized ICT integration in Nigeria's educational institutions into four (4) phases and pegged the Nigeria situation in the emerging phase, which is the first of four-step approach which includes: emerging stage, applying phase, infusing phase and transforming stage. They further submitted that 90% of Nigeria's educational institutions are still within the emerging scene, while 7% are in the applying phase and 3% in the infusing and transforming phase". Drawing inference from Iloanusi and Osuagwu (2009), 90% of the Nigerian schools are still in the emerging phase of ICT integration, which makes it clear that there is so much to be done to reach the transformation stage. Also, Adepetun & Lawal (2020: 5) "acknowledged the backward state of e-learning in Nigerian public universities and further amplified some of the challenges that have been identified by key stakeholders, these challenges include; failure of successive governments to invest in technologies and IT infrastructures, unstable power supply, and underfunding of government-owned institutions".

During the 2020 global lockdown, "ICT based learning continued in many private universities, but it was not the same for public universities. The Academic Staff Union of Universities in Nigeria publicly decried the idea of virtual learning when the Federal Ministry of Education suggested it, based on the inadequacy of ICT infrastructures and unpreparedness of faculty and staff considering the special pedagogical skills needed to teach courses online" (Okolor, 2020: 13). From what is currently obtainable in the Nigerian university system, the implementation of information and technology policy suffers colossal setback. This should not be so, considering the very assertive ICT policy objectives and strategies created in 2001, which seek to restructure the education system at all levels to respond effectively to the challenges and imagined impact of the information age. This thus makes it pertinent to examines national information communication technology policy and its impact on teaching quality and some of the challenges that may be responsible for the lagging implementation of information communication technology for improved teaching quality in Nigerian universities.

2. METHOD

This study adopts qualitative research design; the researcher used descriptive analysis to examine national information communication technology policy and its impact on teaching quality in Nigerian universities. The study which is theoretical in nature draws its argument basically from secondary data which include journal articles, books and internet sources, and were content analyzed in relation to the scope of the study.

3. RESULTS AND DISCUSSION

3.1 The Concept of Information Communication Technology

Information communication technology (ICT) is "an extended synonym of what is traditionally known as information technology. The researcher however stresses the compounded nature of the former over the latter, with emphasis on role of unified communications and the integration of telecommunications, computer system and other digital technologies that enables all round processing of information, for further understanding (Yekini, 2014: 9). Kumar and Singh (2012: 137) affirmed that "ICT can be widely interpreted as technologies that amplify communication process and facilitates the transmission of information through electronic channels. Information communication technology represents a radical move away from the traditional norms, bringing change in areas of knowledge dissemination and education, information sharing, social engagements, economic and commercial activities, politics and governance (Yekini, 2014: 9).

According to Kozma (2011: 97) "a sizeable number of the significant socio-economic changes that have been recorded in the late twentieth and early twenty-first centuries have been made enabled by the exponential increase in the capabilities and availability of information communication technologies". Basri, Alandejani, and Almadani (2018: 3) posit that "the technology and telecommunication sectors were initial beneficiaries of ICT, it has however spilled across other sectors over the years touching bases with every aspect of the economy and in recent times becoming a key indicator for development". Information communication technology has become "a socio-cultural norm, with technologies such as telephones and laptop computers ranking high among the necessity of survival in modem societies. The use of these technologies varies, as many use them on both commercial and individual basis, there has been ground-breaking innovations that have expanded areas where these technologies can be used, making it possible for usage in places like home, road, work, to mention a few" (Piszcek, Pichler, Turel & Greenhaus, 2016: 5). It is thus evident that "the increased impact of ICTs can be traced to the astronomical increase of its power and coverage. The full strength of the term comes from the unending processing capabilities of computers and the information exchange capabilities of networks. Thus, hinging the evident paradigm shift in global socioeconomic development space on the combined processing and networking power of contemporary ICT, which is a remarkable improvement over traditional technologies like radio and television" (Kozma, 2011: 99).

Today, information communication technology has become a driving force for global development with its presence in every sector as a catalyst for improved outcome. Being in the information age, ICT and many other technological are rapidly increasing, but this rapid advancement is a bit lopsided because developed economies are more primed towards the socioeconomic dividends towards economic prosperity and improvement of efficiency of public services and other essential sectors (Galbraith & Mcadam, 2013; Baridam & Govender, 2019). However, Kumar & Singh (2012: 14) hold that if "ICT potentials are well maximized, its role in combating rural and urban poverty and promotion of sustainable development through creation of knowledge-based economies and information rich societies cannot be overemphasized". Therefore, information communication technology is seen as a primary enabler for innovation, research and new discoveries, hence its inevitability in national and international development since the beginning of the information age.

ICT is widely defined with multisectoral representation or meanings. Adams (2016: 8) reiterated its primary description, which is "it being an umbrella concept to describe the use of communication devices and utilities to adequately manage information. It is a multifaceted concept that has the capacity to promote sophistication and re-ok havoc depending on the

skills, intention, and value system of users or society in harnessing its strength towards either good or evil intentions". Evidently, ICT cut across afferent sector and areas with varying meaning and application. As much as its capacity to introduce new products, improve efficiency and promote sophistication are widely proliferated. However, "its negative part includes double capability to cause devastating damage when it's wrongfully harnessed or integrated for negative purposes" (Adams, 2016: 8).

Buhalis and O'Connor (2005: 9) highlighted the contributions of Information communications technology to the transformation of the tourism sector, describing its integration as "a paradigm shift from the norm and creation of new opportunities and threats". This "gives historical credence to the multisectoral nature of ICT penetration" as described by Adams (2016: 11). Also, along this line but domicile in the educational sector is the perception of Kajee and Balfour (2011:188) which highlighted" the instrumental role of ICT in the promotion of lifelong learning, curriculum transformation and innovation, breaking digital divide, diverse participation and improvement of the quality of education". Drawing inference from scholarly contributions to the concept of ICT and its integration, it is evident that ICT development necessitates digital readiness of different sectors for the purpose of competitiveness and efficiency.

Certain intricacies however characterize "the process of technological sophistication and ICT motivated development, these boils down to processes such as; hardware development, improvement of processing capabilities which enables computer-based solution to handle fast-growing new issues within its new areas of application" (Buhalis & O'Connor, 2005: 10). This in turn defines the strategic centralization of ICT units within sectors and organizations, which also may draw its strength from the specifications of the existing ICT Policies. Otiso and Moseley (2009: 100) described "the growth of ICT as a rapid one in more developed countries since the beginning of the information age". A growth, Dicken (1998: 4) initially described as "key deposition of the larger socioeconomic and technological shift that characterizes the development from traditional industrial economy to a service and information based one". Otiso and Moseley (2009: 102) further recognized the "growing concerns and efforts towards ICT development in less developed countries, which is compared to that of their more developed counterparts in varying capacities". Furthermore, recent gravitation towards permanent global knowledge-based economy has vitalized the continued efforts of different national governments and corporations towards a techno-economic paradigm shift in their activities.

Haftu (2018: 19), while using mobile phone and internet access as the parameters for measuring ICT penetration submitted that "ICT drive the gross domestic product per capita of Sub-Sahara Africa countries. ICT evidently has a multidimensional contribution to growth and development, it has overtime expanded its coverage towards organizational, national and even global development, also peculiar to its integration and development is the widening scope of measurement, which is owed largely to its dynamic nature, such as old and modem innovations like; telecommunications, internet connectivity, internet of things, artificial intelligence, etc., all contributing to different sectors through different means". It is thus evident that there is "a positive interaction between investment in ICT and economic growth" (Niebel, 2018: 199; Oladipo & Wynand, 2020: 1396).

3.2 The Concept of Public Policy

Policy, according to Easton (1953) is the "authoritative allocation through the political process of values to groups or individuals in society". The premise justifies Parsons (1995: 2) for submitting that "public policy presupposes that there is a sphere of life that is commonly held, thus comprising of human activity that requires governmental or social regulations". Dye (2002:85) defines public policy as "what governments do, why they do it and what difference it makes. It is the description and explanation of the causes and Consequences of government activity". According to Anyebe (2018: 2) policy is largely regarded as "the labeling behaviours of certain actor such as political appointees, government agencies, legislators, policy entrepreneurs who function in area of governance and other public enterprises". However, public policies are refined by much larger parameters that, hence the description of policy as what the government does to meet the needs of the citizens. Thus, Abdulsalami (1987:2) described public policy as "the political system receives inputs from the environment and converts them into outputs. The inputs are in form of demands from groups or individuals for specific policy outcomes. The policy outcomes take the form of determination of societal values and allocation of resources and allocation of resources; a feedback loop thus exists by which the outputs alter the future inputs".

Public policy is the backdrop of all government's actions towards achieving public goals. Policies, in its entirety, are purposive course of action devised in response to a perceived or resting problem (Cochran & Malone, 2014: 3). This simply means that, policy is a course of action designed and executed by the government in response to specific public concerns. Policy creation, implementation and evaluation bear in its core interests of different parties, hence the prioritization of politics in the understanding of the concept. Lowi (1964) cited in Almeid and Gomes (2018: 446) argued that "policy is the basis upon which politics is created, with explanation further drawn from the emanation of public policies from process of disputes in different decision areas. Thus, public problems are those issues that have been identified by public leaders and their offices as worthy of a planned or coordinated government response".

Public policy is "shaped on multiple levels by different actors, whose inputs are essential for the workability of such policies, tailoring new policies along interest lines which on a larger scale translate to the promotion of public interest. Public policy is an aspect of a process of decision making and action taking, it is at the core of a process, which focuses mainly on interactions between policies and actors, events, contexts and outcomes" (Weible & Carter, 2017: 23). Consequently, public policy is the aggregation of government activities initiated and pursued directly by the government or through key stakeholders, thus influencing the general populace.

There seem to be a meeting point of all the definitions of public policy, which is in the area of public policy as a process or pattern of governmental activities that are established to address certain public problems either real or imagined. However, drawing inference from the different definitions given above, "public policy is thus derived from the readiness of a government to address a problem in the society" (Lester & Goggin, 1998: 2). They further opined that policies are created based on environment, for example, it can be created at international, national, regional and local levels to address issues that affect the different policy environments at the time. Dye (1984: 12) described the "process of investigating the reasons for and progress of government as policy analysis. This encompasses the study of the different stages of policy process which includes; agenda setting, policy formulation, policy implementation and policy evaluation (Anderson, 1978; Backenbus, 1998).

3.3 Concept of Education

Formal education is "institutionalized, intentional, planned and provided by recognized public and private bodies. It comprises of initial education structure created for the younger population in preparation for their inflow into the labour market. Education is however not restricted to children and young people, it also cuts across different demography, such as; vocational, special needs and adult education which are mostly registered and approved as critical parts of the formal education system by the national education authorities" (UNESCO, 2018: 34). It is thus clear that initial education captures a younger demography, while formal education in its entirety makes room for people across different demography. Dib (1988: 302) classified education into three major categories, formal, non-formal and informal. "Formal education is a systematically designed education model which is structured and strategically executed through certain rules and norms. Formal education is mostly characterized by rigid curriculums. Non-formal education however does not mirror the model for formal education has it requires less than the formal education. It is mostly characterized by non-contiguous communication feature, while informal education captures the different means of education through the society, it does not adhere to any organized and systematic view of education, it does not necessarily require objectives and modules as contained in the traditional curricula, it targets students as much as it targets the general public".

Education occupies "a germane position in the developmental process of every nation and its importance cannot be overemphasized globally. Furthermore, education has shaped every aspect of society development with its impact touching base with all aspects of human existence" (Otonko, 2012: 45). Education, as described by Blaike (2002) is the biggest industry in the world, as it impacts every aspect of human endeavours. It is thus clear why the sector remains a foremost priority of different countries. Otonko (2012: 46) further "magnifies the conscientious efforts of countries, Nigeria inclusive towards harvesting the full capacity of the sector, a task that has become the cornerstone of efforts towards national development and global competitiveness. Education contributes immensely to every country's economic and socio-political development". Therefore, education is "the cornerstone of national development, it provides knowledge and skills to population on all levels, as well as moulding the national identity through inclusive and innovative teaching and learning experience" (Idris, Hassan, Ya'acob, Gill & Mohd-Awal, 2012: 444).

Education therefore facilitates democratic citizenship as it is the point of convergence for citizens to ram and participate responsibly towards public life. Audigier, 1999 cited in Albulescu and Albulescu (2015: 98) opine that "democracy becomes volatile when citizens are poorly informed, as it encourages indifference towards institutions, norms and values that characterized the society where they live in. The education process is driven by development of autonomous, dynamic and innovative personalities that are in touch with social realities. On this premise, schools are expected to assume formative objectives, adapt through the evolution of creative curriculum projects and pacing socioeconomic changes that authoritatively transform the conception of role of the education system".

Similarly, Gray (2017: 63) while discussing 'the social construction of time in contemporary education' holds that "education brings rapidly growing realities within the education system, such that determines the education output globally". The author further emphasizes the role of available tools and infrastructure to the ability of student and learners on all levels to engage with education, especially in a period where there is gross inequality of time and technology. A study by Peter and Valkenburg (2006) showed that, inadequate access to ICT infrastructure is not only responsible for the divide but effective usage also determines. Adolescents' access to the internet in Netherlands according to the study revealed that an

effective access and use of internet towards education is structured along social lines, with affluences being the defining factor. While explaining further, Peter and Valkenburg (2006: 301) study showed that "those from well-off backgrounds use the internet more for information and education, as well as create formidable social connections through digital communications while their counterparts from disadvantaged backgrounds use it more for entertainment". This thus highlights the double jeopardy for those on the departmental, college and institution level. This thus opens up the evaluation process to other environmental factors such as policies, new trends, among others that have become the parameters for measuring teaching impact and effective education globally.

3.4 Teaching and Teaching Quality in Higher Education

There is a wide disparity between teaching in higher education and lower levels of education. This is typically because of the training, which prepares higher education instructors to be more than just teachers but also disciplinary specialists. "Diversity in student's age, experience, cultural background and socioeconomic status also contributes to the disparity between higher and lower education teaching" (Yang, 2020: 347). It is thus evident that achieving quality teaching in tertiary education comes with certain unpredictable and inevitable challenges. According to Laurillard (2012: 87) "quality teaching focuses more on learning than teaching itself, with reference to higher institutions, teaching serves as a connecting hub to learning more than it is to impartation of knowledge. This mediation nature of quality of teaching covers aspects such as the content of learning, the learning process and the learning outcome. Thus, focus is extended from the traditional method of instruction but now captures contemporary methods which cut across the different aspects of teaching. Biggs and Tang (2011: 229) also from a student perspective reinforce the multifaceted nature of teaching in universities by opining that "students are not restricted to knowledge acquisition but also to gain competences such as critical reasoning, robust intellectual base, and extra-curricular activities among others".

Therefore, even though quality teaching still has within its scope knowledge acquisition, it ensures that competences across different areas are developed which prepares the students to become specialists in their disciplines and also ready if their careers snowballs into another area which through the basis of quality teaching have been embedded in their learning process. According to Henard (2010: 6) "development of institutional policies to support quality teaching can be tasking, many institutions have recognized these constraints within the scope of fast pacing world, characterized by evolving curriculums, technological advancements and changing demographic distribution". However, the author iterated the possibility of certain institutions to dive straight into the process of creating institutional support for their faculty members, but with emphasis on their hands-on experience to enable smooth transitioning of roles or methods. Additionally, "institutions employ means which primarily highlights the values of quality teaching. Such means may include adaptation or improvement of teacher proficiency in using new equipment or adapting pedagogy to the new tools put at their disposal, especially information technology tools" (Henard, 2010: 9). Therefore, faculty get more comfortable with instruments that they did not use during their own training period but are now vital to the knowledge dissemination or enhance effective learning.

3.5 Information Communications Technology and Public Policy Implementation

Addressing public interests in the area of provision of goods, services and satisfaction is the main output of the political decision-making process. In this regards, outputs of the private sector is also deemed heavily consequential; both public and private sector bureaucracies have resolved to ICT tools for more efficiency and effectiveness (Eckardt, 2014: 61). It is needful to mention that both sectors, depending on whatever new or existing innovations are regulated by policies with considerations of environmental factors towards desired outcomes. "The potentials of ICT infrastructure and tools have continued to evolve with new daily discoveries. It is most notable for its roles just as implied in the name, roles such as supply of public goods and services, proliferation of information, and communication services which aids interaction between the citizenry and public bureaucracy, and ICT plays tangible role in general public interaction" (Promberger, Benhart & Fruh, 2010: 7). Summarily, ICT has presented itself to be "catalytic to service delivery in both public and private spheres and following its integration in one too many activities, the need for policy direction for implementation becomes pertinent. It goes both ways however, as ICT too is now a determining factor in public policy making due to its inevitability in everyday life" (Cochran & Malone, 2014: 5).

ICT policies cover three major areas, which Nool (2003) describes as telecommunications, broadcasting and the internet. These policies may be international, regional and national with each level owning its own decision-making bodies. Public policies are known to be derived from governments but different stakeholders, particularly the private sectors contribute to its process as they also operate within the policy environment. The areas listed have become integral parts of human social and economic existence since the beginning of the information age and some before it, some societies evidently got head start in ICT deployment, hence widening the digital gap between them and other countries that did not, most of the countries who fall under the latter are developing countries, with emphasis on the African countries (UNESCO, 2019).

Idomi and Igun (2008: 7) described "Information Communication Technology policy to be an official document that highlights the objectives, vision and strategies that seeks to champion and regulate the development, integration and application of ICT". Furthermore, "information communication technology policies help countries to maximize the revolutionary potentials the information age for purpose of socioeconomic development at local, national and sub regional levels. At the core of this policy and strategy introduction and adoption is an effort to improve accessibility and affordability of ICT infrastructures and knowledge for citizens. The development of national ICT policy is suggestive of regressive governance, giving the attached benefits that have citizens' lifestyle improvement, reaction of good institutional and regulatory frameworks for implementation and development of human resource capacity" (Enakrire, 2011: 735).

It is widely accepted that information communication technology has become "a potential enabler for national economic and social development and for strengthening global competitiveness for countries. This is evident in the objectives of the national ICT policies of Nigeria, Thailand and other countries who have brought ICT to the forefront of their developmental agenda" (Olatokun, 2008: 54). The "International Development Research Centre of Canada (IDRC) provided the first regional support for information work in 1976; it brought within the focus of developing countries the importance of information technology in their development process. Development Sciences Information System (DEVSIS) which was created by the IDRC addressed the challenge of information technology in the developing countries and then created two regional socio-economic information systems for Latin

America, Information System for Planning (INFOPLAN) and Pan African Documentation and Information System (PADIS). The primary objectives of these support systems with reference to PADIS was to enable African countries strengthen their capabilities on national levels to collect, store and realize data effectively for development purposes, improve physical ICT infrastructures in African countries, accelerate similar framework of information handling and ensure their processes are in line with best global practices" (Economic Commission of Africa, 2008: 82).

Furthermore, "IDRC in 1989 amplified the need for national ICT policy formulations, with a global campaign to place ICT Policy on the international research priority, encourage sustainable investments in research and development, in essence, promoting technology transfer and adaptation through multi and interdisciplinary researches" (IDRC, 1989; Valantin, 1996 cited in Olatokun, 2008: 55). Another important milestone in the ICT policy development process of Africa was "the establishment of the African Information Society Initiative (AISI) in 1996 under the auspices of the United Nations Economic Commission of Africa (UNECA) in collaboration with IDRC, UNESCO, ITU, World Bank, to mention a few; an initiative that was birthed from Resolution 795, at the 21st meeting of the Economic Commission of Africa Conference of Ministers, which had 53 African ministers responsible for economic and social development and planning in attendance. The ECA while providing support for its member-states in strengthening their planning and socioeconomic development strategies, availability of information to support these activities was a major setback, the continent at the time lacked the information gathering and sharing mechanisms needed by planners, policy makers and researchers" (Economic Commission of Africa, 2008: 86).

The basis of the resolution was to construct an accelerative pathway for incorporation of ICT m Africa's economy to promote global equality and competitiveness (ECA, 2008 cited in Mogaji, 2019: 94). Furthermore, the conference brought about the commissioning of a group of expert who would draft the AISI, as a framework to leverage on ICT for the socioeconomic development of Africa and Africans at large. This document was submitted and adopted through Resolutions 812, "Implementation of the African Information Society Initiative" at the 22nd meeting of the ECA conference of Ministers which took place in 1996. AISI set a 2010 target to make Africa realize sustainable information Development Society; these targets have been aggressively pursued by policy makers and other stakeholders on national, sub-national, regional and international levels (Olatokun, 2008: 83). It is thus, pertinent to note that development of the ICT sector in Africa since the 1990s can be largely credited to the implementation of the targets of AISI (Kamba; 2013).

It is also for the reason of the emerging global reality and the consciousness of the fast growing digital divide, thus signaling imminent global inequalities in areas that concern adoption of information communication technology that every forward thinking country pursued aggressive national ICT policies that would make them relevant and key competitors in the emerging global digital economy. Nigeria, in 2001 having realized the pertinence of information technology in what is obviously the information age formulated a national ICT policy that would aid its effective participation and relevance in the emerging digital economy, one that is drives the national economy to a knowledge based one with targets roaming around full integration of ICT into every sector of the economy (Kamba; 2013). The policy process is however incomplete or unsuccessful when targets are not met or rather, when poor outcomes are reported. Hence the possibilities of varying successes in the different policy areas for different national government and by implication further creating a wide gap in ICT policy implementation for sustainable development. Galbraith and Mcadam (2013: 250) attributes the relatively poor ICT policy outcome to Africa, especially in areas that

concern integration of ICT for poverty alleviation and also meagerness of researches that amplifies the politics of policy creation, reform and economic regulation. These issues raised are not entirely different from the ones that birthed the earliest agenda towards ICT deployment and development of policy environment in Africa by the IDRC in 1989 and UNECA in 1996 (Olatokun, 2008).

3.6 Information Communication Technology and Teaching Quality

Information and communication technology consist of prospects that can complement, improve and transform education at the same pace with the rapid global development, some of the prospects of ICT includes; facilitation of universal access to education, closing the earning divides, improving capacity of teachers, enhancement of quality and relevance of earning, promotion of inclusion, and improvement of education administration, governance and lifelong opportunity for everyone as enshrined in the sustainable development goals (Yusuf, 2005; UNESCO, 2015). Odegbesan, Ayo, Oni, Adeoba, Okezie and Udenwagu (2019: 5) summarize this by spelling out certain prospects of information technology in education with "emphasis on the transformation of skill and knowledge acquisition and delivery mode from the traditional physical method to blended and distance learning method. The Qingdao declaration further captured the effect of advances in ICT and rapid expansion internet connectivity on the global system, hence rendering knowledge and familiarity with ITT an essential for everyone". Suryani (2010: 108) opines that "the development of ICT is rapidly replacing the traditional teaching pedagogy, with examples such as decrease in face to face interaction and gravitation to online communication, move away from traditional white or blackboard to interactive smart boards and books and other printed research materials are sourced through online library and archive systems. The promising nature of the inscription of this migration in some climes and integration in others, it can be assumed that technology can bring education sector from the traditional age to the information age, thus presented with the possibility of matching the pace of global development in its entirety".

Historical depth into literature have shown "a pattern of agreement on the necessity of ICT integration into education, within the scope of these submissions is the potential to accelerate, enrich and deepen skills to engage and motivate learners, blend school experience to industry indices, create solution-based learning for new industry recruits and also important is the improvement of the educational system for sustainable socio-political and economic solutions and development" (Yusuf, 2005: 319). Summarily, "education, like other sectors have been grossly affected by the rapid advancement and infusion of ICT, hence impacted teaching, learning and research; ICTs provide educators, learners and the institutions with pool of opportunities in adapting learning and teaching to individual needs" (Ratheeswari, 2018: 46). Furthermore, to properly harness the strength of ICTs, certain conditions, according to Ratheeswari (2018: 47) wield be checked, these conditions includes; "sufficient access to digital technologies and internet connectivity in classrooms and other learning environments; creation and proliferation of adequate, evocative and culturally responsive content for use of educators and learners; and also, adequate knowledge and skills for teachers and educators to access and use digital tools and resources to improve the academic standards of students".

ICT improves "the delivery of education by teachers and educators so that learners can have unrestricted access to knowledge. It has the potentials to transform both teaching and learning model, as has been evidently recorded in many nations of the world. As well as the administrative aspect of educational sector which involves management and disbursement of material and intellectual resources for the purpose of academic development across all levels

of education; besides, many constraints are also eliminated by the infusion of technology in education, a germane one is that which faces learners with special needs" (Osakwe, Dlodlo & Jere, 2017: 21). Other areas this author highlighted as improvements of ICT in educational sector includes; enhancement of teaching and learning process, improvement of quality and accessibility of education, enhancement of learning environment, improvement of research and promotion of interest in education and other scholastic performances.

Also examining the practicality of ICT in education, especially for areas where it has been completely or optimally integrated into the school system, Yusuf (2005: 320) identified ICT as" a tool catalytic for the daily activities within, between and among schools. Examples are drawn from opportunities for schools to communicate with one another using electronic mailing system, chat rooms and in recent times, social media. Also, like the first example is the access and dissemination of research information, report and findings". Yusufs study dating back to the pre-new media age, was unable to capture the new opportunities that have been presented by the new media and technologies that now enable or facilitates educational and research activities at faster paces compared to what was obtainable in the early 2000s. Tatheeswari (2018), while contextualizing ICT in education, further strengthens the claim that ICTs enhances educational activities and also helps keep the pace with the latest developments with the help of growing technologies that emanate on daily basis. However, certain practical factors and ethos outlined by Tearle (2004) are essential for effective implementation of ICT in schools. These include management and coordination, the time availability of educators and learners, availability of technology, adequate training and on boarding. Part of this ethos, also includes the existing policy position of the school towards the use of ICT, for example, OECD (2001) pinpoints the necessity of change in the curriculum and organizational structure of schools noting that ICT is a revolutionary change that most sectors did not prepare for and in essence requires a complete switch from the traditional curriculum to a modern one.

3.7 Challenges of the Nigeria's National Information Communication Technology Policy

Nigeria's National ICT Policy initially made projections to transform the country in terms of information technology capability and relevance within the information society by 2005. Thereafter, the 2012 National ICT policy draft built on this foundation to transform Nigeria to a knowledge-based economy by 2020, with strategic plans to move Nigeria with ICT-led socio-economic policies to the other side of the global socio-economic divide (National IT Policy, 2001; National ICT Policy Draft, 2012). National ICT in education policy was predicated on the 2001 information technology policy and approved in 2010 in a bid to further focus on the digital transformation of the education sector, a policy that was reviewed and approved again in 2018 (National ICT in Education Policy, 2018). The assumptions of the policies, according to Njoku (2016) barely recognized the socio-economic standing of Nigeria but did not take into cognizance how the hurdles of existing divide in access and affordability of services would be crossed.

Additionally, specific challenges that Nigeria faces as a developing country also put the multisectoral ICT integration plan at a disadvantage. Some of these challenges are high illiteracy rates, infrastructural deficit, unstable power supply, inadequate political will, the sharp digital divide between Nigeria and the rest of the world, which mostly impacts on development and deployment of infrastructures, sectoral applications, orientation, research, and development (Etuk, 2015; Ndimande & Ndebele, 2017) . With a growing perception of global ICT application as the cornerstone for transforming countries to the knowledge-based economy as contained in the National IT policy, these issues put Nigeria far behind in the

global technology race. There has been an epileptic enhancement of ICT based learning and teaching management in Nigeria's educational institutions. This is evident in the stagnant position of the mode of delivery of knowledge and curriculum in the traditional setting. Among many factors that contribute to this drag is inconsistency of policy or curriculum peculiar to ICT integration in the Nigerian education system (Musa *et al*., 2018).

3.8 Information Communication Technology Policy Implementation in Universities Globally

Information communication technology has become the engine room of many sectors globally; it has become the launch pad for innovation and efficiency in a fast-changing world. ICT has become an indispensable to the education sector, as it has become catalytic to the naming process for students across board (Basri *et al*., 2018). There is a global convergence point that ICT is a critical element that amplifies learning experiences in higher education contexts. Chowdhury, 2019 cited in Woyo, Rukanda and Nyamapanda (2020: 14) attests to the fact that ICT "has great potential to support innovative pedagogies that are important in enhancing both instructors and learners' experiences". Furthermore, ICT policy implementation is exemplified in integration of digital technologies for all educational activities, ranging from administrative activities to academic service delivery. Lawrence (2015: 43) posits that "government and other stakeholders have invested finance, time and intellectual resources into adoption of ICT in the educational system since 2000s. Accordingly, many universities that have fully adopted and some who have oprationalized some aspects of it have recorded enormous improvements in form of sophistication in administrative and educational processes".

In a bid to align universities with the new pace of information dissemination and knowledge sharing, "there have been restructuring of computer centers and information technology division and also establishment of e-learning activities, all aimed at maintaining and increasing the use of ICT in universities teaching and learning practice" (Khasawneh, 2015: 176). A very important goal of this has been stated globally, which is to improve the teaching skills and practice among teaching staff and also enhance administrative efficiency. Elis and Loveless (2013) in a study emphasized the relationship between higher education pedagogy and academic achievement, while also indicating the place of improvement for the etching process. Innovation, especially the potentials of ICT in the educational process is thus reinforced by this emphasis. A similar thought along this line by Sari and Mahmutoglu (2013: 586) suggests that "change in teaching methodology in universities require paradigm shift from the norm". That is, "adoption of more user-oriented approaches, students being the users in context. By implication, this would put the student at the centre of the learning process as against the traditional passive stance that restricts them to guidance from the tutorial team" (Basri *et al*., 2018: 6).

While establishing the relationship between this paradigm shift in learning and educational technology, Chan, Bernal and Camacho (2013: 1043) emphasized the "indispensability of ICT in democratization of university education which would in turn equip new graduates with the necessary knowledge and skills to function in technological sophisticated world". In addition, "the utilization of information and communication technology infrastructures in universities have evidently transformed the position of students to a more active one and also improved the capacity of the educators in many climes" (Iniesta-Bonillo, Sanches-femandez, & Schlesinger, 2018: 166). While examining the integration of ICT into university system globally, units of analysis are majorly classified into two, which include its impact on teaching and learning. Kozma (2011) observed that many governments have been using the introduction of information communication technology to improve teachers' skills and also

enable them adopt new pedagogical principles in the classroom. An example is Enlaces programme in Chile registered participation from teachers who received two (2) years of face to face training which amounted to an estimated 100 hours of contact. As a result of this training, teachers got computer appreciation and use skills which allowed them to do some professional activities using computers, activities such as e-learning, professional up scales, etc., they also learnt to use computers for class management and out of class tasks activities like grading, report computation and generation, lesson planning and research.

In 2003, the Ministry of Education in Jordan announced some key policy shifts which further transform the education outlook and output of the country. These are captured within the government's intended education reform programme, some of the major shifts' dwells on ICT integration for education and learning purpose, these according to Kozma (2011) includes: (i) utilizing technology as an integral part of the education and learning process and as a tool to support/enhance learning, thereby enabling the effective and rapid acquisition of knowledge and skills for the new knowledge economy requirements and (ii) utilizing the high-speed broadband learning network to provide increased access to learners at lower costs, reducing maintenance and administrative costs of technology in education and extending the life cycle of technology through re-use of older computers as thin-client terminals in schools. The policy captures goals of similar policy documents across the globe, as the potentials of information communication technology is highlighted and projected to transform the education sector with emphasis on secondary education in Jordan.

Even though integration of information and communication technology into teaching and learning is considered means for various approaches and other pedagogical principles to be effectively implemented, Ajegbelen (2016: 4) affirms that "its role as teaching aid is somewhat complicated as it demands more specific skills from the teachers. Buttressing this point, technology acceptance into education varies by so many indicators. Using a macro-level of analysis, economic distribution of countries can be used from the perspective of access and – affordability". Bingimilas (2009: 236) expatiates further on this by noting that "the use of ICT in enhancing students' learning and creativity in developing countries is limited to certain identified barriers, these include both institutional and individual level barriers. These barriers are yet to be identified as factors that higher education student assume to be factors that affect adequate implementation of the national ICT policies in higher education". Further breaking down to a micro-level of analysis, it may include domestication of ICT in university systems and other paraphernalia that accompanies the process (Kozma, 2011). Ajegbelen (2016: 5) further explains the challenges that may impede the adoption of ICT within the school system, which ranges from "synchronization of the prescribed tools or new technologies with the existing curriculum to training of the educators who are going to be directly using the technologies".

3.9 Information Communication Technology Policy Implementation in Western Universities: United Kingdom

Information communication technology policy development in "the United Kingdom usually follows a top-down model of policy making. It is initiated by the Strategic planning unit of the Cabinet office; this office is saddled with responsibility of articulating the ICT policy visions, mission and objectives of the United Kingdom" (knapper, 2016: 109). The procedure seems overwhelmed by bureaucracy, but it appears to be a functional means to align all the United Kingdom policies towards the central goal of national growth before passing it down to cabinet offices and other parastatals that implement these policies. As contained in the reports of Association of European Universities in 1996 and 1998, there was a lack of clear

established strategies to provide a blueprint for the integration of sophisticated technologies into teaching and learning. Furthermore, in the report, there are several experiments going on in many universities, but these activities are mostly disconnected from the institutional framework in which they are existing (CRE, 1996; CRE, 1998). Also like it exist in other countries; the CRE (1996) observed that both academic and administrative officers in universities resist the use of ICT, for reasons that may not be far from inadequate knowledge and skills.

According to Vander, Wende & Beerkens (1999: 286) "ICT implementation in universities in the United Kingdom have long been prioritized by the government, with history dating as far back as 1992 when the Teaching and Learning Technology Programme (TLTP) was launched by the Universities Funding Council (UFC), the main target of this initiative was to improve the efficiency and productivity of teaching and learning by articulating the opportunities presented by contemporary technology and the initiative aimed to improve the capacity of institution in responding to the rapidly growing number of students and to maintain maximum educational service delivery".

3.10 Information Communication Technology Policy Implementation in Ghanaian Universities

According to Acquah (2012: 28) "educational programmes and curriculums often require intellectual quality improvement amid rapid expansion in knowledge. These kinds of expansions have been linked to infusion of information communication technology into education for improved teaching and learning quality and on a larger scale socio-economic development of countries. The Ghana ICT for Accelerated Development (ICT4AD) Policy 11003 cited in Acquah (2012: 33) clearly concretized the place of Ghana in the new emerging economic order, by identifying information and knowledge as the fundamental grounds for wealth creation and national development. Similarly, the 2008 ICT in education Policy of Ghana established the important of improved educational delivery to the intended socio-economic development of the country. Also acknowledged in the policy document is the perception held by both developed and developing countries that ICT has huge capacity to influence process of knowledge dissemination; knowledge acquisition; effective learning and the development of more vibrant education sector (ICT in Education Policy of Ghana, 2008).

Peprah (2016: 10) acknowledged the "inevitability of ICT to Ghana's social, political and economic growth by emphasizing the need to my ICT in education accessible for everyone". Serving as a foreground to this, is the observation of Mangesi, 2007 cited in Peprah (2016: 18) which identified the "investment of Ghanaian government into ICT, through concentrated resources and sectoral policies that seeks to make Ghanaian education sector a competitor in the advancing information age". Dei (2018: 3) also acknowledges "the implementation of ICT policies in universities in Ghana in a study that covered four major universities, namely; University of Education (UEW), Kwame Nkrumah University of Science and Technology (KNUST), University of Ghana (UG), and Ghana Institute of Management and Public Administration (GIMPA), however, certain challenges according to the author impedes the e-leaning aspect of ICT in education in some universities, and these includes but not limited to inadequacy of trained hands, lack of motivation among lecturers to blend electronic learning and physical training programmes, difficulty synchronizing the traditional curriculum with technology enhanced education delivery, poor financing for the acquisition end maintenance of ICT infrastructure, etc., it is thus clear that despite the early attempt to create policies that will integrate ICT into education in Ghana, education at the tertiary level still suffer array of

setbacks in implementing the policies, especially in areas of integration of ICT into curricular activities".

3.11 Information Communication Technology Policy Implementation in Jordanian Universities

Since education is a key indicator of modernity in the global system, "Jordanian government has prioritized the development of the sector to improve its bountiful human resource and also make up for the inadequacy of other natural resources" (Alnoaimi, 2011: 56). "Several ICT adoption studies have been carried out in the developed world; different from this is the situation in the less developed countries, particularly the Arab region" (Khasawneh, 2015:173). There is a huge disparity in the adoption of technology globally, especially when the level of adoption in Arab region is compared to other countries in Europe and North America (Khasawneh & Stafford, 2008). Odufiwa (2012: 32) iterated "the efforts of higher institutions and universities in the world towards technological innovation in ways that include but not restricted to investment in efficient infrastructures to accommodate the increase in number of students and also improve high quality education. Additionally, Middle East education institutes have therefore prompted movements and university managements to consider new ideas that will enable ICT infrastructures in educational institutions".

Alkhawaja and Halim (2019: 488) described the "Jordanian higher education as one of the fastest mowing educational system in the Arab district. A particular reason for this is the decision of the Jordanian Ministry of Information and Communication Technology's decision to establish the nation's National Broadband Network to improve its status as a developing country in 2003. Following this action has been series of ICT programmes that have been aggressively directed towards improvement of the educational system, ensuring that it is decelerated to an electronic based one, such that is obtainable globally". Also worthy of mention is "the introduction of a new technology referred to as e-learning by the Open University in Amman in 2002. This innovation accelerated activities of both staff and students that require pedagogical and instructional support as well as improvement" (Al-Gahtani, 2016: 21). Also, Alkhawaja and Halim (2019: 489) further acknowledged that "ICT programmes aimed at improving the educational system and ensuring its full transformation into an electronic system have been established. These programmes were targeted at staff and student, which was mainly to train them to use e-learning systems with a bigger target of improving the quality of education. The lapses identified however can be traced back to the submission of Al-Mobaideen and Uk (2009: 16) which after acknowledging the early presence of "ICT in Jordan but blames the lateness in technology development and training as the reason for the slow pace of ICT implementation in the universities".

3.12 Information Communication Technology Policy Implementation in Namibian Universities

Ngololo, Howie and Plomp (2012: 6) affirm that "Namibia introduced its national ICT policy for education in 1999, and the policy was reviewed and reapproved with respect to certain dynamics in the year 2005. Drawing inference from the revised ICT Policy for Education 2005, ICT has been projected to decelerate service delivery in education and vocational training". According to Shafika (2011: 43) "Namibia was among the first African countries to develop a working ICT policy. He further explains that the policy's value proposition for investing in ICT integration includes the recognition that ICT have a role to play in education both directly as a subject and indirectly as tools to support educational delivery and management. In addition to ICT integration, the policy contains four other key distinct development areas for the use

of ICT in education and these include investigation and development of appropriate ICT solutions; deployment of ICT; maintenance and support of ICT and ICT literacy". Woyo et al. (2020) opined that, research even though research have measured the factors that could affect the perception of effective implementation of this policy in Namibia, it would be important to underscore the paucity of researches that focuses on the impacts of the ICT policy implementation in education.

It has been two decades since the introduction of the Namibian ICT policy in education, Osakwe *et al*. (2017) claim that there have been research-based evidences that the implementation is relatively slow. According to Adedokun and Shittu (2015: 187) "ease in teaching and learning, access to information and up-to-date resources, online interaction between staff and students, external engagements though exchange of academic researches general productivity are some of the advantages of ICT to teaching and learning according to students and lecturers." However, "the proliferation of ICT related equipment such as mobile phones, notebooks, to mention a few does not elevate the educational institutions from its disadvantaged position where they must struggle with inadequate ICT infrastructures" (Lowga, 2012: 97). This shows that the diverse developmental agenda of the national ICT policy in Namibia may have necessitated a wave of technological advancement on a general basis; it has however not amplified the integration and improvement of ICT infrastructure in the educational institutions. In addition to this, Ngololo *et al*. (2012) while agreeing to the inadequacy of ICT infrastructures in schools, further exposes another major challenge has to do with digital divide between urban and rural schools. Evidently, rural schools suffer more infrastructural deficit than the urban ones.

3.13 Theoretical Framework

For this study, Technology Organization Environment (TOE) Framework has been used to offer analytical explanations on ICT policy implementation and teaching quality in higher education. This model is most suitable because of its major thrust, which focuses on the influence of human action on technology and how it's either improves or decline quality depending on the technological artifact, acceptance and the environment where such technology exists. Technology Organization Environment model was developed by Tomatzky and Fleischer (1990) in their book, 'The Process of Technological Innovation'. The model has within its scope illustrates the factors that affect the adoption process of technology and its likelihood in the process by which organizations adopt and implement technologies and how this process is influenced by technological features, organizational contexts and environmental conditions (Tomatzky & Fleischer, 1990). In addition, Baker (2012) described the initial presentation of this model as one that captures the entire process of innovation, ranging from development of technologies to the adoption and implementation of such technological innovations by users within the context of an organization.

Technology Organization Environment is an organization-level model that explains how three different elements of a firm's context affects or influence its technology adoption decisions (Baker, 2012). As implied in the name of the model, the elements include technology, organization and environment. The technological context covers both the internal and external technologies that are relevant to the activities of the firm. This translates to how existing internal practices and equipment can be used alongside or integrated with available technologies external to the organization (Starbuck, 1976; Thompson, 1967 cited in Oliveira Martins, 2011: 114). Chimhowu, hulme and munro (2019: 77) concretized "the synergy of both internal and external technologies by postulating that a firm's existing technologies set the broad limit on the scope and speed of technological advancement such

firm can pursue. Consequently, available technologies that are not currently in use by an organization influences innovation especially in areas of evolution and adaptation through new technologies".

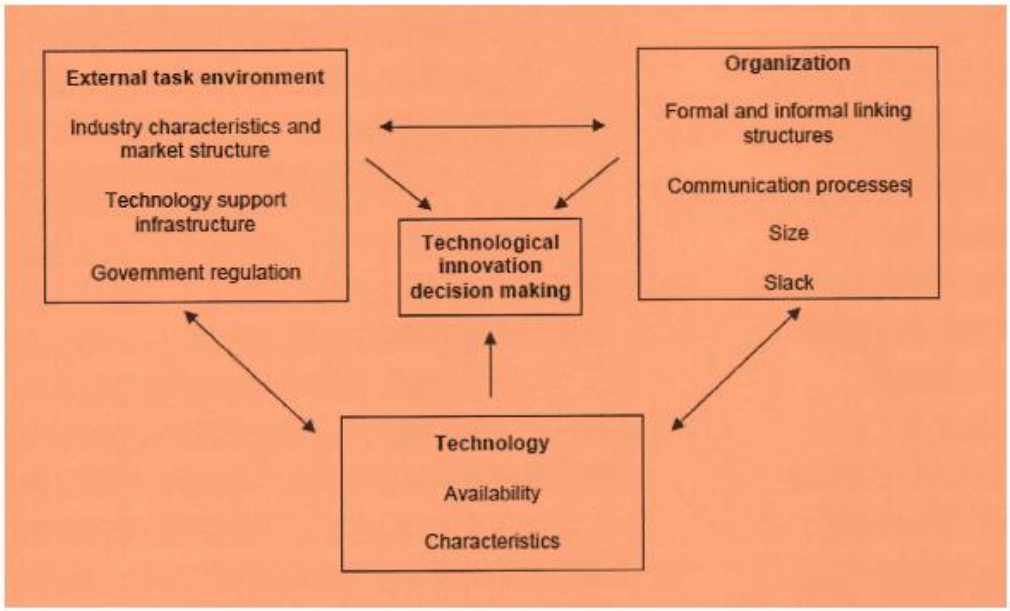

Figure 1 Technology Organization Environment Model

The organizational context consists of "the features and resources of the organization such as managerial support, organizational culture, organizational size, communication processes and pool of slack resources organizations possess; these factors play considerable role in the adoption of new innovations within organizations" (Luhamya, Bakkabulindi & Muyinda, 2017: 28). Diso (2005: 297) however identified "slack and size as the most discussed factors within the organizational context that affect innovation". Even though, Rogers (1995 cited in Baker, 2012) affirms the positive impact of slack resources on adoption of innovation, the proponents had earlier stated that slack is desirable and helpful for adoption but its inconsequential to the occurrence of innovation within the organization as other factors affect such process. The environment context consists of the industry structure, status of technology service providers and the regulatory frameworks. Another important point of convergence in research pertaining to the environmental context is the intensity of the competition within the industry can enhance adoption of innovation (Mansfield, 1968; Baker, 2012). Dealings with government also largely determine "technology innovations, especially in areas of regulation, policies, legislations and other paraphernalia that characterize government procedures. Government regulations can either benefit or deter the process of technological innovation" (Oliveira & Martis, 2011: 117).

3.14 Application of Model to Study

Technology Organization Environment model is "a generic framework because of its flexible applicability in different areas" (Zhu & Kraemer, 2005: 69). Ajadi (2010) supports this notion because of the synergistic nature of the model when used to explain different entities. Additionally, the freedom and flexibility to adopt the framework into different research contexts makes it highly adaptable. For this study, the model best captures the place of technology implementation within the university systems with emphasis on host of factors that exist within the framework and are present within the university and its immediate

environment. The technology context explains the existing technologies that seek to improve the teaching quality of the universities; it also compares these internal technologies with what is currently obtainable within the technology industry and their possible improvements for educational technology. According to Etuk (2015: 220) "educational technology has become indispensable in higher institutions with an accelerated demand for access and utilization. This is because universities now exist in an environment where they must function within an ICT framework that enhances administration, communication, research and most importantly teaching and learning".

The technological context of this model emphasizes the inseparable nature of certain factors to teaching quality, factors such as ICT technical infrastructure, ICT ready lecturers, internet penetration and bandwidth, to mention a few. Thus, "the technical competence or readiness of an institution remains the key indicator for incorporation of information communication technologies as it highlights the relevance of such digital innovations to the academic practices, especially ICT technical infrastructure that seeks to improve teaching quality" (Piszczek et al.2016: 11).

The organizational context illustrates the existing structure of the universities, readiness to adopt innovations in line with the mandate of the national information communication technology policy, which is to adopt and integrate ICT into the mainstream of education to be globally relative and competitive in the fast pacing technology age. It provides a framework to measure the impact of the managerial status, ICT skills and literacy of the users. That is, the lecturers, administrative staff, etc., of these institutions on implementation of information communication technology for educational development. Scott, 2007 cited in oyetimi (2020: 6) further emphasized this by amplifying the place of organizational culture, which covers the institution's sense of identity, core values, internal practices and how they impact the goals of the institutions. This means that improvement of teaching quality largely depends on environmental context that focuses on policies and government regulations; this model provides necessary backing to the systematic explanation of how environment input and output determines the workability or implementation of ICT policies for desired teaching outcomes in universities. Universities do not exist in isolation; they are bound by certain regulatory framework that makes practices in one not so distance from another (Osakwe *et al*., 2017). The environmental scope of this model, being majorly concerned with the structure of the industry, availability of technology service providers and regulatory environment thus emphasizes another factor that may influence the quality of teaching in universities (Anyu, 2007; Baker, 2012).

It is however pertinent to note that government regulations can either be beneficial or not to technological innovation, this according to Amunden and Wilson (2012: 106) can appear in different forms but in the situation of integration into education, it can appear in areas such as curriculum uniformity and preference of tools which may all be introduced to maintain a level of uniformity in the education service delivery across institutions and all levels of education in the country. It is needful to also mention the other factors that make up the environmental context such as organizational characteristics, market scope, competitive pressure, and technology support infrastructure (Luhamya *et al*., 2017). For teaching and learning, these environmental factors shape the acceptance and deployment of technology, even though some of the factors that have been identified in literature may not relate directly with educational sector, but organizational structure, technology support infrastructure and favourable regulatory policies are strategically essential for implementation of ICT for improved teaching quality (Baker, 2012; Luhamya *et al*., 2017).

3.15 Gap in Literature

First, existing researches on ICT policy implementation have focused on how the information technology policy have improved the ICT output and global competitiveness, with little reference to its functionality within the education sector, especially how it affects teaching quality in Nigerian universities. Tertiary education, considering its importance as the cornerstone of every country's human capital development records the most significant stages ICT integration in education. Many of these studies have also focused on analyzing the implementation process with minimal review of its objectives alongside the fast-changing world. The national information technology policy is a multisectoral policy document and at such cannot be assessed or reviewed in a holistic manner as it has appeared in many existing literatures, there is a need to break it down for effective sectoral analysis of its implementation to be able to assess its viability vis-a-vis global standard for ICT deployment in the educational sector, particularly the Nigerian education sector. Additionally, not many works have reviewed how the policy strategies have been executed by policy actors both outside and inside universities in Nigeria.

Researches on implementation of ICT policy in education have advanced to the stage of perception measurement, which changes the argument from that of whether it is being implemented or not but the perception of implementers and end-users on the pace of implementation. These researches are however not domiciling within the Nigerian context, as there is paucity of literature in areas of ICT implementation in universities. This study hereby expands the focus of ICT in education policy researches to go beyond length of existence and implementation but also to capture perception and readiness of the end-users. Also, previous researches have showed the flaws of the existing national information technology policy towards education but have not succinctly incorporated the other policies and programmes that are claimed to have been predicated on this policy, this will thus expatiate the relevance of information communication technology to education and carry out a review of how the existing policy has formed basis for integration of ICT into the education system. This will also examine the roles of universities in the implementation of the policy, thus examining the synergy between government and universities being primary implementers of the policy within the university system. In furtherance to this, other actors who have indispensable roles will also be brought to the forefront of the analysis. There has been identifiable inconsistency in the implementation of the ICT in education policies stated above, however references are barely made to the existence of the policies at different time. That is, 2010 and 2019 approvals but nothing has been said about the reason for the delay experienced in implementing this policy and its implication for the impact within the university system.

4. CONCLUSION

National information communication technology policy is viewed to hold a lot of potentials in developing countries by way of enhancing quality in the way and manner educational service delivery is carried out. Nigeria, like most countries seems have realized the potentials of information communication technology in quality and quantity of teaching, learning and research in educational institutions for the purpose of global competitiveness and securing global relevance in the information age. There however, appears to be an imbalance in the integration of information communication technology based solutions to challenges of education in Nigeria, with varying evidence of its presence in different institutions. The integration of information communication technology into education has been identified as a critical catalyst to achieving quality of teaching and learning across the globe and since

academic quality is the primary objective of Nigerian universities and this has been pursued traditionally for decades, it becomes important to source for role or outcome specific Technologies that can be used to substitute or improve the traditional teaching practices. Information communication technology, if properly implemented in Nigerian universities, would fortify educational systems, enhance knowledge proliferation, and improve the quality of teaching and learning. Based on the foregoing, this study recommends as follows:

1. Federal and states governments should intensify effort to invest more on information communication technology infrastructures such as internet connectivity, adequate power supply, learning and teaching management systems aimed at improving teaching quality in Nigerian universities.
2. National information communication technology policy on education should cover training and workshop to improve faculty and staff knowledge of ICT to adequately improved teaching quality in Nigerian universities.
3. The government should develop appropriate mechanisms to monitor and evaluate the effectiveness of ICT implementation in Nigerian universities, most especially the purchase and scheduled maintenance of ICT infrastructures.

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