International Journal of Advanced Academic Studies

Zainab Mohammed Abdullahi
Ph.D., Department of Library and Information Science, Modibbo Adama University of Technology, Yola, Nigeria

Abbas Adamu Lamido Gora
Department of Library and Information Science, Modibbo Adama University of Technology, Yola, Nigeria

Abubakar Mohammed
Department of Library and Information Science, Modibbo Adama University of Technology, Yola, Nigeria

New media technology in university libraries: Panacea for development of sustainable digital economy in Nigeria

Zainab Mohammed Abdullahi, Abbas Adamu Lamido Gora and Abubakar Mohammed

Abstract
The paper focused on new media technology in university libraries: panacea for development of sustainable digital economy in Nigeria. It dealt extensively on new media technologies such as web 2.0, library 2.0, social media, blogs, mobile technology as well as cloud computing technology; detailing how each of these are applied in library services. Digital economy which is also known as the Internet economy, new economy or web economy, is an economy that is based on computing technologies. It has been established that impact of knowledge, educational attainment and intensity of research and development results in economic growth. The concept of digital economy, research productivity, impact of new media on research productivity, impact of new media on digital economy, the state of digital economy in Nigeria as well as efforts made in adopting new media in Nigerian university libraries are discussed. Challenges of adopting new media in Nigerian university libraries were highlighted which include: poor digital literacy skills among librarians, poor ICT infrastructural facilities and shortage of funds among others.

Keywords: New media, technology, digital economy, research productivity, university libraries, Nigeria

1. Introductions
The emergence of 21st century has moved the world from the industrial age to the information age. The world now boasts of knowledge based economy where information is perceived as the fifth factor of production. This is brought about as a result of technological advancement, which is characterized by speed in creation, production, access, transfer, dissemination and use of information through new media such as web technology, mobile/ smart devices, telecommunication infrastructure, Internet, social media, etcetera. Information age epitomizes an era where position of countries, their power, wealth and influence depend largely on the extent and abilities to harness and utilize information for sustainable development in all sectors of economy.

Universities generally are established with the mission to expand and promote the frontiers of knowledge through provision of conducive atmosphere for teaching, learning and research and also to produce graduates who are worthy in character and learning, who can compete with their counterparts globally. They are citadels where researches are conducted by both the faculty and students in order to find solutions to the myriad of challenges bedeviling individuals, institutions, organizations, societies, nations and the world at large. They are centered toward knowledge creation and knowledge production for ultimate development of the society. To achieve these missions, university libraries are the key drivers, without which, teaching, learning and research cannot be facilitated. University libraries are fundamental in achieving these objectives as they are geared toward supporting their parent organizations. The core responsibilities of university libraries are to acquire, organise and disseminate information in all formats to lecturers, researchers and students with the aim of supporting and encouraging the generation of new knowledge through effective and efficient library and information service delivery.

The adoption of ICT by university libraries has led to globalisation of library services. It has changed the way and manner services are delivered regardless of distance. Such changes according to Krubu and Osawaru (2010) [15] are evident in computing technology, networking technology, communication technology, as well as mass storage technology.

Corresponding Author:
Abbas Adamu Lamido Gora
Department of Library and Information Science, Modibbo Adama University of Technology, Yola, Nigeria

They stressed further that, continuous devolvement of these technologies have reshaped the means through which libraries access, retrieve, store and disseminate variety of information to patrons. The continuous advancement of ICT has led to the launching of Internet, which connects computers and other devices across the globe. It is the largest network which is often regarded as the network of networks, connecting millions of devices such as computers, smartphones, tablets, Ipads, among others, around the world. Internet and other technologies have made it possible for people to connect, communicate, collaborate and share information regardless of their distance. The Internet proliferation and advancement in technology have made it possible for the development of new technologies popularly known as new media, which are regarded as the emerging technologies in the ICT world and have gotten wide popularity in libraries and their service delivery.

It is imperative for university libraries to keep embracing technology as they are developed especially new media such as web 2.0, Library 2.0, social media, blogs, mobile apps, cloud computing, among others, in order to provide current, quality and relevant information that would facilitate quality research among the users of the libraries. These researches would no doubt help the country solve its myriad challenges and join the global community toward participating in digital economy. Digital economy is an economy that is based on computing technologies. For these and other reasons, this paper examined new media technology in university libraries as panacea for development of sustainable digital economy in Nigeria.

2. Application of new media in university library services

New media are the types of media that have been developed for interaction, communication, collaboration and sharing of information in the contemporary world, which often rely on Internet network for utilisation. They arose as a result of advancement of ICT as well as subsequent development of Internet in the digitised world. Libraries being institutions that continuously embrace technology have found new media as vital tools for revolutionising their services. This became possible because of the digital nature of both librarians and the users especially in countries with developed economies. The new media used in university libraries include web 2.0, which has metamorphosed into Library 2.0, social media such as facebook, whatsapp, blogs, YouTube, twitter, wikis, etcetera; mobile apps, and lately, cloud computing.

1. **Web 2.0:** One of the major advancements of Internet is the development of Web 2.0, which is a technology that provides platform for people to interact, communicate, participate, add or edit contents via the Internet (Pachler & Daly, 2009) [21]. Ementa and Ile (2016) [8] described web 2.0 as an Internet-enabled web application which allows people to collaborate, get actively involved in creating content, generating knowledge and sharing information online. It provides a community-based web information services such as social media, blogs, wikis, among others that socially connect people and can facilitate information sharing, collaboration, communication among its users. Web 2.0 tools have greatly influenced the delivery of information services which include improved information sharing, information delivery and communication between librarians and users. Highlighting its impact in libraries, Hangsing and Sinate (2012) [12] stated that web 2.0 have made it possible for libraries to engage patrons in their activities and solicit for opinions, suggestions and feedbacks for improving information service delivery and this has since resulted in better utilisation of library resources. In addition, through their websites and portals, libraries have been able to expand their information services delivered to users for the ultimate aim of satisfying their information needs. Examples of web 2.0 include Gmail, google, wikipedia, library 2.0, etcetera.

2. **Library 2.0:** One of the major products of web 2.0 is Library 2.0, which is a technology that makes information available wherever and whenever the user wants to access and use it, provided that there is Internet connection. Thus, Library 2.0 can help libraries offer variety of services. Abedoh, Oyedum and Abifarin (2017) [1] refer to Library 2.0 as the application of interactive, collaborative and multimedia web-based technologies to web-based library services and collections.

3. **Social media:** Another important new media worth discussing here is the social media, which are powerful technological tools used for communication, and also for interacting, creating and sharing information, which are developed on the ideological and technological foundations of Web 2.0. The most popular social media used are Facebook, Twitter, Whatsapp, Skype, IMO, blogs among others. Social media can serve as an avenue that facilitates communication and collaboration between libraries and their patrons, which can allow sharing of ideas, aid users in information searching, promotion and marketing of information services as well as develop interactive reference service that operates as Frequently Asked Questions (FAQs), where users can ask and demand for information, while the library responds timely and accurately. A library can create a social media page and provide updates on the information services and resources available, interact with users, communicate and share and deliver information to the doorsteps of the users irrespective of their location. Penzhorn and Pienaar (2009) [23] stated that librarians in University of Pretoria in South Africa have so far adopted Facebook, wikis, Skype, YouTube, among others. In the same vein, Ezeani and Igwesi (2012) [10] revealed that both librarians and users in Nigerian academic libraries are increasingly using facebook, twitter, myspace, etcetera, to deliver and receive variety of information services, respectively.

4. **Blog:** Blog is another new media which is also regarded as a social media but very significant in libraries. It is created and used in promoting library services such as announcing new acquisitions, online discussions and enlightening patrons about the programmes and schedules of the library. Librarians can explore the opportunities availed by this technology in sharing information and allow patrons to share their views on issues pertaining to how information services could be delivered efficiently and effectively. It is also an effective tool for promoting and marketing of library products and services.

5. **Mobile technology:** Information services can as well be delivered through the use of mobile technology,

especially, smart phones and tablets to access library services by users through library websites, web search engines, social media, Wi-Fi and the Internet. With mobile technology becoming more popular than computers and other technological devices, a user can pop into the library's website and databases remotely and access information needed without physically coming to the library environment. Mobile applications installed can give librarians the opportunity of uploading information contents and offer series of services to users. Smartphones are being used by the users for accessing information services for fast and easy communication.

2.1. Cloud computing

Another emerging technology in libraries is cloud computing. Cloud computing according to Misra and Mondal (2010) [18] are collection of disembodied services which are accessed from any location through computer or mobile device provided that there is Internet connection. Even though this technology is not yet popular in Nigerian university libraries, it has helped libraries in developed worlds to offer variety of their services online. It can also offer users an alternative means of accessing library service from their homes or offices. This can be accessed through smart phones, PDA's, computers etcetera. As libraries battle with dwindling funds, librarians could take the opportunities availed by this technology by storing their resources in the cloud. This could facilitate multiple access to information and make information services cheaper and faster to users. Libraries can keep track of the latest available literature on different subjects as well as enable one to retrieve information from anywhere virtually. Cloud computing can also improve the level of management and service of library network information and reduce the cost of management and services (Assuncao, Calheiros, Bianchi, Netto & Buyya, 2015) [4].

3. The concept of digital economy

Digital economy which is also known as the Internet economy, new economy or web economy, is an economy that is based on computing technologies. In this kind of economy, people and organizations are able to interact, communicate, collaborate and search information on global platforms through digital networking infrastructures (Fournier, 2014) [11]. According to Rouse (2017) [25], digital economy is an economic activity as well as economic transactions carried out via information and communication technologies (ICTs). According to Mesenbourg cited in Wikipedia (2017) [28, 29], digital economy constitutes of three major components; e-business infrastructure which consist of hardware, software, networks as well as human; e-business which entails how organizations and companies conducts businesses over communication networks; and e-commerce which entails transfer of goods from one location to another. Digital economy provides opportunities for government, private organizations and individuals to use technologies and perform task that were hitherto impossible to execute better, faster, more reliable and more efficient. Nation's growth and developments have shifted from infrastructural development to economic developments and advancement, such as manufacturing, retail, transportation, financial services, education, healthcare, media, job creation and growth in Gross Domestic Product (GDP), among

others, through technology.

The benefits of digital economy according to Organisation for Economic Co-operation and Development (OECD) (2013) [20] lies in emerging digital industries and increased productivity through variety of digital technologies, which in the long run has great impact on broader economic growth. The emergence of digital age has ushered in great changes in the ways and manner information is made easily available and accessible to users through new media tools and technologies, which have no doubt played positive impact in research productivity of faculty and researchers in universities. Qu, Simes and O'Mahony (2016) [24] states that, research and development, as a major component of knowledge capital, can be a source of significant domestic technological change.

Global economies heavily rely on digital technologies such as new media for growth; this is why developed countries such as United States, United Kingdom, China, Germany, Japan, among others, are the biggest economies and world powers as a result of adoption of digital technologies in all their economic sectors. These technologies have resulted in increase in productivity of goods and services, heavily rely on information for production growth, increased in exports of goods and services, job creation, growth in Gross Domestic Product (GDP), and improved quality of life. Countries such as Brazil, India, South Africa, Malaysia, etcetera, are drifting towards joining the league of biggest economies for their productivity of goods and services. These countries have since embraced digital technologies in all spheres of their national lives. For example, India is rated among the best in terms of information and communication technology (ICT) and this has led to explosion of industries, which harness information products and services in the country.

4. Research productivity in universities

Research plays an important role in the growth and development of a nation. The quality of education of a nation is measured by the quality of researches emanating from its universities. They provide avenues for overcoming professional problems; develop the means for analysis of organisations, services and behaviour. Highlighting the significance of research productivity to the society, Ugwuona and Dike (2015) [27] maintained that, research provides translation of knowledge into technologies, interventions as well as strategies effectively and appropriately delivered to those who need it. What this emphasised is that research can make society adopt technology and improve the standard of living of the citizens. The extent of research activities depends on the current, quality and relevance of information resources at their fingertips. Qu, Simes and O'Mahony (2016) [24] state that, research and development, regarded as the key of knowledge capital, can serve as a source of significant domestic technological change. It can also lead to development of technologies that can be used in production of goods and services, and enhance productivity in organizations, institutions and the nation at large. Creswell (2008) [6] reports that research do not only help to solve practical problems and bring about material improvements, it also provides insight into new ideas that improve human understanding of various social, economic and cultural phenomena.

5. Impact of new media on research productivity

Researchers depend largely on information in order to carry out researches especially in this era of information explosion. New media availability and effective usage can help libraries provide current, quality and relevant information that would enable academics, researchers and students conduct impactful research in the fields of science, technology and engineering among others. Studies have shown that new media enable librarians to deliver needed information faster at the doorsteps of users regardless of distance. For instance, Penzhorn and Pienaar (2009) [23] stated that librarians in University of Pretoria in South Africa have so far adopted facebbook, wikis, Skype, YouTube, among others. In the same vein, Ezeani and Igwesi (2012) [10] revealed that both librarians and users in Nigerian academic libraries are increasingly using facebook, twitter, myspace, and etcetera, to deliver and receive variety of services, respectively.

6. Impact of new media on digital economy

New media as part of ICT contributes immensely to GDP growth, improve market competiveness of a nations products and services, improve standard of living, and narrow digital divide (Bello & Aderbigbe, 2014) [5]. According to Massachuset Institute of Technology (MIT) (2015) [17] research, companies which earns fifty percent (50%) or more from digital economy are likely to have higher profits than others. The implication of this is that, companies who fail to adopt digital economy are likely to earn less profits, and this could consequently lead to their extinction.

Academic research conducted by academics and scholars can translate knowledge into technological innovation, creativity and ideas. With these, the society can be able to develop technology for e-health, e-learning, e-business, e-commerce, e-governance among others. This development can lead to improvement in standard of living, provide more employment opportunities, and enhance production of goods and services, among others. Studies such as Kuo and Yang (2008) [16] revealed that research and technology adoption are the major areas that significantly contributes to the economic growth in China. Sterlacchini (2008) [26] showed that impact of knowledge, educational attainment and intensity of research and development results in economic growth of European regions. Also, Jin (2009) [13] revealed that research and productivity caused economic growth in Korea and Taiwan. In Pakistan, Khan and Khattak (2013) [14] suggested improvement in research and development in order to develop a sustainable economy. In Nigerian context, Agwu, Atuma, Aigbiremolen and Iyoha (2014) [3] emphasised that ICT was the driving force behind the fast rate in the growth of Nigerian economy.

7. The state of digital economy in Nigeria

Recent indices have indicated that Nigeria and other African countries are still lagging behind in an effort to achieve digital economy. The World Economic Forum's Networked Readiness Index (2016) [29] rated Nigeria at 119th as of 2016, based on adoption of ICT into the economy. This index has also rated country's network readiness; including policies that enable countries integrate ICT into their economy. South Africa which was rated the 1st in Africa is placed at 65th in the world, while Kenya occupied 2nd in Africa and 85th in the world. This index has showed that a lot need to be done in an effort to bridge the digital divide in the country and achieve digital economy.

In an effort to launch the Nigeria into the league of nations with biggest digital economy, the Nigerian President, Muhammadu Buhari had on 28th November, 2019 approved the change of name of the former Ministry of Communication to Ministry of Communication and Digital Economy. In addition, the government had highlighted that the digital economy sector could contribute more than 45% of the country's GDP by the end of 2020 and also increase the broadband penetration rate to 50%. It is on this premise that the Ministry had introduced eight development pillars upon which the National Digital Economy is anchored. These include: developmental regulation, digital literacy skills, solid infrastructure, service infrastructure, digital service development promotion, soft infrastructure, digital society and emerging technologies, and indegeneous content development and adoption (Pantami, 2020) [22].

8. Efforts made in adopting new media in Nigerian university libraries

Nigerian higher education has in the last two decades witnessed the adoption and application of new media. They have provided platforms for accessing and utilising information to enhance research productivity across faculties. These opportunities availed by new media can enhance information search of lecturers and students in the nations university libraries, and in turn, implementing the research findings, can help facilitate growth and development in all sectors of the economy. Okiki (2012) [19] maintained that, to ensure Nigerian lecturers get access to the e-resources especially online databases, the National Universities Commission (NUC) and Electronic Information for Libraries (eifl.net) have in the past partnered for the purpose of providing e-resources for lecturers to aid their teaching, learning and research activities. Egbe (2014) [7] further reported that, the National Information Technology Development Agency (NITDA) was in the process of developing ICT in Nigerian tertiary institutions, by establishing virtual libraries and making donation of computers and Internet facilities.

9. Challenges of adopting new media in Nigerian university libraries

Despite the advantages offered by new media in libraries and the society in general, studies have shown that librarians in Nigeria are not taking these advantages of exploring the digital world, but, still operate library services manually. Emiri (2015) [9] in a study revealed that librarian's level of digital literacy skill is low amongst other findings. The implication of this study as well as other similar studies is that majority of librarians in Nigeria are not technologically inclined to operate with the emerging technology trend perhaps due to the non-availability, inaccessibility, under-utilisation, and lack of skills to operate new media in their libraries to deliver effective and efficient information services to their patrons. Studies have established that, funding and lack of ICT infrastructure as the major drawbacks in Nigerian libraries.

10. The way forward

Based on the challenges highlighted above, the following are recommended as the way forward:
1. Librarians in Nigerian universities should be

encouraged to acquire digital literacy skills so as to be able to operate new media in this digital age.

2. University administrations should provide an enabling environment where new media can be adopted in the university libraries.
3. University libraries should ensure availability, accessibility and utilisation of new media infrastructure in all information services to users.
4. NUC and university administrations must work toward increasing financial allocation to university libraries in order for these to function effectively.

11. Conclusion
The 21st century has given birth to technologies including new media which are applied in university libraries for transforming services rendered to users. It has been established that these new media help in providing current and relevant information to academics, researchers and students in universities thereby facilitating quality research emanating from the universities. Such researches can help the country achieve a lot in terms of development, thereby leading to sustainable digital economy. However, Nigerian university libraries are still lagging behind in adopting new media technologies as a result of low digital literacy, poor ICT infrastructure and insufficient funds, among others.

12. References
1. Abedoh G, Oyedum GO, Abifarin PF. Use of web 2.0 tools as panacea to effective service delivery in the 21st century librarianship. Presented at NLA Niger State Chapter annual conference held at Bida, Niger State 2017.
2. Adeyemi JA, Awojobi EA, Osisanwo TA, Appah HD, Ezeudu BO, Aghama EO. Information society in Nigeria: The role of government and private sectors. Kuwait Chapter of Arabian Journal of Business and Management Review 2014;3(7):85-100.
3. Agwu ME, Atuma O, Aigbiremolen OM, Iyoha F. The Impact of Information Communication Technologies in the Strategic Management of Financial Institutions. International Review of Management and Business Research 2014;3(3):1588-1602. www.irmbrjournal.com
4. Assuncao MD, Calheiros RN, Bianchi S, Netto MAS. Buyya R. Big data computing and clouds: Trends and future directions. Journal of Parallel and Distributed Computing 2015, P3-15.
5. Bello OA, Aderbigbe FM. The role of ICT in national development and poverty alleviation. IMPACT: International Journal of Research in Engineering & Technology (IMPACT: IJRET) 2014;2(5):275-284.
6. Creswell JW. Educational research: Planning, conducting, and evaluating quantitative and qualitative research, Upper Saddle River, New Jersey; Columbus, Ohio: Pearson Education, Inc 2008. http://www.aare.edu.au/08pap/bai08493.pdf.
7. Egbe NG. An exploration of sources of funding ICT in Nigerian academic libraries 2017. www.negbe.blogspot.com.
8. Ementa CN, Ile CM. Business educators, awareness and adoption of web 2.0 technologies for educational instruction in tertiary institutions in South East Nigeria, International Research in Higher Education 2018;1(1):23-29. www.irhe.sciedupress.com
9. Emiri OT. Digital literacy skills among librarians in university libraries in the 21st century in Edo and Delta States, Nigeria, International Journal of Scientific & Technology Research 2015;4(8):153-159.
10. Ezeani CN, Igwesi U. Using social media for dynamic library services delivery: the Nigerian experience. Library Philosophy and Practice 2012;814. http://www.digitalcommons.un/edu/libphilprac/814.
11. Fournier L. Merchant sharing towards a zero marginal cost economy. Quantitative Finance 2014;4(2):19-21. arxiv.org>q-fin>arxiv:1405.2051
12. Hangsing P, Sinate L. Use of web 2.0 in academic libraries in India: a survey of central university library websites 2012. http://www.lab.org.bd/4.pdf.
13. Jin JC. Economic research and economic growth: Evidence from East Asian economies, Journal of Asian Economics 2009;20:150-155. http://dx.doi.org/10.1016/j.asieco
14. Khan J, Khattak NUR. The Significance of Research and Development for Economic Growth: The Case of Pakistan, City University Research Journal 2013;17(5):86. http://www.cityuniversity.edu.pk/curj/Journals/Journal/Article%203.pdf
15. Krubu DE, Osawaru KE. The impact of information and communication technology (ICT) in Nigerian university libraries, Library Philosophy and Practice 2010, P1-10. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1614&context=libphilprac.
16. Kuo CC, Yang CH. Knowledge capital and spillover on regional economic growth: Evidence from China, China Economic Review 2018;19:594-604. http://dx.doi.org/10.1016/j.chieco
17. Massachuset Institute of Technology (MIT). Sloan Management Review. MIT research: Thriving in an increasingly Digital Ecosystem 2018. https://sloanreview.mit.edu/article/thriving-in-an-increasingly-digital-ecosystem/
18. Misra SC, Mondal A. Identification of a company's suitability for the adoption of cloud computing and modeling, its corresponding return on investment. Mathematical and Computer Modeling 2010;53:504-521.
19. Okiki OC. Information literacy skills and availability of information resources as factors influencing research productivity of academic staff of federal universities in Nigeria, An International Electronic Journal 2012. http://www.iiste.org.
20. Organization for Economic Co-operation and Development (OECD). Measuring the internet economy: A contribution to the research agenda. OECD Digital Economy, 226, OECD Publishing 2013.
21. Pachler N, Daly C. Narrative and leaning with web 2.0 technologies towards a research agenda, Journal of Computer Assisted Learning 2009;25(1):6-18.
22. Pantami IA. National Digital Economy 2020. http://www.ecofinagency.com/telecom/0110-41883-digital-economy-to-contribute-up-to-45-of-gdp-2020.
23. Penzhorn C, Pienaar H. The use of social networking tools for innovative delivery at the University of Pretoria. Innovation 2009;36(1):66-77.
24. Qu J, Simes R, O'Mahony J. How do digital technologies drive economic growth? JEL

classification, O40, O47 2016.

25. Rouse M. Information society 2017. http://whatistecharget.com/definition/informationsociety

26. Sterlacchini A. R&D, higher education and regional growth: Uneven linkages among European regions, Research Policy 2008;37:1096-1107. http://dx.doi.org/10.1016/j.respol.2008.04.009

27. Ugwuona CS, Dike VW. Relationship between library resources and research productivity in five Nigerian health-based research facilities. Library Philosophy and Practice (e-journal) 2015;1267. http://digitalcommons.unl.edu/libphilprac/1267

28. Wikipedia.com. Information society. http://wikipedia.org/informationsociety

29. World Economic Forum. Global Information Technology Report: Networked Readiness Index 2016. http://reports.weforum.org/global-information-technology-report-2016/economies/#economy=NGA