



Motivation: Adoption of an online voting system for the upcoming Nigeria General Election 2023

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Abstract

Nigeria general elections apparently had been experiencing a high level of irregularities, inconclusiveness and less involvement in its electoral processes right from 1999-2019 due to lack of implementing an online voting system (OVS). There is no contradiction that technology has drastically reduced incidences of electoral malpractices such as: ballot stuffing, result sheet mutilation, manipulations, over voting, alteration of result sheets and hijacking of ballot boxes in the history of Nigeria elections. Though the Independent National Electoral Commission (INEC) has employed a number of innovative approaches to improve the management and conduct of elections in the country. The last few years have brought a renewed focus on to the technology used in the voting process. The current voting system in Nigeria has many security holes such as failure of card reader among others. This paper provides an overview on the past technologies being adopted for voting in Nigeria since 1999-2019 and proposed an adoption of an OVS in Nigeria for the 2023 general election and ascertain success to review of other countries that have adopted OVS; the adoption success is based on implementation of OVS adopted at the international level.

Keywords - INEC, OVS, Nigeria, 2023 General election.

1.0 Introduction

One of the most dramatic changes to our way of life over the past fifty years has been the widespread proliferation and use of digital technology. Today many people buy their groceries, pursue relationships through dating sites, conduct their banking, watch movies or shows, work remotely, and communicate using forums or applications that rely on the internet.

Tasks such as voter strike-off at the polls, changes to poll books, the administration of oaths, the casting of ballots and ballot tabulation are done manually. If the internet can be used to promote transparency and accountability in other government institutions, can the same be true for Nigeria's 2023 general elections?

Democracy in every society is very important not only because through it a change of leadership is effected but also because voting is the main form of political participation for most people. For democracy to be sound, it should be anchored on election free from fraud. Democracy thus, encourages individual freedom according to the rule of law, so that people may behave and express themselves as they decided. This not only gives people a chance to choose their leaders, but also to freely express their views on issues.

Voting is a means of selecting or choosing leaders, it does not apply only to higher institutions of learning, associations, and social organization but also in local government, states and federal government of Nigeria.

Voting in Nigeria has long been a challenging democratic process. It is natural for man to always seek for easier ways to carry out processes. As far back as from 1999, after the military regime; the elections had been conducted manually until 2015 (Omolaye, Daniel & Orifa, as cited in Enoch and Saturday, 2017) and it has resulted to non-credible elections; even though it has always been termed free and fair election (Ahmad, Abdullah & Arshad, 2015). There had been

high level of rigging, large differences between eligible voters and accredited voters. It has resulted to advocacy for the use of e-voting system by policy makers in the country; in order to check transparency, integrity of the electoral process and the likes (Ahmad *et al.*, 2015). OVS can be termed as internet voting system (i-voting) and they are all part of e-voting since it inculcate the use of software and hardware.

According to Ahmad *et al.* (2015), it is necessary to point out the loopholes in our traditional voting system which has been the reason for the exploitation of our electoral processes by partisans and mischief politicians; which means that it lacks transparency, accountability, free and fair play.

Europe and America, have been on the top in the use of i-voting in electoral process (Ahmad *et al.*, 2015).

Nigeria has indeed seen the need for alternative method to carry out the electoral processes; that is why introducing Information Technology was raised (Onu&Chiamogu as cited in Ahmad *et al.*, 2015). E-voting has been projected as a better way to achieve good electoral process and to avoid thuggery, violence, etc. Thus, it has some potential advantages over the traditional method that has been in practice. It has been proven to be more safe, better security and robust; also reduces substantial errors (Ahmad *et al.*, 2015). Statistics Canada (2008) opines that Information and Communication Technology (ICT) is a field of work and study that includes technologies such as the desktop and laptop computers, software, peripherals, and connections to internet primarily for information processing and communications functions. The usage of OVS in election can eliminate the incidents of multiple registrations, which had been one of the main political tools for rigging elections by unscrupulous and savage elements (Ejikeme, 2015).

E-voting is more convenient and thereby encourages citizens to vote wisely which is a problem with the traditional method (Kozakova as cited in Ahmad *et al.*, 2015). Its efficiency and effectiveness cannot be over-emphasized; which has helped to organize electoral processes with cost effectiveness. Some level of accuracy, and verification process is can be achieved with this method (Abu-Shanab, Knight & Refai, 2010).

E-voting is a voting process where electronic technologies are used. For a good measure of legitimacy of a state and its relationship with its citizenry. That is guided by the rule of law, e-voting is an accepted method (Brown as cited in Ahmad *et al.*, 2015).

The idea of sourcing for an alternative method is to achieve a representative of the people's voice; and so a large number of electorates is needed which will depict an effective voting system (Olaniyi, Adewumi, Oluwatosin, Bashorun & Arulogun, 2011).

E-voting and I-voting systems has been in use in developed countries such as Switzerland, Canada, Australia, Estonia etc. and other developing countries like India, Brazil (Goldsmith & Ruthrauff as cited in Enoch and Saturday, 2017). However, the choice of a voting a system is very crucial and sensitive since it poses the risk of losing trust and confidence on the system of the citizenry (Hall, 2012).

In Nigeria, the transition from traditional method of the electoral process to partial e-voting obviously facing a lot of challenges. It is important to note that the adoption of the legal terms and conditions to use the e-voting system in Nigeria is a challenge (Ajayi as cited in Ahmad *et al.*, 2015); Ahmad et al. (2015) asserts that ICT seem to be the major pivot to cause a great turning point in the Nigeria Vision 2020. This means that Nigeria is definitely on the road to a better governance because when there is a fairly transparent electoral system adopted like an

OVS in the upcoming Nigeria 2019 general elections, probability of achieving the people's choice will be optimized.

In the bid to transit from the traditional method of voting to e-voting, Nigeria has experimented partial use of e-voting system in 2015 general elections; it is termed partial e-voting system because the actual ballot casting was done manually (Okediran& Ganiyu, 2015).

The paper is organized as follows: Section 1 contains introduction; research motivation, problem statement, aim and objectives, justification of the study, section 2 contains literature review; review of e-voting and OVS in other countries, review of other related works, section 3 contains analysis of technologies used in Nigeria's general elections from 1999-2015 and its discussions, section 4 contains conclusion, section 5 contains recommendation and Section 6 is the reference.

1.1 Research Motivation

The internet is also transforming governments and the way we interact with them, creating additional participation channels and in some cases enabling the culture of government to become more open, transparent and accountable. While technology has influenced government in other areas, efforts to modernize or digitize electoral institutions at the federal level have been slow. Though, as a sign of progress on transition to e-voting system, the senate, on Thursday, 30th March, 2017 approved the use of e-voting in subsequent electoral processes (Daily Post Nigeria website, 2017).

In previous manual/partial e-voting elections in Nigeria, a nationwide ballot could consume thousand tonnes of paper, phials of indelible ink and require more than thousands strongboxes among others to store them under heavy security until the votes were counted. In the past, it took up to two-three days to count the votes, with hired personnel spending day and night in secured areas manually counting each ballot from ward level to INEC headquarters. Sometimes

demanding for recounting resulting for the low margin of difference of votes between the top two candidates coupled with large number of invalid and doubtful votes which might end up as inconclusive or rerun.

1.2 Problem statement

Processes associated with Nigeria voting system in the past have always been a manual/partial e-voting process which entails a lot of problems. Thus, without ambiguity, this work was initiated to propose an OVS for the Nigeria 2023 general election and it also analyze the weaknesses and limitations of the manual/partial e-voting system with the intention to provide solutions to the below problems. The problems of the paper ballot system of voting include among others the following;

- Expensive and time consuming
- Too much paper work, errors during data entry
- Short time provided to allow the voter register
- A number of voters end up being locked out from voting
- High rate of rigging during election process, multiple voters, inefficient and inaccurate counting of votes by officers concerned, illegible voters casting their vote, over voting and underage voting.

1.3 Aim and objectives of the study

In view of the rapid development of computer technology in virtually all fields of operation and its use in relation to information management, the aim of this paper is to propose the adoption of OVS to enable INEC to achieve the following objectives;

- To conduct free and fair election,
- To safeguard data and information in the system.

- To reduce workload in the process of conducting election.
- To keep accurate record of votes, and reduce delay in announcing election result.
- And to eliminate disenfranchising of electorates among others.

1.4 Justification of the study

The use of OVS will help to solve the problems in the existing system, and some of the justification for the proposed OVS includes;

- To check double voting and disallow double registration.
- To maintain transparency and allow remote access.
- And early display of results among others.

2.0 Literature review

This section presents review of e-voting and OVS in other countries and basically reviews conceptual framework of other related works in the area of e-voting and OVS.

2.1 Review of e-voting and OVS in other countries

This subsection of the paper review adoption success of fully implementation of e-voting and OVS in other countries. Though, systems of voting vary widely from country to country, and sometimes from locality to locality. Below are list of some countries that have adopted e-voting and OVS;

In Estonia, the most widespread use of e-voting has been in existence. According to Barrat *et al.* (2012b) accounted that Estonia has allowed its voters to cast a ballot over the internet in local elections since 2005 and national elections since 2007 as part of the government's e-government strategy. Brightwell (2011) commented that the Australian state of New South Wales, home to Sydney and with population as large as Quebec, recently introduced i-voting.

According to Républiqueet Canton de Genève (2009) revealed that Switzerland is a federal state in which 26 separate cantons each administer their own elections. Four cantons have adopted Internet voting, a number that is constrained by Swiss laws that limit the number of voters who can use e-voting in a general election.

Norwegian Ministry of Local Government and Regional Development (2011) analyzed that in Norway 2011 municipal elections, over 27,500 voters in 10 municipalities cast their vote online in a pilot project that was unique because the government focused on making the e-voting system highly transparent.

OSCE (2012c) accounted for the recently used internet based voting in France to elect 11 deputy ministers to represent citizens living abroad. As a result, this became one of the largest e-voting uses to date, with over 126,000 votes being cast online.

According to Alvarez *et al.* (2011) indicated that electronic machines were introduced to replace older machines using levers in some South American countries, such as Brazil and Venezuela, the motivation behind moving to voting machines was primarily due to a lack of trust in local elections officials, and a genuine perception that voting equipment would provide more reliable results that were relatively immune to manipulation by voting authorities.

Kumar (2011) reported that the introduction of voting machines in India replaced some 2.5 million ballot boxes that needed to be secured. Voters are still required to physically attend a polling station and properly identify themselves to electoral authorities before being permitted to use a voting machine. Most of these machines are stand-alone kiosks, meaning that they are not connected to the Internet.

2.2 Review of other related works

Kohno *et al.* (2004) indicated that voting systems must be transparent and comprehensible enough that voters and candidates can readily accept the results. Electronic Voting Mechanisms (EVMs) ensured that the total number of votes cast was tallied within two to three hours as against thirty to forty hours when the conventional means were used.

Cetinkaya *et al.* (2007) reported the verification and validation in e-voting and gave the proper definitions for verifiability and validity. It describes about verification and validation activities and explains the relationship between the core requirements to any e-voting system

Cranor (2011) gave an extensive list on references relating to e-voting (including i-voting). Brazil and India are examples of countries that use e-voting for both general and state elections. Statistics show that the use of EVMs, an e-voting system in India has eliminated the occurrence of invalid votes during elections and prior to their use, the number of invalid votes that were recorded in India was always more than the winning margin between the candidates (Mira, 2004; Gadekaret *et al.*, 2011).

St. Albans, UK, in May 2007, implemented a fully electronic election with no paper-based voting allowed. People were to use a number of channels to vote, the Internet, kiosks, Interactive Voice Recognition (IVR) via telephones or mobile phones, and also by post. Within six minutes, the system had counted all the ballots – recording the fastest ever vote count. Furthermore, no invalid vote was recorded, and all attempts to subvert the system by means of worms, viruses and Denial-of-Service proved futile (Kelly as cited in Inuwa&Oye, 2015). The newer and more improved trends in voting are showing that a greater number of developed nations are beginning to choose e-voting systems over the paper based voting systems due to their convenience and the ease which they offer voters and election officials (Awad& Ernst, 2011; Gefen *et al.*, 2005).

Elections BC (2014) analyzed that administratively, online voting can reduce ballot errors and spoiled ballots, which can occur by selecting too many or too few candidates, unclear markings, or markings that identify the voter by letting the voter know if he/she has over-voted or under-voted. The proportion of rejected paper ballots is typically about 0.05% of all votes cast.

From the above literature reviews, it could be understood that the published information on e-voting and OVS is gaining more importance very recently among the researchers and this indicates the high priority of researchers towards this topic.

3.0 Analysis on technologies used in Nigeria’s general elections from 1999 to 2015

Table 1 below shows the technologies used in the Nigeria general elections from 1999 to 2015 which ranges from the use of typewriters to Direct Data Capture Machine (DDCM), Electronic Voters’ Register (EVR) and Smart Card Reader (SCR).

Table 1: List of technologies deployed by INEC for voting from 1999-2015.

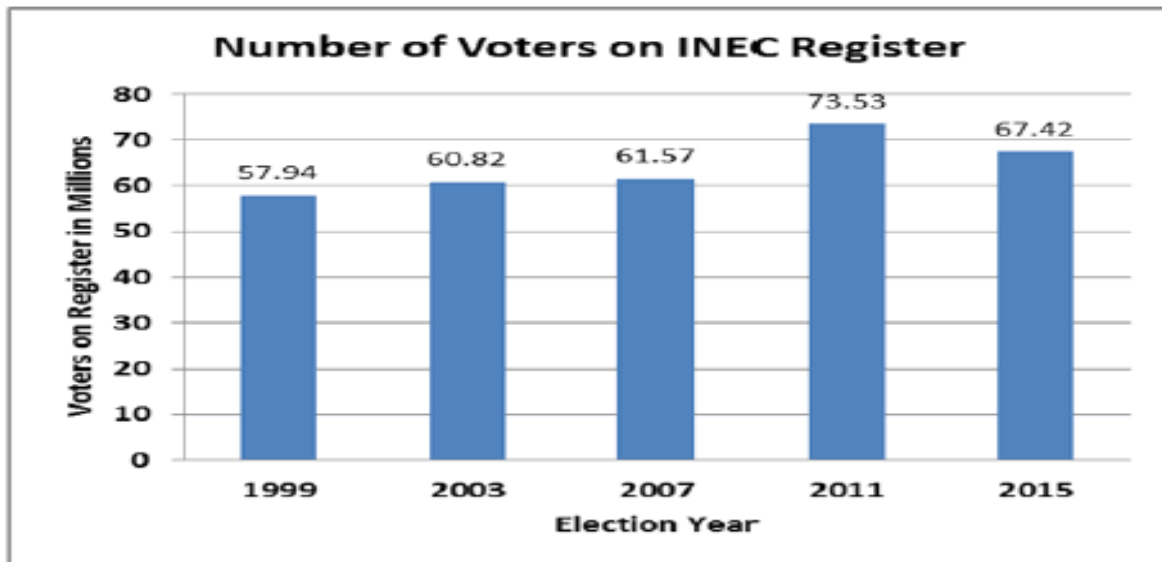
S/N	Year	Voter Registration	Days For Registration	Data Captured	D-Base	Accreditation/ Voting	Result Collation
1	1999	Pen/Sheets and Typewriters	14 Days	Basic details. no picture or finger prints	NIL	NIL	NIL
2	2003	Optical Magnetic Recognition Form (OMR Form) *Automated Finger Prints Identification System (AFIS)	10 Days	Basic details and finger prints only	YES	NIL	NIL
3	2007	*Direct Data Capture Machine (DDCM) * (AFIS)	4 Months	Basic details, photograph, and finger prints	YES	Electronic Voters’ Register (EVR)	Excel Sheet/E-mail
4	2011	*Direct Data Capture Machine (DDCM) * AFIS	21 Days	Basic details, photograph, and finger prints	YES	Electronic Voters’ Register (EVR)	Excel Sheet/E-mail
5	2015	*Direct Data Capture Machine (DDCM) *Improved AFIS/Business Rule.	Continuous Voters Registration (CVR)	Basic details, photograph, and finger prints	YES	*EVR *INEC Voters Authentication System (IVAS)/Smart Card Reader (SCR)	Election Transparency Administration And Collation (e-TRAC)

Source: INEC

3.1 DISCUSSIONS

By observation from table 1 above, Nigeria's general elections get more refined with its technologies but still not up to international standard since vote are still casted on ballot papers. For the registration of voters, it started in 1999 with the capture of only basic details of voters. In 2003, it added finger prints which were done on paper forms. It went fully electronic in 2006 with the introduction of biometrics-(pictures and fingerprints) which gave birth to the popular Electronic Voters Register (EVR). In 2011, the introduction of AFIS to detect and minimize cases of multiple registrations. In 2015, an improved AFIS was further used to clean the register. Business rule was also applied in 2015 which allowed for the capture of minimum of two fingers as the criteria for inclusion of any voter in the electronic register. It is believed that with the use of OVS, INEC would be able to eradicate or reduce to the barest minimum cases of irregularities and inconclusiveness in the Nigeria 2023 general elections.

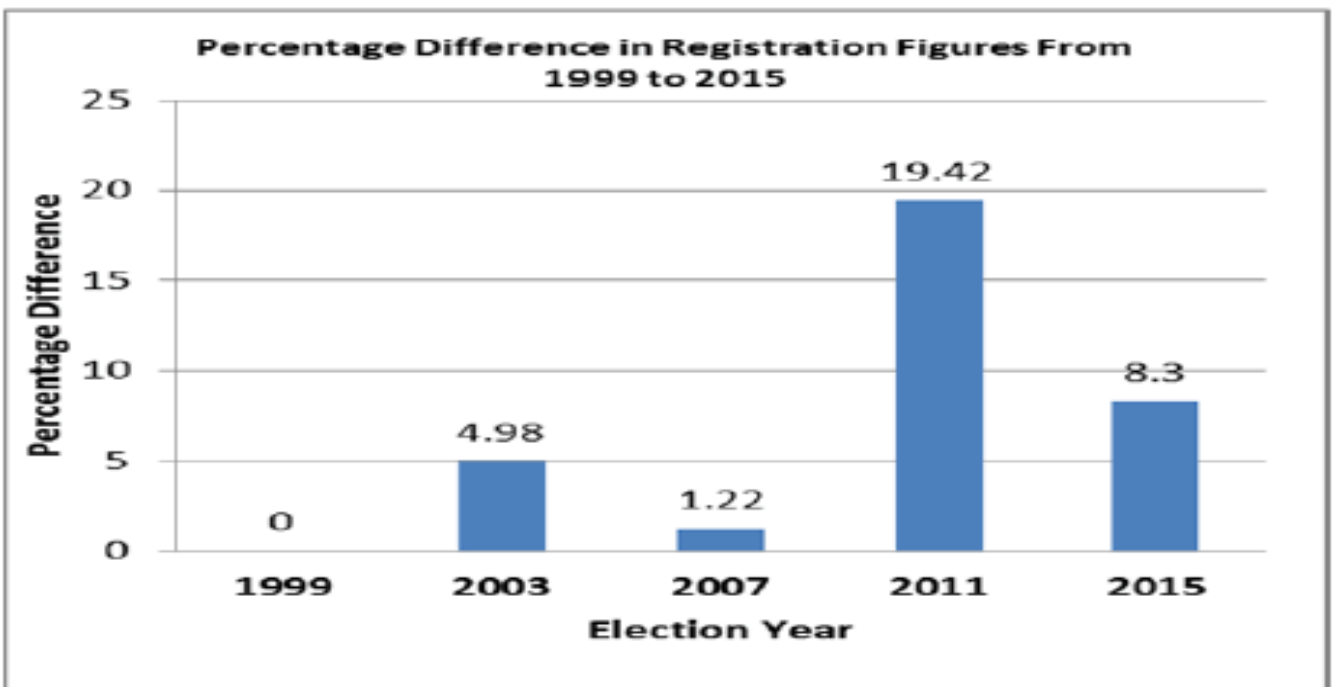
Figure 1: Number of voters on INEC register from 1999 to 2015 general elections



The total number of voters on INEC register for general elections from 1999 to 2015 is shown in figure 1 above. It can be deduced from the chart that INEC through the regular use of its technologies by its staff is now more technologically efficient. This is evident in the number of

days voters registration was conducted in 2006 compared to 2011. It took INEC 4 months to register 61,567,036 voters in 2006 while it registered 73,528,040 within 21 days in 2011. The number of voters registered in 2011 differs with that of 2007 by 19.42% which represents over 12 million voters. This is due to the INEC improvement on the quality of machines and personnel used for the 2011 voters' registration.

Figure 2: Percentage difference in registration figures from 1999 to 2015



In figure 2 above, a shortfall of 6,106,035 voters is observed on the register between year 2011 and 2015 which represents 8.30% of the total voters in the EVR despite the further addition of 2015 continuous voters' registration (CVR) exercise figures. The reason is the re-introduction of an improved AFIS in 2015 which led to the deletion of over five million double registrations from the EVR. The introduction of business rule which only allows voters who has at least two fingerprints captured in the register further reduced the number of voters on the register drastically. With the rate of technological advancement of INEC, it is believed that if OVS can

be used in the future elections, issue of irregularities will be completely eradicated or reduced to the barest minimum.

4.0 Conclusion

The use of the partial e-voting in Nigerian electoral system has really modernized the system and improved election management in the country (Ayeni & Esan, 2018). Results revealed that the introduction of some e-voting mechanism such as Electronic Voters Register (EVR), Automatic Fingerprints Identification System (AFIS) and Smart Card Reader (SCR) have reduced the incidence of multiple registration and multiple voting but not negligible.

Nigeria is in the process of incorporating an alternative method of voting in the electoral process. Some frameworks have been proposed and also a partial e-voting system was used during the 2015 general elections. This research work proposed the use of OVS that can help to ease and increase participation in the electoral process in the Nigeria 2023 general elections thus reduce irregularities. OVS are known with the following features; adequate security for voters, fast vote counting and release of result, convenient participation and check on the problem of disenfranchisement, long term cost effectiveness, easy to modify and user-friendly.

If the partial use of e-voting can be useful then let imagine using full e-voting system such as OVS? Therefore, OVS if implemented in election management in Nigeria 2023 general elections will curbed excessive electoral fraud and irregularities to the barest minimum, foster credible elections and confidence can be vested on INEC concerning the upcoming Nigeria 2023 general elections transparency.

5.0 Recommendations

Based on various studies and implementations of OVS at international level, the paper recommend the followings:

- Nigeria government should try to implement the use of OVS in the upcoming general elections to overcome the challenge of delay in the final collation of results and to save costs and thereby increase transparency.
- Voters register update and voters' revalidation exercise should be done before any general election directly from the NIMC system. This will enable INEC to detect and remove illegible voters from the register.
- Enough time should be allocated to ICT-based activities to reduce the stress of technical support staff.
- Additionally, experts should be recruited from Nigeria and abroad to train INEC officials (staffs) as technology evolves. This will also reduce the cost of outsourcing the e-voting system tasks to consultants. It will also minimize security risk.
- Lastly, voters' education and ICT knowledge should be prioritized as most Nigeria electorates are semi or fully illiterates.

REFERENCE

- Abu-Shanab, E. Knight, M. & Refai, H. (2010). E-Voting Systems: A Tool for E-Democracy. *Management Research and Practice*, 2(3): 264-274
- Ahmada, S., Abdullah Bt, S. A., & Arshad Bt, R. (2015). Issues and challenges of transition to e-voting technology in Nigeria. *Public Policy and Administration Research*, 5(4): 95–102.
- Alvarez, M., Gabriel K., & Julia, P. (2011). The Impact of New Technologies on Voter Confidence in Latin America: Evidence from E-voting Experiments in Argentina and Colombia. *Journal of Information Technology & Politics*, 8(2): 199–217.
- Awad, M.L., & Ernst, L. (2011). *Internet voting in the USA: Analysis and commentary. Transforming Government: People, Process Policy*, 5(1): 45-55.
- Barrat, I. E., Jordi, B. G., & John, T. (2012b). *International Experience with E-voting, Norwegian E-Vote Project*. Washington, DC: International Foundation for Electoral Systems.

- Brightwell, I. (2011). *iVote Technology Assisted Voting: NSW State Election*. Sydney, Australia: New South Wales Electoral Commission.
- Cetinkaya, O., & Cetinkaya, D. (2007). *Towards Secure E-Elections in Turkey: Requirements and Principles, International Workshop on Dependability and Security in e-Government (DeSeGov'07)*. Proceedings of ARES'07, Vienna, Austria, 903-907.
- Cranor, L. (2011). *Electronic Voting Hot List*. Retrieved from: <http://lorrie.cranor.org/voting/hotlist.html> (Accessed on: 17 October, 2018).
- Daily Post Nigeria website (2017). *Breaking: Senate finally approves E-Voting, passes amendment to Electoral*. Retrieved from <http://www.dailypost.ng/politics/2017/03/30/>
- Ejikeme, J. N. (2015). Information and Communication Technology and Administration of 2015 General Election in Nigeria. *Mediterranean Journal of Social Science MC SER*, 7(4) 303-316. Doi:10.5901/mjss.2016.v7n4p.0o
- Enoch, J. D., & Saturday, N. (2017). Biometric Online Voting System in Nigeria. *International Journal of Computer Trends and Technology*, 49(1): 18-86.
- Elections BC. (2014). *Independent Panel on Internet Voting: Recommendations Report to the Legislative Assembly of British Columbia*.
- Gadekar, R. R., Kiran, T., & Hwa, A., P. (2011). Websites for E-Electioneering in Maharashtra and Gujarat, India. *Int. Res.*, 21(4).
- Gefen, D. M., Rose, M. W., & Pavlou, P. A. (2005). Cultural diversity and trust in IT adoption: A comparison of potential e-voters in the USA and South Africa. *J. Global Inf. Manage.*, 13(1): 54-78.
- Hall, T. (2012). *Choosing and implementing an effective voting system*. Paper presented at International Foundation for Electoral Systems (IFES) buyer's guide to election suppliers, Washington DC.
- I. Inuwa & N.D. Oye (2015). The Impact of E-Voting in Developing Countries: Focus on Nigeria. *Int. J. Pure Appl. Sci. Technol.*, 30(2), 43-53
- Kohno, T., Stubblefield, A., Rubin, A. D., & Wallach, D. S. (2004). *An Analysis of an Electronic Voting System*. McGraw Hill, New York.
- Kumar, S. (2011). "Analysis of Electronic Voting System [sic] in Various Countries." *International Journal on Computer Science and Engineering* 3(5): 1825-30.
- O.O. Okediran & Ganiyu, R.A. (2015). A Framework for Electronic Voting in Nigeria. *International Journal of Computer Applications*, 129(3): 13-16.
- Mira, L. M. (2004). *For Brazil Voters, Machines Rule*. Wired News, Brazil.

Norwegian Ministry of Local Government and Regional Development. (2011). *Project Mandate for E-vote Project*. Norway

Olaniyi, O.M., Adewumi, D.O., Oluwatosin, E.A., Arulogun, O. T., & Bashorun M.A. (2011). Framework for Multilingual MobileE-Voting Service Infrastructure for Democratic Governance. *African Journal of Computing & ICTs*, 4(3): 23–32.

OSCE. (2012c). Republic of France Parliamentary Elections. Needs Assessment Mission Report: Organization for Security and Co-operation in Europe. Warsaw: Poland

Républiqueet Canton de Genève. (2009). *Online Voting: Challenges and Outcomes*.
Retrieved from: www.geneve.ch/evoting/english/presentation_projet.asp.

