Int. J. Pure Appl. Sci. Technol., 30(2) (2015), pp. 43-53

International Journal of Pure and Applied Sciences and Technology

ISSN 2229 - 6107

Available online at ***www.ijopaasat.in***

Research Paper

The Impact of E-Voting in Developing Countries: Focus on Nigeria

Ibrahim Inuwa[1,*] and N.D. Oye[2]

[1] Department of Information Technology, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria

[2] Department of Computer Science, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria

* Corresponding author, e-mail: (ibrahiminuwa1985@gmail.com)

(Received: 7-1-15; Accepted: 23-9-15)

Abstract: *The world is in the era of globalization. Information technology has greatly affected all aspects of life, and to a large scope, this includes politics. This paper reviewed E-voting of some developed and developing countries. Online voting system has been an upmost issues in most of the developed and developing countries. The idea behind developing an online voting system was to improve and speed up the process of traditional way of voting. The concept of e-voting should be embraced by the developing countries because of its advantages over the traditional manual voting system. Government should provide adequate infrastructure such as efficient communication network and internet facilities and constant power supply as these are critical to the implementation of e-voting system.*

Keywords: Electronic online voting, Election, E-Voting, Nigerian INEC, Manual voting.

---

1. Introduction:

Voting is a method by which groups of people make decisions. These decisions could be political, social or public. Voting can also be used to choose between difficult plans of actions or to decide who is best eligible to be awarded a prize. Voting can thus be defined as a process that allows a group of individuals to choose between a numbers of options. Most voting systems are based on the concept of majority rule or plurality. For example, in an election, a candidate with a plurality receives more votes than any other candidate, but does not necessarily receive the majority of the total votes cast.

Elections allow the populace to choose their representatives and express their preferences for how they will be governed. Naturally, the integrity of the election process is fundamental to the integrity of democracy itself. The election system must be sufficiently robust to withstand a variety of fraudulent behaviors and must be sufficiently transparent and comprehensible that voters and candidates can accept the results of an election. Unsurprisingly, history is littered with examples of elections being manipulated in order to influence their outcome. The design of a good voting system, whether electronic or using traditional paper ballots or mechanical devices must satisfy a number of competing criteria. The anonymity of a voter's ballot must be preserved, both to guarantee the voter's safety when voting against a malevolent candidate, and to guarantee that voters have no evidence that proves which candidates received their votes. The existence of such evidence would allow votes to be purchased by a candidate. A voting system must be comprehensible to and usable by the entire voting population, regardless of age, infirmity, or disability. Providing accessibility to such a diverse population is an important engineering problem and one where, if other security is done well, electronic voting could be a great improvement over current paper systems. Flaws in any of these aspects of a voting system, however, can lead to indecisive or incorrect election results.

2. Background Problem

The public thirst for rapid and objective results has increasing-y led countries to adopt new technology in the electoral process. Automation is often a complicated process, especially in countries with limited infrastructure, and where frequently the attention of decision-makers gets overwhelmingly focused on technical aspects. Technology, impacts all aspects of elections, including those that seem immune, but eventually may lead to unintended con-sequences. It is obvious that manual way of conducting election could be difficult to determine transparency in an election process. However, this paper has carefully identified the following problem associated with the election processes as: The absence of an online registration system where people of voting age can simply logon and register at any time and place convenient to them. The attempt made by some individual to cast their vote more than once or register under different names in order to place multiple votes. There is also problem of conveying election result from a pooling unit to the collation center, where the election officials may be attacked. Paper balloting may be damaged as a result of rain fall or other external interference that gives room for rigging. Absence of a central database system, which should be online to collect information of any registered voter.

People sometimes are unwilling to participate on election because of the system of election. Traditional system requires people to stand in line for hours to get the chance to vote, while they also have a lot of routine activities to do [1]. It seems that the traditional one become less efficient regarding its longer waiting time. Online voting, on the other hand gives a large opportunity to vote from any point where Internet access is available such as home, school, office or even shopping mall. Using online voting can reduce the time people need to vote. This means that citizen can vote without waste of time and to avoid long queue of voter which was identified as the biggest problem of every election. Citizens can vote without going to the polls and may be this is the efficient way to encourage people's participation on Election Day. In other countries democracy is celebrated, like the United States and Britain, election time is a period of looking forward to change, a new hope for better leadership. But in Nigeria, where democracy has thrived for over 11 years now, election time is a period of anxiety. This is because Nigerian politicians view election as a do-or-die affair. The irony is that something worth celebrating in civilized countries generates palpable fear in Nigeria which is the most populous black nation in the world. Every election year is fraught with migration and/or relocation by the citizens. Some ethnic groups leave their host communities to return home in anticipation of trouble, such as riots, violence and even killings.

3. The Concept of E-Voting

Since last decade the technologies that are being used for conducting the elections are amazing. The introduction of the electronic voting has eased the way voting is conducted. The term e-voting is used for the variety of different ways of voting where the voter's intention is expressed and collected using the electronic methods. These technology have reduced quite lot of time in conducting the elections and announcing the results. These technologies have also reduced the manpower that used to be spent on the traditional voting system. Electronic voting, also known as e-voting, is simply voting electronically by deploying biometrics to achieve accuracy. This would prevent fraudulent people or groups from voting twice or taking electoral documents to their homes to thumbprint and fill ballot boxes. Just as e-passport has become a success in the country, e-voting is also achievable if the will to make it work is there. It is important to know that e-voting machine is a product of Electronic Corporation of India Ltd. (ECIL), established in 1967 as electronic unit of the Department of Atomic Energy owned by the government.

In the everyday life most of us indulge with the online transactions. This is because of the rapid improvement in the e-commerce technologies. Internet technologies have conquered each and every sector of today's businesses. Everything from buying to selling, checking bills online, transferring money into different account, sending and receiving emails and even the education industries are getting online. Even the democracy is not different from this. Online voting system regards to the web based application that could be used to vote from any computer using internet from any part of the world with the convenience of your own comfort. It has been an upmost issue in most of the developed and developing countries to develop an online voting system. The idea behind developing an online voting system was to improve and speed up the process of traditional way of voting. The eligible voters would be able to vote from any part of the world through the internet. Another big advantage of using online system will be that it would reduce the amount of manpower used to conduct the voting.

Online voting has become one of the new systems that are considered as an appropriate way to make the voting more convenient and, it is expected to increase citizen’s participation on the election. This system has been referred to as a more challenging than other electronic commerce or electronic government application with regard to network security and data encryption.

The internet technology has been has been flourished in past few years. It has been a valuable resource for so many organizations. It has given business great heights. The internet has introduced the concept of electronic democracy to different countries. It is also known as online voting or remote voting. The idea of voting online came out in 1999 when the president of the United States direct the national science foundation (NSF) to a one year study of the internet voting. And on January 2000 the internet task force organized by the California's Secretary of State issued its report. The report said," At this time it would not be practically or fiscally feasible to develop a comprehensive remote internet voting system that would completely replace the current paper process.

Stages of Online Voting System Works

The general online voting system has been divided into six phases. These are

- Registration
- Authentication
- Voting and saving the votes
- Managing the votes
- Counting the votes
- Auditing

Advantages and Disadvantages of using Online Voting System:

Advantages: The following are the advantages of using online voting system [2].

Increase Turnout: One of the biggest advantages of using online voting system is that it could increase the voter turnout. The percentage of the UK population that has home internet access has increased rapidly from 35% in 1950 to 70% in 2009.

Convenience: Online voting system will provide citizens the comfort of voting from their own place at their own time. This will also help citizens who are abroad and using special mail ballot to send their vote. Also the people who are out of the country for the military services can be advantaged by this project. Survey in Canada concluded that 57% of the voter's that didn't turnout were complaining everyday circumstances or they were too busy to vote. 54% out of them said they would prefer to vote online.

Appeal to Young Voters: Online voting would appeal young voters to vote. The voter turnout among young people is particularly low. The Canadian survey shows that 64% of the young voters who did not vote would prefer to vote online.

Reduce the Expenses: The online voting system will help reduce the expenses involved in the setting up the polling sites and saves money in printing and mailing the paper ballot. It will also reduce the expenses on the manpower. More information on the candidates: Online voting system will allow more information to be displayed about the candidates and their policies.

Comprehensive Reporting: Online voting system will instantly provide the informative day-by-day statistics about the elections beyond just who has won. Save paper: Online voting will also help saving tons of paper. So it contributes towards the environment saving.

Issues with Online Voting: There are different issues that need to be considered before developing online e-voting system. The main issue is security. There are other aspects besides security. Some of them are forcibility; vote selling, vote solicitation, registration etc.

Security: The importance of security in elections cannot be overstated. The future of the country and the people residing there depends on it. The acceptance of the online voting system depends upon how secure the online voting system is? Online voting has serious threats from the hacker and everyone who has intention to fraud in the elections. The hacker can hack the computers terminals and manipulate the votes before they reach the back-office server. There are so many kinds of hacker programs available these days. Some of them are malicious payload and delivery mechanism.

Malicious Payload: There are so many programs available that can threat the concept of online voting. The hacker only needs to visits the website of any number of security vendors. Once the malicious payload reaches the host or voting platform, it can cause lot of harm that no one can imagine. This program can change the voter's vote without anyone knowing it regardless of any kind of encryption or voter authentication in place. The main threat with this program is that it can manipulate the votes before the authentication is applied and it erases itself after causing the damage so that there is no evidence of the voting manipulation and fraud. One of the examples of this program is Back orifice 2000 (BO2K). It is open source software and freely available. This program contains the remote server that could be installed into the machine and the remote administrator can control every aspect of that machine as though the person is actually sitting at the machine. BO2K is hard to detect even though it is running on the computer.

Another kind of virus that can threat the security is CIH virus. This virus triggered to activate on the particular day. This virus affected thousands of computers on the April 26, 1999 in Asia. This virus can cause very severe damage. This virus raises the concerns as the election dates are known far in advance, this virus triggers to activate on the particular day [3].

Selling of the Votes: This issue is the matter of concern and it is nearly impossible to stop until people realize what difference a single vote can make. It is has been happening in the past, people sell their votes for the money. It doesn't matter how secure the system; it cannot do anything if the person sells his online voting details to someone. The system will authenticate the individual once he enters the correct login details. The system will not authenticate the person by face. This is a real threat to democracy.

Fraud: This issue comprise to registration part and the voting part. The voter can register more than once online as there is none to see and can vote more than once. There is no point of having election if the voter votes more than once using forge identity. Measures should be taken to stops voter to register and vote more than once.

4. The Review of Papers based on E-Voting System

Computer scientists who have done work in, or are interested in, electronic voting all seem to agree on two things:

Internet voting does not meet the requirements for public elections. Currently widely-deployed voting systems need improvement. Voting on the Internet using every day PC's offers only weak security, but its main disadvantages are in the areas of anonymity and protection against coercion and/or vote selling. It's such a truly bad idea that there seems to be no credible academic effort to deploy it at all. The US Presidential elections of 2000 brought national attention to problems with current American methods of casting and counting votes in public elections. Most people believe that the current system should be changed; there is much disagreement on how such changes should be made. The MIT/Caltech researchers see a promising future for electronic voting, despite its problems today, (under a few conditions). They advocate using the methods currently in use which result in the lowest average numbers of uncounted, unmarked, and spoiled ballots, like in-precinct optical scanning. Their report even proposes a framework for a new voting system with a decentralized, modular design. Other researchers have done work in electronic voting; while they may not explicitly mention voting from remote poll sites, their work is nonetheless relevant to any effort at designing or implementing a remote poll site voting system. Some other academics, which we did not study in class, who moderates the risk mailing list, are less optimistic. They agree mostly with the Caltech/MIT committee, but their papers focus on the immensity of the problem one faces when trying to design and implement a truly secure voting system. They often remind us of Ken Thompson's Turing acceptance speech and the fact that we really can't trust any code which we did not create ourselves. (And in reality, we cannot trust even code that we do write ourselves, since we almost always need a development tool-chain written by someone else.) Therefore, they tend to be extremely suspicious of proprietary voting machines and their makers who insist that we should just trust them [4].

After developing an online voting system for student council, made some security assessment of his system and the result were remarkable. According to him the system was small, simple and successful, and that the election system consists of two basic parts; the website and the database. The website breaks down into two sections, the user section and the administration section. The web interface provides almost all the functionality to cast ballot and administer elections. The database primarily serves to manage voter’s information. The website maintains a running tally of the voters, making it easy for elections committee to determine which candidate won the election [5].

Electronic voting systems may offer advantages compared to other voting techniques. An electronic voting system can be involved in any one of a number of steps in the setup, distributing, voting, collecting, and counting of ballots, and thus may or may not introduce advantages into any of these steps. Potential disadvantages exist as well including the potential for flaws or weakness in any electronic component. Stewart estimates that 1 million more ballots were counted in 2004 than in 2000 of the US election because electronic voting machines detected votes that paper-based machines would have missed. A report was released in September 2005 detailing some of the concerns with electronic voting, and ongoing improvements, titled "Federal Efforts to Improve Security and Reliability of Electronic Voting Systems are under way, but Key Activities Need to Be Completed." It has been demonstrated that as voting systems become more complex and include software, different methods of election fraud become possible. Others also challenge the use of electronic voting from a theoretical point of view, arguing that humans are not equipped for verifying operations occurring within an electronic machine and that because people cannot verify these operations, the operations cannot be trusted. Furthermore, some computing experts have argued for the broader notion that people cannot trust any programming they did not author [5].

Need for Electronic Online Voting System

According to Hensler [6] "The World Wide Web, thanks to its simplicity and user transparency, Internet could go beyond the academic world to become part of our daily lives. Although we cannot yet foresee its full impact on society, we feel that a deeply rooted change is at work. The web closes a cycle of what has been called the "IT revolution" by introducing full interconnectivity and standardizing computer programming language. It is a powerful democratic and popular tool. Today the keyword most often associated with Internet in Europe is e-Government. This many-faceted concept encompasses anything from an online tax declaration and payment to an online license renewal or direct access to authorities through e-mail or chat sessions.

In March 2001, the Geneva State Council officially launched the project by choosing its partners. Internet voting will however not replace the existing ballot forms, the traditional ballot box and postal voting, but is offered as a supplementary way of casting a ballot. Many States are currently working on electronic voting (e-voting) solutions. This expression covers a broad range of ballot systems, from electronic ballot reading devices, to electronic ballot boxes installed in polling stations, activated by buttons or touch screens, or to mobile phone voting systems" [6].

Security Measure

Rubin given the current state of security in internet voting says the importance of security in elections cannot be overstated. The future of our country, and the free world for that matter, rests on public confidence that the people have the power to elect their own government. Any process that has the potential to threaten the integrity of the system, or even the perceived integrity of the system, should be treated with the utmost caution and suspicion. Cryptography can be used to protect the communication between the user's browser and the elections server. This technology is mature and can be relied upon to ensure the integrity and confidentiality of the network traffic. This section does not deal with the classic security properties of the communications infrastructure; rather, it looks at the availability of the Internet service, as required by remote electronic voting over the Internet [7].

Electronic Online Voting

Remote electronic voting refers to an election process whereby people can cast their votes over the Internet, most likely through a web browser, from the comfort of their home, or possibly any other location where they can get Internet access. Internet voting can use remote locations (voting from any Internet capable computer) or can use traditional polling locations with voting booths consisting of Internet connected voting systems.

Corporations and organizations routinely use Internet voting to elect officers and Board members and for other proxy elections. Internet voting systems have been used privately in many modern nations and publicly in the United States, the UK, Ireland, Switzerland and Estonia. In Switzerland, where it is already an established part of local referendums, voters get their passwords to access the ballot through the postal service. Most voters in Estonia can cast their vote in local and parliamentary elections, if they want to, via the Internet, as most of those on the electoral roll have access to an e-voting system, the largest run by any European Union country. It has been made possible because most Estonians carry a national identity card equipped with a computer-readable microchip and it is these cards which they use to get access to the online ballot. All a voter needs is a computer, an electronic card reader, their ID card and its PIN, and they can vote from anywhere in the world [8].

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 [9].

It is important to note that even though e-voting systems appear to be the best alternative to paper-based and other mechanical systems, they must be used with caution because experts believe that some of such systems could have challenges ranging from software engineering, auditing pitfalls, to insider threats, thereby undermining their integrity [10][11]. In his review on electronic voting security criteria, i.e., confidentiality, integrity, availability, reliability and assurance, [12] concluded that a lot of such criteria are by nature very difficult to satisfy. Evers in 2004 wrote on the US online voting system and the challenges it faces, [13] clearly pointed out critical security requirements for online voting and [14] discuss e-voting privacy protection. Despite all the success stories recorded on the use of electronic voting systems, it is believed that further studies must be carried out to improve upon them [15].

Some Countries that Use E-Voting

The first known use of the term Cyber Vote was by Midac in 1995 when they ran a web based vote regarding the French nuclear testing in the Pacific region. The resulting petition was delivered to the French government on a Syquest removable hard disk [16]. In October 2001 electronic voting was used for the first time in an Australian parliamentary election. In that election, 16,559 voters (8.3% of all votes counted) cast their votes electronically at polling stations in four places [17]. The Victorian State Government introduced electronic voting on a trial basis for the 2006 State election [18].

In 2007 Australian Defence Force and Defence civilian personnel deployed on operations in Iraq, Afghanistan, Timor Leste and the Solomon Islands had the opportunity to vote via the Defence Restricted Network with an Australian Electoral Commission and Defence Department joint pilot project [19]. After votes were recorded, they were encrypted and transmitted from a Citrix server to the REV database a total of 2012 personnel registered for and 1511 votes were successfully cast in the pilot, [20] costing an estimated $521 per vote. Electronically submitted votes were printed following polling day, and dispatched to the relevant divisions for counting [21].

Belgium

Electronic voting in Belgium started in 1991. It is widely used in Belgium for general and municipal elections and has been since 1999. Electronic voting in Belgium has been based on two systems known as Jites and Digivote. Both of these have been characterized as "indirect recording electronic voting systems" because the voting machine does not directly record and tabulate the vote, but

instead, serves as a ballot marking device [22]. Both the Jites and Digivote systems record ballots on cardboard magnetic stripe cards. Voters deposit their voted ballots into a ballot box that incorporates a magnetic stripe reader to tabulate the vote. In the event of a controversy, the cards can be recounted by machine [23].

Brazil

Electronic voting in Brazil was introduced in 1996, when the first tests were carried in the state of Santa Catarina. Since 2000, all Brazilian elections have been fully electronic. By the 2000 and 2002 elections more than 400 thousand electronic voting machines were used nationwide in Brazil and the results were tallied electronically within minutes after the polls closed [24].

Estonia

Electronic voting in Estonia began in October 2005 local elections when Estonia became the first country to have legally binding general elections using the Internet as a means of casting the vote and was declared a success by the Estonian election officials. In 2005 Estonia became the first country to offer Internet voting nationally in local elections]. 9,317 people voted online. In 2007 Estonia held its and the world's first National Internet election. Voting was available from February 26 to 28. A total of 30,275 citizens used Internet voting [25].

France

In January 2007 France's UMP party held a national presidential primary using both remote electronic voting and with 750 polling stations using touch screen electronic voting over the Internet. The election resulted in over 230,000 votes representing a near 70% turnout. Elections in France utilized remote Internet voting for the first time in 2003 when French citizens living in the United States elected their representatives to the Assembly of French Citizens Abroad. Over 60% of voters chose to vote using the Internet rather than paper. The Forum des droits sur l'Internet (Internet rights forum), published a recommendation on the future of electronic voting in France, stating that French citizens abroad should be able to use Internet voting for Assembly of the French Citizens Abroad elections. This recommendation became reality in 2009, with 6000 French citizens choosing to make use of the system [26].

India

No other country in the world has used electronic voting in as large a scale as India has. Electronic voting was first introduced in 1982 and was used on an experimental basis in the Parur assembly constituency in the State of Kerala. However the Supreme Court of India struck down this election as against the law in A C Jose v. Sivan Pillai case. Amendments were made to the Representation of Peoples Act to legalize elections using Electronic Voting Machines. In 2003, all state elections and by-elections were held using EVMs [21].

Italy

On the 9th and 10 April 2006 the Italian municipality of Cremona used NEDAP Voting machines during the national elections. The pilot involved 3000 electors and 4 polling stations were equipped with NEDAP systems. The electoral participation was very high and the pilot was successful [27].

Netherlands

From the late nineties until 2007, voting machines were used extensively during elections. Most areas in the Netherlands used electronic voting in polling places. After security problems with the machines were widely publicized, they were banned in 2007. The most widely used voting machines were produced by the company NEDAP [28]. In the parliamentary elections of 2006, 21,000 persons used the Rijnland Internet Election System to cast their vote. On 5 October 2006 the group "Wij vertrouwen stemcomputers niet" ("We do not trust voting machines") demonstrated on Dutch television how the NEDAP ES3B machines could be manipulated in 5 minutes. The exchange of the software would not be recognizable by voters or election officials [29].

Philippines

In May 2010, the government of the Philippines planned to carry out its first ever entirely electronically tabulated election, using and optical scan voting system. The government invested $160 million into the new system [30]. This included the electronic voting machines, printers, servers, power generators, memory cards, batteries, and broadband and satellite transmission equipment. This national implementation of electronic voting was intended to increase the accuracy and speed of vote tallying. In addition, it was expected to decrease the fraud and corruption found in past Filipino elections.

On May 10, 2010, the Philippines had its first presidential election using electronic voting. Comelec reported that only 400 of the 82,000 machines malfunctioned. Most voter complaints were related to waiting in long lines and learning the new technology. Although Filipino elections have been notorious for being violent after polls close, the 10 deaths in the 2010 elections were far fewer than previous years [31].

Nigeria

According to [32] the Independent National Electoral Commission (INEC) is the main agent of democracy in Nigeria. INEC is the body created by the constitution to organize all government elections in Nigeria. The origin of an electoral body in Nigeria can be traced to the period before independence when the electoral commission of Nigeria (ECN) was establish to conduct 1959 election. The Federal Electoral Commission (FEC), established in 1960 conducted the immediate post-independent federal and region of electoral of 1964 and 1965 respectively. The body organized all transitional elections that ushered in the 4^{th} republic on May 1999. It has today repositioned itself to deliver credible elections that would sustain Nigeria’s democracy. The body has been established in all the 36 states and the federal capital Territory as well as in the 774 Local Government Area of Nigeria.

E-voting was endorsed for Nigeria's 2007 general elections. According to former Independent National Electoral Commission (INEC) Chairman, Professor Maurice Iwu, the time has come for introduction of technology into the nation's electoral process and if this system is applied, it will eliminate rigging and manipulation of manual systems of voting. 'The e-voting was adopted from India when INEC officials in 2004 went to observe that country's general election.

The introduction of E-Democracy policies in developing countries can improve the quality of decision-making and strengthen the political process. However, the implementation of new technologies involves different risks and challenges that, while not accounted for, may lead to misuse. Risks can be avoided and challenges met by an extensive public discussion including all stakeholders as well as framing the country's specific vulnerabilities and referring to international standards and best practice. Conclusively, at the beginning of the implementation process of E-Democracy, an analysis of the feasibility and the political, technological, legal and social factors is recommended.

Computerizing voting procedures imply the use of computer technology in undertaking such activities as Voter Registration Exercises, Voting and Vote Counting. Although the initial cost of developing computerized voting systems would be high, the long run effects would be that election costs would drastically reduce. Computerized voting systems would make obsolete the need for ballot boxes and papers, because the system would simulate these. This would mean that printing costs would be reduced by a considerable amount. Computerizing the verification process by using the computerized voting systems would help to enforce relevant controls in order to verify whether or not a person has already cast a vote, leaving no need for indelible ink.

5. Conclusion

The world is in the era of globalization. Information technology has greatly affected all aspects of life, and to a large scope, this includes politics. This paper, hereby stresses the fact that, the importance and necessity of electronic online voting system cannot be overemphasized. There is no doubt that the new voting protocol became not only simpler with higher security level, it also offers a better integration of the general public irrespective of their locations. All this brings us one step closer to feasible electronic voting system for elections in the range of operational political elections. Necessary and adequate research materials should be made available by the government in the institutions of higher learning so as to ease and assist wider and broader researches in the field of Computer Science and Information Technology. The process of voter registration/re-validation should be made online. This is with a view of eliminating registration fraud and other electoral malpractices. It is also worth mentioning that, mobility difficulties will be eliminated.

A central database should be created to keep records of all registered voters in the country. Also provision for the training of staff of the commission on the usage of the new system should be made. Government should provide adequate infrastructure such as efficient communication network and internet facilities and constant power supply as these are very critical to the implementation of the system. It is hoped that when this is implemented, the Independent National Electoral Commission (INEC) will go a long way in achieving her goals.

References

[1] P. Bonetti, S. Ravaioli and S. Piergallini, The Italian academic community's electronic voting system, *Computer Networks*, 34(2000), 851-860.

[2] Online Voting: Number 155, (2001), Available from: http://www.parliament.uk/post/pn155.

[3] A. Rubin, Security criteria for electronic voting, AT&T Labs – Research, (2006), Available from: http://www.avirubin.com/e-voting.security.html.

[4] The Caltech/MIT, A preliminary assessment of reliability and existing voting equipment (electronic version), (2001), http://www.vote.caltech.edu/Reports/index.html.

[5] K. Stewart, Building Theories from Case Study Research on E-voting System, New York, McMillan Publishers Co., 2006.

[6] R. Hensler, Electronic Voting Offers Opportunities and Presents Challenges, (2003), Available from: http://www.gao.gov/new.items/d04766t.pdf.

[7] A. Rubin, Electronic Voting - Evaluating the Threat, CFP '93, 2008.

[8] C. Backert, California internet voting task force, *British Journal of Education*, 27(2005), 165-169.

[9] A.D. Kelly, Secure oracle 91AS gets their-vote, *Oracle Magazine*, January-February (2003), 45-50.

[10] A. Rubin, Security considerations for remote electronic voting over the internet, *Communications of the ACM*, 45(12) (2002), 39-43.

[11] R. Lebre, R. Joaquim, A. Zúquete and P. Ferreira, Internet voting: Improving resistance to malicious servers, *Paper Presented at the IADIS International Conference Applied Computing*, Lisboan, (2004).
[12] P.G. Neumann, Security criteria for electronic voting, *16th National Computer Security Conference*, September (1993), Baltimore, Maryland, Retrieved from: http://www.csl.sri.com/ users/neumann/ncs93.html, Accessed on 15 May (2011).
[13] J. Pescatore and C.H. Baum, Online voting can't be trusted on standard PCs, (2004), Retrieved from: http://news.zdnet.co.uk/security/0,1000000189.3914811000.html, Accessed on 15 May (2011).
[14] K. Evangelia, G. Stefanos and C. Kalloniatis, Protecting privacy in system design: The electronic voting case, *Transforming Government: People, Process Policy*, 1(4) (2007), 307-332.
[15] R. Morse, Electronic voting: Progress over setbacks, *Law Technol.*, 35(4) (2002), 1-6.
[16] International Internet News Clips, (1995), Available from: https://en.wikipedia.org/wiki/ Electronic_voting_examples.
[17] ACE Electoral Knowledge Network, (2015), Available from: http://aceproject.org.
[18] Victorian Electoral Commission Electronic Voting Pilot, (2015), Available from: https://www.vec.vic.gov.au/Results/results-historical-vicevents.html.
[19] Electronic Voting Trial for Deployed Defense Personnel from the Australian Electoral Commission, (2001), Available from: http://www.aec.gov.au/Voting/report.htm.
[20] Evaluation of the remote electronic voting trial for overseas based ADF personnel electors at the 2007 Federal Election, Australian Electoral Commission, (2008), Available from: http://www.sourcewatch.org/index.php/Electronic_voting_internationally.
[21] D.W. Jones, Kazakhstan: The Sailau e-voting system, In: M. Yard (ed.), Direct Democracy: Progress and Pitfalls of Election Technology, IFES, (2010), 57-70.
[22] Expert visit on new voting technologies: Local elections, Kingdom of Belgium, OSCE Office for Democratic Institutions and Human Rights, (2006), Available from: https://en.wikipedia. org/wiki/Electronic_voting_examples.
[23] Estonia pulls off nationwide net voting, News.com, (2005), Available from: www.cnet.com/ Tech Industry.
[24] Estonia to hold first national internet election, News.com, (2007), Available from: https://en.wikipedia.org/wiki/Electronic_voting_in_Estonia.
[25] Estonia scores world web first in national polls, Information Week, (2007), Available from: https://en.wikipedia.org/wiki/Estonian_parliamentary_election.
[26] What is the future of electronic voting in France? The Internet Rights Forum, (2003), Available from: http://www.law.uni-sofia.bg/Kat/T/IP/T/EV/e_votinglawunisofiabg.
[27] e-Democracy Forum article on French Internet voting from abroad, (2009), Available from: https://en.wikipedia.org/wiki/Electronic_voting_.
[28] Prima sperimentazione voto elettronico con NEDAP in Italia: Cremona (Italian), (2011), Available from: www.ocg.at/ak/edemocracy/wiki2/.../doku.php?id...italy...voting...italy.
[29] Dutch citizens group cracks NEDAP's voting computer, (2006), https://edri.org/ edrigramnumber4-19e-voting/.
[30] NEDAP/Groenendaal ES3B voting computer, a security analysis, (2006), wijvertrouwenstemcomputersniet.nl/other/es3b-en.pdf.
[31] Filipino poll panel allays concerns about faulty voting machines, (2010), http://gulfnews.com/news/asia/philippines/filipino-poll-panel-allays-concerns-about-faulty-voting-machines-1.622394.
[32] The Independent National Electoral Commission (INEC), Available from: http://www.inecnigeria.org, Accessed on 23 January (2015).