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ELECTRONIC VOTING SYSTEM – THE ONLY ALTERNATIVE CHANNEL TO NIGERIA DEMOCRACY

Abstract
Voting plays important role in democracy of any country. It gives chance to the citizens to select their leader so it must be transparent. Over the years manual voting system replaced by the E-voting to ensure the security and transparency. Electronic voting process reduces human error in calculation of votes and identification of the authenticated user. E-voting involves less human interface which makes the system error free. Many techniques are come into scene over the years to ease the process of authentication of the user and to cast the vote in more transparent way. The E-voting background, definition, features, functionalities, strengths and topology are surveyed in this paper.

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Key words: Electronic voting, democracy, polling station

Introduction
Electronic voting in polling stations is in place in some of the world's largest democracies, and Internet voting is used in some, initially mainly small and historically conflict-free, countries. Many countries are currently considering introducing e-voting systems with the aim of improving various aspects of the electoral process. E-voting is often seen as a tool for advancing democracy, building trust in electoral management, adding credibility to election results and increasing the overall efficiency of the electoral process. The technology is evolving fast and election managers, observers, international organizations, vendors and standardization bodies are continuously updating their methodologies and approaches.

Properly implemented, e-voting solutions can eliminate certain common avenues of fraud, speed up the processing of results, increase accessibility and make voting more convenient for citizens—in some cases, when used over a series of electoral events, possibly even reducing the cost of elections or referendums in the long term.
Unfortunately not all e-voting projects succeed in delivering on such high promises. The current e-voting technology is not problem-free. Legislative and technical challenges have arisen in some cases; in others, there has been skepticism about or opposition to the introduction of new voting technologies.

The inherent challenges of e-voting are considerable and linked to the complexities of electronic systems and procedures. Many e-voting solutions lack transparency for voters and even for election administrators. Most e-voting solutions are only fully understood by a small number of

experts and the integrity of the electoral process relies largely on a small group of system operators instead of thousands of poll workers. If not carefully planned and designed, the introduction of e-voting can undermine confidence in the whole electoral process. It is therefore important to devote adequate time and resources to considering its introduction and looking at previous experiences of electronic voting.

A definition of electronic voting

Some definitions of electronic voting are very broad. This paper focuses on systems where the recording, casting or counting of votes in political elections and referendums involves information and communication technologies.

E-voting: not comparable to any other ICT application?

Virtually every information and communication technology (ICT) application is built in a way that allows verification of its proper functioning by observing the application's outputs. If a customer does not trust a bank's electronic banking system, he or she can check their account overview and confirm that all transactions are reflected properly. If the owner of a car does not trust the electronics in the car, every starting of the engine gives an opportunity to test that system.

E-voting systems are fundamentally different. Due to the requirement to protect the secrecy of the vote, they have to avoid any connection between the voter's identity and the vote cast. This is in itself a challenge as standard ICT systems are inherently built for tracking and monitoring transactions that happen on them. More importantly, breaking the link between voter and vote means that the examination of an e-voting system after an election cannot prove directly that every vote was indeed counted and tallied as cast.1 This is why indirect proofs of the validity of the electronic results, such as paper trails or system certification, in combination with stringent quality control and security procedures, are exceptionally important. Without such mechanisms, manipulated or incorrect results produced by an e-voting system could remain undetected for a long time.

Typical features and functionalities of e-voting systems

Internally, electronic voting systems have many functions, including encryption, randomization, communication and security systems. A specific analysis of these functionalities goes beyond the immediate scope of this paper. For a basic understanding of what e-voting systems can do, however, it is useful to consider the following list of some of the end-user functionalities that such systems can provide to both voters and election officials.

- *Electronic voter lists and voter authentication.* Part of an electronic voting system can be an electronic voter list, covering either a single polling station or the entire country. This list can be used to authenticate eligible voters and to record that they have cast their vote.
- *Poll worker interfaces.* Special functionalities that are only available to poll workers, for example, resetting the vote count at the opening of the polling station, closing polling, printing and transmission of results.
- *Interfaces for casting votes.* These include touch screens, optical mark recognition (OMR) ballot papers that are fed into a scanner, touch-sensitive tablets, push buttons, web pages or special client software for Internet voting.

• *Special interfaces for handicapped voters.* These include Braille or audio input devices for the blind, easier access for voters with physical disabilities, and simpler interfaces for illiterate voters.

Strengths associated with e-voting

- Faster vote count and tabulation.
- More accurate results as human error is excluded.
- Efficient handling of complicated electoral systems formulae that require laborious counting procedures.
- Improved presentation of complicated ballot papers.
- Increased convenience for voters.
- Potentially increased participation and turnout, particularly with the use of Internet voting.
- More attuned to the needs of an increasingly mobile society.
- Prevention of fraud in polling stations and during the transmission and tabulation of results by reducing human intervention.
- Increased accessibility, for example by audio ballot papers for blind voters, with Internet voting as well for housebound voters and voters from abroad.
- Possibility of multilingual user interfaces that can serve a multilingual electorate better than paper ballots.
- Reduction of spoilt ballot papers as voting systems can warn voters about any invalid votes (although consideration should be given to ensuring that voters are able to cast a blank vote should they so choose).
- Potential long-term cost savings through savings in poll worker time, and reduced costs for the production and distribution of ballot papers.
- Cost savings by using Internet voting: global reach with very little logistical overhead. No shipment costs, no delays in sending out material and receiving it back.
- Compared to postal voting, Internet voting can reduce the incidence of vote-selling and family voting by allowing multiple voting where only the last vote counts and prevent manipulation with mail-in deadlines through direct control of voting times.

Typologies of e-voting systems

In discussing the advantages and disadvantages of the various e-voting systems it is useful to distinguish several overlapping typologies of systems.

All typologies have various strengths and weaknesses, both when compared with each other and when compared to traditional paper-based voting. There is no such thing as a perfect electronic voting system and available systems continue to evolve with ongoing technological advances. It is therefore important to choose the right system for the right context by carefully weighing the advantages and disadvantages of all options.

The types of e-voting systems

Technically, most e-voting systems fall into one of the following four types.

- *Direct recording electronic (DRE) voting machines.* DREs can come with or without a paper trail (VVPAT, or voter-verified paper audit trail). VVPATs are intended to provide physical evidence of the votes cast.
- *OMR systems* which are based on scanners that can recognize the voters' choice on special machine-readable ballot papers. OMR systems can be either central count systems (where ballot papers are scanned and counted in special counting centres) or precinct count optical scanning (PCOS) systems (where scanning and counting happens in the polling station, directly as voters feed their ballot paper into the voting machine).
- *Electronic ballot printers (EBPs),* devices similar to a DRE machine that produce a machine-readable paper or electronic token containing the voter's choice. This token is fed into a separate ballot scanner which does the automatic vote count.
- *Internet voting systems* where votes are transferred via the Internet to a central counting server. Votes can be cast either from public computers or from voting kiosks in polling stations or—more commonly—from any Internet-connected computer accessible to a voter.

The general term voting machine (VM) is often used to refer to DRE and PCOS systems as well as to voting kiosks for Internet voting.

E-voting in controlled and uncontrolled environments

E-voting can be conducted either in controlled or in uncontrolled environments.

E-voting in controlled environments happens when the casting of votes takes place in polling stations, polling kiosks or other locations under the supervision of staff appointed by the electoral management body (EMB). By that means the election administration can to a great extent control the voting technology as well as the procedures and conditions under which voters are casting their ballots.

E-voting in controlled environments can be seen as the electronic equivalent of traditional paper-based voting in polling stations, embassies and so on.

E-voting in uncontrolled environments happens without any supervision and from voting devices that cannot be controlled by the election administration. This can be from home, on the voter's personal computer, or potentially anywhere on mobile or public devices.

With voting in uncontrolled environments, concerns about the secrecy of the vote, family voting, intimidation, vote-buying, the loss of the Election Day ritual, the impact of the digital divide and the technical separation of voter identity and ballot paper, as well as the technical integrity of the device from which the votes are cast, all need specific consideration. Current forms of Internet voting have not yet been able to provide a definitive solution to such concerns.

E-voting in uncontrolled environments can be seen as the electronic equivalent of postal voting or absentee voting.

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E-voting as only or alternative channel

E-voting can be introduced as the only voting channel available to voters or it can be offered as an additional option for voting and the voter can choose the preferred channel. Internet voting is commonly introduced as an alternative channel while voting machines are mostly introduced as the only voting channel available to voters in a polling station.

E-voting with or without independent physical evidence of the votes cast

Many of today's e-voting systems in controlled environments produce physical evidence of the vote cast in the form of paper receipts for the voters (often referred to as VVPAT). Voters can verify their vote on the receipt and then deposit the receipt in a ballot box. By manually re-counting the receipts, the results presented by the voting system can be independently verified. The results of an entire election can be verified by a well-designed manual recount of receipts from a random sample of polling stations.

E-voting systems in uncontrolled environments commonly do not produce physical evidence as these could be used for vote-selling. Additionally, as the voter would keep the receipt, a manual recount is not possible, which renders such receipts useless. However, some Internet voting systems utilize a return code system that allows voters to verify that their vote was received unaltered by the counting server.

If e-voting systems provide no physical evidence of the votes cast, direct verification of results is not possible. The results produced by such a system can only be indirectly verified. Indirect verification relies exclusively on a strict certification process against agreed standards in combination with tight security measures that prevent any violation of the voting system's integrity. In these circumstances it can be difficult to communicate the reliability and trustworthiness of the e-voting system in a transparent way to a critical or non-expert audience. This might become an insurmountable challenge in a context where the EMB does not enjoy the full trust of the electoral stakeholders.

Adding a paper trail makes e-voting systems more complex and expensive. Bearing in mind the fact that many voters do not check their receipts, as well as possible mistakes in the manual recount and the need to resolve discrepancies between the electronic count and the paper count, paper trails are not a perfect solution for guaranteeing accurate and transparent elections. Still, if implemented in conjunction with proper audit procedures and mandatory random sample recounts, they become an important tool that makes it easier to build stakeholders' trust. Paper trails allow the verification of electronic election results and make it possible to identify any faults or manipulation in an observable and easily understandable process. The lack of a paper trail is often one of the first issues raised by opponents of electronic voting.

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