Nigeria’s 2011 General Election and 2015 Electronic Voting (E-Voting) System
Ozuru, Henry N. and Chikwe, J. E
Lecturer, Department of Marketing, Faculty of Management Sciences, University Of Port Harcourt Choba, Port Harcourt.

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ABSTRACT
The paper presents Nigeria’s 2011 General Election and 2015 Biometric Voting (Electronic voting) system. The paper adopts the critical, theoretical and documentary research methods in describing Nigeria’s 2011 general election and 2015 electronic voting system. The paper finds that the 2011 general election was credible, reliable and transparent. Also that the implantation of the automated electoral system using Biometric Data would enable the hosting of free and fair election in Nigeria. Three major implications are identified: first to scholars on the investigation of the link between national elections and electronic voting (e-voting); further study to empirically investigate the relationship between national election and e-voting using our proposed conceptual and operational framework; to the citizen, they can have the opportunity in choosing their leaders by exercising their rights in a democratic process. The paper recommends: that the government establish voters list updating: provide a biometric data base of all Nigerians both at home and abroad; the provision of regular power supply to effectively allow for the use of the biometric system; maintenance of adequate security; and leaders to fulfill their obligations and have fear of God in execution of their duties.

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Introduction
In the past, National elections both the Presidential, the Governorship, the National and the State Assemblies that have been conducted from 1965 to 2007 were characterized with violence and election malpractices in Nigeria. At this period, extensive protests as a result of these irregularities hampered democratic process, and led to the death of an estimated 2000 Nigerians in the Western Region in May, 1965. In 1979, 1983, 1999, April/May 2003 and April 2007 general elections also witnessed violence, and virtually all the election results were contested in court (Dayo, 2008). Nigerian politicians acquired or retained political support, wealth and influence through the use of all manners of electoral malpractices. Killings, assassination of prominent Nigerians, rioting and stealing of ballot papers, boxes and destruction of properties were visible. Also, a number of electoral verdicts were rescinded as a result of evidence that results were manipulated and falsified. Further, the 1992 election results were annulled by the military government under the power of General Ibrahim Babangida as a result of claimed electoral fraud. In addition, the election results of June 1993, were also annulled in June 12, 1993 thereby denying the acclaimed winner, Late Chief Moshood Abiola the mandate of the people. Again Babangida claimed electoral fraud as the reason for the annulment of the results of the election.

In spite of pockets of violence that erupted in the last April 2011 election, malpractices, irregularities and more violence were brought to the barest minimum as a result of the introduction of the partial use of the Biometric voting system.

Theoretical Background
As a result of the continued development in Information Technology, several countries have instituted different forms of e-voting projects. As of January, 2010, countries such as United States of America, Australia, Brazil, Canada, France, India, Japan, Kazakhstan, Russia, Venezuela, Peru and United Arab Emirates have legally binding electronic voting with voting machines.

Also, Austria, Canada, Estonia, France, Japan and Switzerland have legally binding Internet voting. For example, on June 1, 2013, French Citizens residing in the United States were given the opportunity to validly elect their representative to the Assembly of the French citizens abroad by remote e-voting. Also in 2001, Estonia started the e-voting. In 2003, Austria started e-voting (http://aceproject.org/ace-en/focus/e-voting/countries,2011).

In like manner, Engineer Timasaniyu Ahmed-Rufai – Managing Director/Chief Executive of Nigerian Communication Satellite Limited (NIGCOMSAT) along with Nigerian engineers put together an “e-voting solution” which he thinks will save the country huge funds and perfect electoral system in 2015. This system was successfully demonstrated to the then INEC chairman, Professor Attahiru Jega including the entire process for registration, verification, voting and tallying. This system has been recently utilized to conduct election for the NIGCOMSAT multipurpose cooperative society and was monitored by members of staff locally and internationally using various web enabled devices such as blackberry, I pad and PC (Adaramola, 2011).

Methodology
Employing the critical, theoretical and documentary research methods, this paper reviews the electoral process in Nigeria in 2011 and the coming 2015 election.

The paper explores the importance of using Biometric Technology in achieving successful, credible and reliable elections in Nigeria. It recommends a biometric database of all
Nigerians. The paper further recommends that the country embrace voter’s list updating rather than that of a wholesale complication because in each of the Nigerian general elections, a new voters list was compiled and the previous register jettisoned with ignominy.

**Literature Review**

The essence of the near introduction of Biometric system that specifically employed the use of Direct Data Capture (DDC) in the last election was to an extent to resolve several challenges that besiege the Nigerian electoral process. Fraud is eminent at all levels of the electoral process in Nigeria. Generally, rigging of elections is now considered a positive way of winning elections. Winning elections in the past comes in two major ways – multiple voting by individuals, and declaration of false electorate results. Significantly, the Direct Data Capture (DDC) machines used in the last election presumably addressed the electoral fraud and ensured free and fair elections in the April 2011 general elections as no two individuals can have the same finger prints. The purpose of the DDC machines was to capture the data of prospective voters and not for voting during the election. To achieve this objective, the Federal Government allocated N70 billion. The Direct Data Capture is merely a device that enables the capture of a representation such as image, speech etc.

**2011 Election and Use of Biometric System**

The 2011 election was credible, transparent and successful, though with some human and material setbacks.

Biometric technology as explained above involves having a database that has stored all citizens information that can be used for proper authentication and identification of their persons.

In employing full biometric technology in e-voting, proper information of legal potential voters will be captured and stored in the Database server that will be developed. The captured information will include voters’ personal data, fingerprints, facial scan, iris, etc.

A fully employed biometric system will verify, validate, and authenticate the information that has been entered during registration for each individual registered voter. Successful verification of the entered information will lead to a successful vote.

The verification process begins with the authentication of the voters’ identity number, followed by the fingerprint, face recognition and the iris. Failure of any of these verifications for a specified number of times terminated the voting process, and the database server will take note of the failure.

On the other hand, the 2011 election in Nigeria fell short of incorporating a complete use of Biometric data of all Nigerian citizens both at home and abroad. The biometric system only achieved to some extent the registration of Nigerian citizens. For instance, a voter lamented: this is the first time voters’ registration exercise would be handled just in three weeks. In the past, the exercise ran for weeks; government agencies and politicians would embark on sensitization programmes and yet many citizens would choose to go about their businesses without registering.

Had this system been fully incorporated and implemented, the frustrations and long waiting during the registration and accreditation exercise of the electorate would not have occurred.

**2011 voters’ registration and Accreditation**

The 2011 accreditation was faced with frustrations and tortuous conditions such as staying under scorching sun for hours before getting accredited. The accreditation was manually conducted before the voting took place each day. This exercise was slow tortuous and not cost effective.

For example, voters turnout in the federal capital territory (FCT) was very impressive, but the number of people still on the queue after midday of the accreditation was enormous, which translates that accreditation will take a little longer than usual (Akinruijiomu, 2011).

As voters’ accreditation came to an end everyday at about 12 noon as stipulated by INEC (Independent National Electoral Commission) crises of late accreditation brewed among party agents in most of the polling units as they wonder when proper voting should commence. Some want voting to commence by 12 noon, others insist that it should commence by 12:30pm. This is due to the fact that accredited voters are already in the queue waiting to be counted before the commencement of the actual voting exercise. For instance, officials battled with accreditation at Opebi Grammar School polling centre along with other centres in the country.

**Benefits and Challenges of 2011 elections**

The 2011 Nigerian General Election witnessed some benefits and challenges

Benefits include:
- Massive turnout of prospective voters which overwhelmed the registration officers.
- At this time, the citizenry were willing to be listed as they had little hope in the use of biometric data machine.
- The first time in Nigerian history that voters registration was handled in three weeks. In the past, this form of exercise ran for weeks; government agencies and politicians would embark on sensitization programmes and yet many citizens would choose to go about their businesses without registering.
- Most of the registration centres were barely invaded by prospective registrants as opposed in the past.
- Some form of remuneration was offered. Some State Governments declared public holidays in order to allow their citizens register while a couple of others tied payment of salaries to the possession of the prized document (voters’ card). The card is also a form of an identity card and was recognized by the banks in the recent accounts update exercise.
- The electronic machine has the capacity of capturing 10 finger prints of voters. This measure was taken to prevent citizens from registering twice. If one finger print was captured, there is the possibility of going to another centre and register with the remaining finger prints.
- Handicaps were accommodated to exercise their rights.

**Challenges Include: Human and Material**

- Inability of the machine to capture biometric data of registrants
- Inadequate training – Some of the registration officers largely from members of the National Youth Service Corps (NYSC) initially found it difficult to operate the Direct Data capturing (DDC) machines.
- The laptops go off after 60 minutes on battery power.
- The machine was slow in capturing finger prints of people.
- In most cases, there is no electricity to recharge the laptops.
- There were frustrations
- There was also long waiting and queuing at the registration centres.

One registrant commented: “I have been waiting and waiting. The other time, they said there was no light and the battery was dead. Most of the time the machine was slow in capturing finger prints of people. I was going and coming..."
back, the same story. Thank God I have done it.” (Ndajihe, 2011).
- Some centres used generators donated by residents.
- Some centres asked voters for fuel money for generators before they could be registered.

**Biometric System and E-Voting in Nigeria**

Biometric is the science of measuring individual body characteristics (Thompson and Cats-Baril, 2003). Turban et al (2006), defines biometric system as an “authentication system that identify a person by measurement of a biological characteristic, such as finger prints, Iris (eye) patterns, facial features or voice etc.

Biometric is nothing other than the business of identification. An identification happens in different stages - having a suitable record or database of people to identify, and then actually verifying identities against a precompiled database containing records. In this instance, if someone presents himself / herself to be verified, his/her details will need to have been already there for that person to be recognized as someone. If the person’s details are not collected and stored in a database, then the person will be tagged as someone who was not registered.

The INEC 2011 registration exercise had lots of bottle necks. All this registration exercise did was only to register citizens with the hope that it will do away with multiple voting and ensure integrity in the process. This hope was not possible to an extent.

Biometric systems can identify an individual from a population of enrolled users by searching through a database for a match based on the person’s biometric trait or the system can verify a person’s claimed identity by matching the individuals biometric trait against a previously stored version. In order to implement a biometric authentication system, the physiological or behavioral characteristics of a participant must be scanned repeatedly under different settings. The scans are been averaged to produce a biometric template, or identifier. The template is stored in a database as a series of numbers that can range from few bytes for hand geometry to several thousand bytes for facial recognition. When a person uses a biometric system, a live scan is conducted, and the scan is converted to a series of numbers, which is then compared against the template stored in the database.

Example of different types of biometric templates includes the following:

- **Fingerprint Scanning:** Fingerprints can be distinguished through various “discontinuities or irregularities that interrupt the smooth flow of ridges” on the bottom tips of the fingers. Ridge endings, dots (small ridges), and ponds (space between ridges) are examples of such discontinuities (Kroeker, 2002). In fingerprint scanning, a special algorithm is used to convert the scanned discontinuities to a set of numbers stored at the template. The chance that any two persons have the same template is one in a million. (Kroeker, 2002).

- **Iris Scanning:** This is the measurement of the unique spots in the iris (coloured part of the eye), which are then converted to a set of numbers that are stored as a template and used to authenticate identity. This iris is the coloured part of the eye. Within a second, a special algorithm can convert the iris scan to a set of numbers. The numbers can then be used to construct an iris scan template, than can be used in iris scanning, in which a camera scans a person’s iris, compares the scan to a template, and verifies the person’s identity.

- **Voice Scanning:** Differences in the physiology of speech production from one person to another produce different acoustical patterns that can be converted into a template that can be used in voice scanning. In most voice scanning, the speaker talks into a microphone or telephone. When the user wants to gain access to the system, the user simply repeats the spoken word and the voice scan is verified within 4 to 6 seconds.

- **Keystroke Monitoring:** This is based on the assumption that the way in which users’ type words at a keyboard varies from user to the other. The pressure speed and rhythm through which a word is keyed in are converted through a special algorithm to a set of numbers to form a keystroke template. The word that is employed in most of these systems is the users ID or password. The system checks the pressure, speed, and rhythm with which the word is typed against the templates in the database.

- **Signatures:** Signatures are matched against the presorted authentic signature. This system can supplement a photo-card ID system.

- **Photo face:** the computer takes a picture of your face and matches it with a presorted one. This is difficult in identifying identical twins. Template generation is vital here and it allow proper recording of personal records.

**The use of biometric voting (e-voting) for 2015**

From the success of the partial use of the biometric machine in the 2011 election, Nigeria’s Independent National electoral Commission (INEC) along with the Nigerian Computer Society (NCS) and Nigerian Communication Satellite Limited (NIGCOMSAT) declared their unwavering support for an electronic voting (E-voting) system for 2015 elections.

This decision has been enforced as a result of serious allegations of vote rigging in the 2007 elections that brought the country almost to the brink of a violent conflict. The then Electoral Commissioner, Professor Attahiru Jega was determined to present another credible pool in the next five (5) years and sees e-voting as the best way to do so. Prof. Jega sees it also as the most reliable solution to electoral fraud, and malpractices that distort the democratic process and risk electoral violence. He points to the fact that Mozambique; an African Country adopted this process in its last election with great success (Adaramola, 2011).

INEC, NIGCOMSAT and NCS posit that electronic voting will overcome the problems of mass thumb printing of ballot papers, ballot stuffing, snatching of ballot boxes, voters impersonation, errors due to manual collation of results and multiple registration.

As a result, the INEC ICT Director, Engr. Emmanuel Akem said if an E-voting system is implemented “Everybody will be happy at the end of the day as the citizens will see that elections are transparent, and politicians will be helpless at certain level to rig elections”. The president of NCS, Professor Uwadia, further stated, “We do not have other choice than e-voting system for a transparent process in the 21st century knowledge economy” (Akaramola, 2011).

Significantly, the essence of e-voting rests on rather than increasing voters mistrust, electronic biometric voting builds and enhances public trust and confidence in the reliability and accuracy of the electoral process and results.

Finally, overwhelming evidence internationally had indicated that biometric voting can provide a guarantee of reliable, credible pools with result produced speedily and without any possibility of interference.
Evolution of Electronic Voting (E-Voting) technology in Nigeria

The development of E-voting system technology is credited to Engineer Timasaniyu Ahmed-Rufai (Director/Chief Executive of the Nigerian Communications Satellite Limited (NIGCOMSAT). According to Rufai, this development is premised on the fact that Nigeria is well known by the international community for her inability to conduct credible, transparent and reliable elections that are crucial to the provisions of the dividends of democracy to her teeming populace. Every quarter of a decade, Nigeria prepares for yet another election to determine who takes over the helm of affairs. The lack of enthusiasm displayed by Nigerian electorate came as disillusionment as a result of previous elections that have been marred by gross, wanton irregularities and lack of credibility thereby failing to involve the electorate in the process of electing a candidate of their choice.

As a result, Nigcomsat’s Printed Circuit Board (PCB) and Microelectronics centre of the Research and Development, embarked on a mission to mitigate the aforementioned issues. This was achieved by proffering an electronic solution to the existing manual system which is slow, tedious, bulky, unattractive and erroneous, as a means of providing a more secure and reliable system in which the electorate can have their votes count thereby shoring up confidence in the electoral process.

The electronic nature of the system moderates the level of human interactions with the system, thus diminishing its disposition to election irregularities, malpractices and human errors. The complete proof and adaptable technology can instantaneously give collated results if communication links are provided to all polling units from local, state to national levels. The estimated design and development time of both the hardware and software components will take 3 months for completion (Adaramola, 2011).

How Does The E-Voting System Work?

The E-voting system is a system that is developed by Engineer Timasaniyu Ahmed-Rufai with his team of software and hardware Engineers of the Research and development department of Nigcomsat Ltd. For the system to work, it will primarily adopt two technologies (a) Radio Frequency Identification (RFID) and Biometrics. The RFID is a technology that offers huge potential for automating processes, as well as providing accurate, reliable data. Its peculiar feature includes provision of a globally unique digital identity for each physical object. This technology comprises of two major units – tags and interrogators. RFID tags are known as transponders that listen to radio signal sent by transceivers/interrogators/Readers. When a transponder receives a radio query, it replies by sending a unique ID back to the interrogator for further processing. Biometrics technology on the other hand, provides means of recognizing human intrinsic physical trait unique to every individual (Adaramola, 2011).

In order to reduce the problems of voters registration as experienced in the last 2011 general Election, especially the cost of compiling voters list, it is better to adopt Automatic Voters Registration and Accreditation listing as being implemented in many countries like Germany, Finland, Denmark, Norway and Taiwan etc. using an Automated Accreditation Machine would have saved Nigeria millions of Naira. Officers without doubt seriously battled with the accreditation

Sections of the Proposed E-Voting System Nigcomsat

The e-voting system under Rufai’s technology solution is grouped into three parts: - (i) Registration, (ii) Voting and (iii) collation.

Registration

The Registration will directly capture the details of voters and stores it in a smart card and the details are sent remotely to a database in the election headquarters. It will consist of both hardware and firmware units combined to acquire and locally stores voters’ data such as fingerprints and personal data.

Voting Starts

With the verification of the voter, this is very essential to eliminate multiple voting. In furthermore, after the verification, voting starts. The voters follow the instructions to select the candidate in a polling booth. Before saving the details, the voters are prompted to confirm their selection and then a field is sent in the card to show what election the voter casted his vote for.

Collation

While voting is taking place, collation is also taking place simultaneously and the results are displayed real time on a web-based application. The casted votes are counted in real time. The votes can be viewed by all but cannot be modified. The communication link between the voting terminal and remote central database is protected against intruders. So, voters, can view results and monitor the progress of their candidate via web (Adaramola, 2011).

Advantages of NIGCOMSAT E-Voting over the Manual Electoral voting system In Nigeria

The advantages include that:

i. It is biometric based, and there is no possibility of multiple voting.
ii. Impersonation is impossible, i.e. one cannot take someone else’s card and vote with it.
iii. Invalid vote as a result of Ink smear in the traditional voting system is eliminated through e-voting system which is just by clicking.
iv. Real-time online view of the system of the votes casted makes the system more transparent.
v. Bulk paper works is eliminated by the e-voting system.
vi. Possibility of human error is reduced.
vii. It can be programmed for voter to vote from any part of the country for the candidate of his choice, thus eliminating the risk, cost and stress of travelling.
viii. Nigerians in Diaspora can vote irrespective of their Geographic location.
ix. The network is a highly secured one.

Disadvantages
i. Fear of hacking when the machines are networked.
ii. Lack of adequate infrastructural amenities such as power and inadequate ICT access in some geographic regions of the country.
iii. Literacy levels of the electorates are low.

E-Voting and the Physically Challenged

In Nigeria, for every election, there is a new law. There is also fresh registration of voters for every general election. For instance, the 1999 election that was conducted by the outgoing military regime came with impromptu rules and regulations for the election. Also, the 2003 pools under the auspices of former President Olusegun Obasanjo – led civilian administration was conducted with the 1999 constitution alongside the 2002 Electoral Act. Another Fresh registration of voters was conducted to replace the 1999 register. The 2007
elections were christened on the 2006 Electoral Act with fresh voters list compiled.

In like manner, the 2011 election passed through four Laws – Electoral Act 2006, Electoral Act 2010, Electoral Act 2010 (First Amendment) and Electoral Act 2010 (Second Amendment).

In light of the several changes in Law, Nigeria’s INEC and NCS emphasized the need for sufficient time to be given for the adoption and implementation of technology needed for electronic voting. For instance, the INEC ICT Director, Engineer Emmanuel Akem stated that: “If the Law was amended on time to allow for the use of electronic voting (e-voting) machine for 2011 elections, INEC would have come out with the best machine in the world otherwise it will be of no use if we are not given the mandate on time. If the Law is amended two years before elections, it will be implemented, but if it is amended six months before the elections, then it’s of no use” (Tawiah 2011).

This translated to the fact that if the legislature in Nigeria want to change electoral laws against the 2015 elections, it must do so two years before the elections in order to allow INEC adequate preparation in the provision of the electronic machines to allow time for adequate training of personnel for the 2015 general election.

Based on the foregoing, we propose a conceptual framework of the relationship between National election and Biometric voting (E-voting).

Our proposal presupposes that National election can be measured through voters’ registration and voters’ accreditation. Also, Biometric voting can be measured through constant power supply and adequate security.

**Figure 1. Conceptual Framework**

Source: Desk Research, 2012

**Conclusion, Recommendations and Implications**

The 2011 general election was credible, reliable and transparent. The European Union Chief Election observer, Mr. Aloiza Petel commended the election result credibility and reliability and calls this success a bulky agenda for 2015. The election observers from the civil society also described the election as a great improvement compared to other Nigerian elections. Further, the international community highly commended the credibility of the election. For instance, David Macrey for the International Community highly commended the efforts of Nigerians (Moji, 2011).

The implementation of the automated electoral system using biometric data would enable the hosting of free and fair election in Nigeria. The system will help to eliminate election irregularities, the stoppage of thugs’ activities at the polling boots and stealing of ballot papers and boxes. This will also give credibility to elections in Nigeria.

The paper recommends that the government should provide regular power supply to effectively allow for the use of the biometric system.

- That adequate security be maintained 24 hours
- That the leaders should have the fear of God in them and ensure that their obligations are fulfilled.
- That voters list updating be established as opposed to a wholesome list complication.
- Provide biometric data base of all Nigerians.

The implications will be that the citizens can be sure that they alone can choose their leaders, thus, exercising their rights in the democratic process. Also to further empirically investigate the relationship between National elections and electronic voting.

**References**