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Security and preservation of election data in Nigeria in the fourth industrial revolution

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Abstract

A fraud-free and credible election is a necessary ingredient to the growth of democracy. Election malpractices and violence, from 1959 till date, have offered major challenges to the Nigerian political system. To achieve a sustainable democracy in Nigeria, it is important to build public trust by ensuring the security and preservation of electoral data. The world has gradually moved into the Fourth Industrial Revolution (4IR), an era where artificial intelligence, big data, internet of things, robotics, blockchain, cloud computing and 3-D printing technologies dictate the pace of activities in all walks of life. This paper suggests specific 4IR technologies solutions to electoral data security and preservation challenges. It also suggests that the Nigerian Government announce policies to serve as catalysts for the Independent National Electoral Commission and stakeholders to harness these developments to ensure that electoral processes benefit from these technologies.

Keywords

election, fourth industrial revolution, data security, data preservation

Introduction

It is generally believed that a free and fair election is crucial to the sustenance of democracy. However, the potential for election malpractices overshadow electoral process in Nigeria. Electoral malpractices or fraud are committed with an intention to influence an election in favour of a candidate(s) by means such as illegal voting, bribery, cheating and undue influence, intimidation and other acts of coercion exerted on voters, falsification of results, fraudulent announcement of a defeated candidate as winner with or without altering the recorded results (Ogbeidi, 2010). For the Independent National Electoral Commission (INEC) to conduct credible elections, it needs to adopt relevant technologies to secure and preserve electoral data.

The world is gradually moving into the Fourth Industrial Revolution (4IR). The 4IR represents a developing environment in which disruptive digital technologies such as the internet of things (IOT), Cyber-Physical Systems (CPS), block chain, Artificial Intelligence (AI), cloud computing, big data analytic, robotics, Self-Monitoring Analysis and Reporting Technology (SMART) technologies, and 3-D printing technologies are changing our approach to work and lifestyle (Xu, David and Kim, 2018). The 4IR evolved from the previous three industrial revolutions.

The first industrial revolution, which began in the 18th century, enabled mechanized water and steam-powered production, rather than purely human and animal power. The second industrial revolution,

between the late 19th century and 20th century, introduced gas, oil and electric power, as well as more advanced communication technology (telephone and telegraph), for mass production of goods and automation of manufacturing process. The third industrial revolution, which began in the middle of the 20th century, was characterized with the advent of electronics, telecommunications, information technology and programming for automation of production process. The fourth industrial revolution of the present era is a digital revolution, where activities are carried out and controlled digitally (David, Nwulu, Aigbavboa and Adepoju, 2022).

There is no empirical evidence on the extent of applicability of the 4IR technologies to securing and preserving electoral data in Nigeria. However, there have been various attempts by scholars to share insights into electoral malpractices in Nigeria (Agbaje and Adejumobi, 2006; Animashaun, 2010; Oromareghake, 2013; Ojukwu, Mazi and Maduekwe, 2019). Agbaje and Adejumobi (2006) noted that electorates have neither voice nor power, and their mandate is freely stolen by the political barons in Nigeria. According to Animashaun (2010), elections in Nigeria have been marred by malpractices and the conduct of credible elections has remained an albatross. Oromareghake (2013) reported that post-colonial elections in Nigeria have been impaired by acrimony and rigging by desperate political office contenders. Similarly, Ojukwu, Mazi and Maduekwe (2019) noted that the 2019 general election was marred by vote manipulations and has credibility deficit. Scholars have also conducted studies on the possibility of the application of election forensics to detect irregular patterns and fraud in Nigeria electoral data (Beber and Scacco, 2008; Tunmibi and Olatokun 2020; Tunmibi and Olatokun 2021).

Brief history of elections in Nigeria

Election fraud, from 1959 till date, has challenged the Nigerian political system. According to Edoh (2004), incidents of violence, and stuffing of ballot boxes as well as obstructions and intimidation of opponents were reported during the Nigeria's 1959 parliamentary elections. Awopeju (2011) noted that elections for the Western House of Assembly in 1965 ended in violence as a result of widespread rigging. Due to widespread election rigging and violence, the first military coup took place in Nigeria on January 15, 1966.

According to Oromareghake (2013), election rigging was also reported during the elections organised by the military in 1979. The observed rigging during the election brought about the phrase "Stolen Presidency", which has since become part of Nigeria's political vocabulary. The faulty election ushered in a civilian administration, governed by the National Party of Nigeria. Election rigging was also reported in the 1983 elections. Animashaun (2010) noted that there was mayhem in the two Southwest states of Oyo and Ondo as a result of the massive manipulation of votes in favor of the ruling National Party of Nigeria. Violence erupted due to the perceived manipulation of the governorship polls in these two states. In addition to the heavy human and material losses suffered by political opponents, the headquarters of the electoral body, Federal Electoral Commission (FEDECO), in Oyo and Ondo states were set on fire. On the 31st of December 1983, the military intervened once more and took over the government. It was not until May 1999 that democracy was restored.

According to Osinakachukwu and Jawan (2011), the polity had been so damaged that people no longer showed interest in politics due to the prolonged reign of military dictatorship. The lackadaisical attitude shown towards the 1999 elections by Nigerians gave the military junta a free hand to manipulate the elections to give power to their preferred candidate, Obasanjo (Osinakachukwu and

Jawan, 2011). The 2003 elections also failed to meet basic international standards. Agbaje and Adejumobi (2006) noted that the 1999 and 2003 elections, like virtually all the other preceding elections in Nigeria's post-colonial history, were classic cases of electoral fraud.

The 2007 elections were described as the worst in Nigeria's history ranking among the worst conducted anywhere in the world in recent times (Onebamhoi, 2011). The elections were characterized by late arrival of electoral materials in the various polling units, inadequate polling materials, voters' registration problems, no secrecy of the ballot, ballot paper problems, snatching of ballot boxes and destruction of ballot materials, violence, use of security agencies to intimidate voters and rig elections, no voting in some polling centres, use of government officials to commit electoral fraud, and omissions of some parties' logo and candidate names on the ballot paper to disenfranchise their opponents' supporters (Kia, 2013). Although, the 2011 presidential election was commended by observers as one of the most successful in Nigeria's political history, cases of stuffing of ballot boxes, under age voting and outright falsification of election results were also reported in some states (Yusuf and Zaheruddin, 2015).

Similar to the previous elections, the 2015 presidential elections were impaired by vote buying, bribery, violation of electoral rules and other irregularities, while the phenomenon of money politics reached its zenith in Nigerian politics (Sule, 2019). The European Union Election Observation Mission (2015) also reported that the 2015 general elections were marred by malpractices, despite being largely peaceful. Likewise, the European Union Election Observation Mission (2019) reported that Nigeria's 2019 general elections were marked by severe operational and transparency shortcomings, electoral security problems, and low turnout. In addition, journalists were subjected to harassment and scrutiny of the electoral process was largely compromised with some independent observers obstructed in their work by security agencies. Ojukwu, Mazi and Maduekwe (2019) reported that the 2019 general elections were, to a large extent, fraudulent as they were marred by the inflation of election result figures, multiple voting, falsification of election results, delay in commencement of voting, and result manipulation. All of which resulted in the subversion of the will of people.

Technologies deployed by INEC in the fourth republic

In contrast to the collapsed first (1960-1966) and second (1979-1983) republics, and the aborted third republic (1993), democracy has been sustained in the fourth republic (1999 till date). The Independent National Electoral Commission (INEC) was established by the 1999 constitution of Nigeria and has been able to conduct successive elections to sustain the nation's democracy. The first and historic Nigeria general election in the fourth republic was conducted in 1999. Voters registration was done manually with pen on a form provided by INEC. There was no database of voters nor was any Information Communication Technology (ICT) introduced to reduce multiple registrations (The Carter Center, 1999). Hence, the electoral process of 1999 allowed all forms of malpractice. In 2003, INEC introduced the Optical Magnetic Recognition (OMR) forms to be used simultaneously with the manual approach of 1999 election. INEC also added a database for scanned records from the OMR forms which were processed to produce the voters' register. There is a unique number on each OMR form for every registered voter. This number, together with register voter's thumb print and other necessary details, were used in printing the Temporary Voters Card (TVC). INEC attempted to address the issue of multiple voting by introducing the AFIS (Automated Finger Prints Identification System) to clean the register (Ayeni and Esan, 2018).

In 2007, INEC introduced the Direct Data Capture Machines (DDCM) for voter registration. The motive for the procurement of DDCM was to eliminate multiple registrations and multiple voting. Unlike the OMR technology, DDCM allows the capturing of a voters' photograph, which created a more robust database for the electronic voters' register. In the 2011 general election, INEC procured more DDCMs and applied more effective AFIS in an attempt to eliminate multiple registration. INEC also introduced the use of electronic mail for transmitting results from local governments and states to the headquarters in Abuja. Although not fraud-free, the overall approach seemed to produce a more credible general election than the previous elections in the fourth republic (Nwagwu, 2016).

More sophisticated ICTs were procured by INEC for the 2015 elections. For the AFIS, INEC ensured that two finger prints were captured during the voter registration exercise. INEC introduced the Permanent Voter Cards (PVCs) to replace the TVC. The commission also introduced the Smart Card Reader (SCR) which allows the accreditation of voters, authentication for identifying a voter's face, verifying the validity of the PVC, and authenticating fingerprints. With this process, no voter can be accredited twice because the Voter Identification Number (VIN) is stored in the SCR after the accreditation of the PVC. Although reports revealed that INEC developed the e-collation website before the 2015 elections, the implementation of e-collation did not commence until 2016 (Ayeni and Esan, 2018). INEC maintained the continuous voters registration for the 2019 general elections, procured more SCR and improved on the AFIS. In recent elections, INEC adopted full implementation of electronic transmission of results, in real time, from polling units to collation centers.

The need to align electoral process with the 4IR

Different studies have revealed challenges to Nigeria's electoral process, including data security and voter authentication issues (Agbaje & Adejumo, 2006; Onebamhoi, 2011; Chuks & Arnesh, 2019). Also, observations have shown many deficiencies in the deployment of some of the current technologies adopted by INEC. For example, there are cases of rejected fingerprints for the biometric recognition process during the 2015 and 2019 elections, which could be due to the poor quality of the fingerprint scanners. There are also cases of inadequate biometric verification attributed to poor picture quality. Hence, there is a need to develop a smart technology infrastructure to aid in the delivery of credible electoral process. INEC, government and electoral stakeholders should enhance the electoral system by promoting the alignment of the electoral process with relevant 4IR technologies. This will aid the preservation and security of Nigeria electoral data.

There are three 4IR technologies that could be of great benefits to INEC. These technologies are The Internet of Things, cloud computing and artificial intelligence. With the adoption of smart biometric technologies (The Internet of Things), INEC should be able to properly identify voters, which will increase electorates' confidence, renew interest in the electoral process and increase voter turnout. Likewise, cloud computing could be integrated into electoral system technology for cloud storage of electoral data. With a cloud storage system, INEC is guaranteed a continuous stream of electoral data from different units into servers managed by a hosting platform. Hence, by implementing cloud computing, INEC could solve a major challenge of ballot tampering, as all data will be secured in cloud storage. Artificial intelligence, using machine learning techniques, could also be adopted to detect patterns of electoral manipulations in some polling stations and the extent of the manipulations across polling units within a ward or state.

Hacking and cybercrime are potential concerns in the modern era. Hackers can hack into insecure 4IR electoral technologies to manipulate results and undermine voters' confidence in the election process. Stakeholders must realize that both foreign and local actors could be interested in tampering with election results in favor of an acceptable candidate. Therefore, it is important for the Nigerian government to introduce policies that support the adoption of 4IR electoral technologies to secure the electoral data. These policies include, but are not limited to, support of a sophisticated artificial intelligence based electoral data security center; smart biometric technologies for voters' verification, authentication and accuracy; cyber security solutions using The Internet of Things, and artificial intelligence for machine learning. Regular internal and external vulnerability assessment and penetration test for the whole platform; and training and necessary skill acquisition programs for operators must be done on an on-going basis.

Conclusion

This study focused on the security and preservation of election data in Nigeria in the fourth industrial revolution. The authors have shown, citing different studies, that all elections conducted in the fourth republic were marred with electoral malpractices. Although INEC has invested in different technologies in order to improve the credibility of the elections, much more can still be done. Despite the introduction of biometric technology such as Smart Card Reader (SCR), INEC still struggles with voters' authentication concerns. Hence, INEC and electoral stakeholders need to rethink and consider strategies to align the electoral process with the 4IR implementations. It is our opinion that alignment with the implementation of 4IR would not only help to secure and preserve Nigeria electoral data, but also help INEC to meet the international standard for the provision of viable, successful and generally acceptable electoral process.

We therefore recommend that INEC should align the electoral process with 4IR technology implementations such as The Internet of Things, cloud computing and artificial intelligence. The Nigerian government should put relevant policies in place to harness the developments in 4IR as well as support INEC and other stakeholders to acquire appropriate 4IR electoral technologies so as to secure and preserve Nigeria electoral data. In addition, we recommend a continuous update of the electronic voters' register (EVR) to clean the database of illegitimate voters.

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Endnotes

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