



**IMPACT OF TECHNOLOGY ON ELECTION RESULTS  
MANAGEMENT IN NIGERIA**

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**Abstract**

*Most recently, one of the most challenging aspects of overall election management in Nigeria has always been election result management despite the various technology adoptions. This has led to concern regarding the accuracy and integrity of the electoral process in Nigeria. It is on the note this study examines the impact of technology on the election result management in Nigeria. The study specifically assesses the influence of Bimodal Voter Accreditation System (BVAS) on election result management and evaluates the effect of INEC Election Result Viewing Portal (IREV) on election result management in Nigeria after the Edo and Ondo Gubernatorial election in Nigeria. Sample of the study was purposefully sampled from election experts' respondents with varied distinct requirements and desires. The results from the regression analysis indicated a positive and significant correlation between BVAS and IREV technology component with election results management. In line with the conclusion of the study, it is recommended that, as technology continues to evolve, it is crucial that election officials continue to adapt and utilize the latest advancements to ensure that elections are conducted smoothly and accurately.*

**1.0 INTRODUCTION**

Over the years, election results management has remained one of the most challenging aspects of the overall election administration in the country. This is to the extent that an otherwise good election day process in terms of timely opening of poll, sufficient provision of men and election materials, enthusiastic and highly disciplined electorates and party agents, peaceful and election conduct suddenly fall into pieces during the stage of counting of ballots, result entry and election results collation such that the eventual outcome (i.e the declared results) is often wide apart from public expectations.

Indeed, in many instances, the malpractices perpetrated in the determination of election outcome takes place not so much at the polling stations but rather during collation at the higher levels. It is thus, quite understandable why stakeholders have become very agitated and as such want election results to be far more quickly than they were in the past. The justifiable lack of thrust in the election collation process has therefore challenged the integrity of the Electoral Management Body (EMB) in its quest to achieve credible election in the country. This ugly situation explains quite often why rather than the polling station, collation centers have become the battleground.

Moreover, as a means of solving this problem and restoring the much-desired credibility in the electoral process, the Independent National Electoral Commission (INEC) resorted to the adoption of technologies such as Permanent Voters Card (PVC), Bimodal Voter

Accreditation System (BVAS), Collation Support Result Verification System (CSRVS) and INEC Election Result Viewing Portal (IReV) with the help of Electoral Act, 2022. These technologies are aimed at addressing the ten most pervasive weaknesses in Nigeria's election result management process which include falsification of votes at polling units, falsification of number of accredited voters, collation of false results, mutilation of results and computational errors, swapping of results sheets, forging of results sheets, snatching and destruction of results sheets, obtaining declaration and return involuntarily, making declaration and return while result collation is still in progress and poor recordkeeping. The ascendance of these initiatives represents a significant intervention in the management of election outcomes (Wahab, 2024; Amusan, 2024; Yakubu, 2022; Leober, 2020).

Assessing the current results management system is the first step towards a successful EMB. It can pinpoint areas that need improvement after a thorough and frank examination. As modifications are found, the evaluation process will be guided by the EMB's own infrastructure and communications capabilities as well as the availability and adaptability of external communication channels in the general public. However, as developments are rarely linear, EMBs cannot assume that technology or ICT-infrastructure deployed and utilized during the previous election (2023 general election) are still operational, or that current staffs know how to properly operate the equipment. Legal or regulatory changes since the initial introduction of technology may render the old technology unfit for use.

Despite the various innovations adopted by INEC for the 2023 General Election, there were some concern regarding the accuracy and integrity of the electoral process, specifically in relation to BVAS and IReV. The EMB admitted that IReV portal experienced glitches during 2023 General election causing delay especially in relation to the presidential election results upload. However, the implication of those challenges on the credibility of the electoral process is not lost.

It is against this background this study seeks to explore the perceptions of stakeholders on conceptual underpinnings of technology deployment role in election results management, alongside empirical evidence that illustrates its impact on election outcomes in Nigeria. The study specifically:

- i. assess stakeholders' perceptions of the effect of BVAS on election results management in Nigeria.
- ii. evaluate stakeholders' perceptions of the influence IReV on election results management in Nigeria.

In line with the specific objectives, the following null ( $H_0$ ) hypotheses are formulated:

$H_{01}$ : BVAS is not associated with election results management.

$H_{02}$ : IReV has no influence on election results management.

By examining the improved technological interventions with a focus implementation after the 2024 Edo and Ondo Gubernatorial Elections, this study seeks to highlight both the potential benefits and the existing challenges. Ultimately, a comprehensive understanding of the relationship between technology deployment and election results management will facilitate more effective practices and policies, thereby enhancing the democratic experience and public trust in electoral processes within Nigeria's complex political landscape.

## **2.0 LITERATURE REVIEW**

### **Conceptual Review of Election Technology**

The concept of technology like every other similar term has received a plethora of definitions. According to Omoleke (2017), technology can be seen as a tool (or machine), a technique, the cultural force or a combination of the three, it could also be entities, both material and immaterial created by the application of mental and physical efforts in order to achieve some values. Coccia (2019) view technology as a complex artifact system made or used by living systems while Barak (2005) conceptualizes technology as the deployment of knowledge to achieve human aims, or towards the tinkering of the human environment. Wahab, Rose and Osman (2012) defined technology as the combination of knowledge or technique, with the action of doing in order to achieve a desired result, either to resolve a problem, exploit assets, or complete a particular task.

Consequently, election technology is broadly seen as information and communication technologies used in planning, managing and conduct of elections. This includes the digitalization of information, text, pictures, sound, the digital data storage, and processing of information such as biometric matching algorithms (McDermott, Cox & Roblot, 2022). Furthermore, the phase of election technology deployment in Nigeria involves Pre-election period (IVED for production PVC), Election period (BVAS for authentication and accreditation) and Post-election period (IReV for transmission of result).

Two technical advancements praised for increasing election results transparency and public confidence in recent elections are the Bimodal Voter Accreditation System (BVAS) and INEC Election Result Viewing (IReV) Portal. A technical tool called the BVAS is utilized to recognize and validate voters' fingerprints and facial recognition prior to voting. Additionally, the polling unit (PU), Registration Area (RA), Local Government Area and State election result sheet can be captured using the device and transmit to the IReV (Yakubu, 2022).

On the other hand, IReV is an internet portal where results at the polling unit level are uploaded straight from the polling station, sent, and made public. The public can register personal accounts on the internet portal's front end, which will allow them to view all uploaded results that are saved as PDF files. Election observers and other interested parties can monitor and confirm election results in real-time thanks to a technology called IReV (Yakubu, 2022).

### **Conceptual Review of Election Results Management**

Election results management can be referred to the process of collecting, verifying and disseminating election results in a transparent, accurate and timely manner. In other words according to Cobos-Flores and McDermott (2015), it contains all elements related to the count, aggregation, analysis and publication of votes once they have been counted at the lowest level (PU)". It may include three standard stages in which stage 1 entails storage of election results, stage 2 covers the transmission of election results and stage 3 relates to processing and publishing of election results.

Results management is unarguably the most important component of election administration, aside from voting. In fact, it may be more significant than voting for the majority of candidates and political parties. The explanation for this is not implausible. Although voting is a free and public process, results management is often handled by a small number of election officials, largely out of the public eye. Politicians and even the general public are therefore frequently concerned that the results might be manipulated and might not accurately represent the votes cast.

Past events in Nigeria system, where there has been widespread election result manipulation and fraud, have reinforced this sentiment. As a result, one may argue that the effectiveness of an election depends on how well the results are handled. The 2022 Electoral Act as well as the Commission's guidelines and manuals were the game-changer, enabling the Commission to use electronic methods for results management and accreditation. Indeed, the current legal framework, administrative practices, and technological advancements brought about by the Commission recently adequately reflect the Commission's tenacity on these issues, especially in the management of results (Yakubu, 2023).

## Theoretical Frameworks

The theories underpinning this study are prospect theory and agency theory. **Prospect theory** was propounded by Kahneman and Tversky (1979) and it is a theory that describes how people or organizations make decisions under uncertainty. It posits that people tend to be risk-averse when it comes to gains but risk-seeking when it comes to losses. This can have implications for relationship between technology deployment and election results management.

In the context of technology deployment, organizations such as INEC may be hesitant to invest in new technologies or citizens/voters may be doubtful of the new technologies introduced if they are uncertain about the potential gains they may bring. There might be fear that the investment will not pay off and therefore be reluctant to take the risk. However, if the organization is facing potential losses due to outdated technology or falling behind with the citizens/voters expectation, they may be more willing to take the risk and deploy new technologies in order to avoid further losses.

In the context of election results management, election officials may be risk-averse when it comes to adopting new technologies for fear of potential failures or security breaches that could lead to negative outcomes such as inaccurate results or voter fraud. However, if the current system is perceived as flawed or inefficient as previous elections, officials may be more willing to take the risk and deploy new technologies such as BVAS and IReV in order to improve the accuracy and efficiency of the election process.

Additionally, the **agency theory** proposed by Jensen and Meckling (1979) is utilized to analyze how the implementation of election technology affects the management of election results by exploring the interactions among various participants in the electoral process. In this scenario, agency theory emphasizes the possible conflicts of interest and incentives that arise among different stakeholders, including election officials, technology providers, political parties, and voters.

In terms of deploying election technology, agency theory implies that the incentives and motivations of these stakeholders can significantly affect how election results are managed. For instance, election officials might be driven to implement new voting systems to enhance efficiency and accuracy, whereas technology vendors may be motivated to market their products and maximize their earnings. Political parties may also have a significant interest in the election's outcome and might attempt to influence technology (BVAS and IReV) usage to gain an edge.

Moreover, agency theory brings attention to the potential conflicts of interest that can occur among these stakeholders, including worries about the security and integrity of the electoral process. For instance, election officials might feel pressured to ensure election results are both accurate and trustworthy, while also grappling with budget limitations and resource constraints. This situation could lead to choices that emphasize cost reduction at the expense of security protocols, thus jeopardizing the integrity of the election outcomes.

In summary, agency theory offers a valuable perspective for grasping the intricate dynamics involved in the adoption of election technology and how these elements can influence the management of electoral results. By evaluating the incentives and motivations of the various participants in the electoral process, decision-makers can more effectively identify potential conflicts of interest and make informed decisions to uphold the integrity and dependability of election results.

## **Empirical Review**

Wahab (2024) assessed the role of technology in Nigeria's electoral process during the fourth republic employing a qualitative research design. The study showed that despite challenges like technological glitches and political interference, technology has positively impacted the electoral process by addressing problems such as manipulation of results and multiple registrations. Similarly, Amusan (2023) examined the authentication issue at polling unit results after the 2023 Presidential election by electronic transmission to enhance electoral credibility. The study adopted qualitative data and the findings revealed that technology (ICT-enabled authentication) improved the accuracy and transparency of polling result and reduce electoral dispute to an extent.

Ayeni, Aweh, Badeji-Ajisafe and Atachin (2023) explored how technology deployment has reduced electoral malpractices such as ballot stuffing, voting by proxy, result collation manipulations and over-voting in Nigeria's 2019 and 2023. The result of the analysis showed that technologies have reduced multiple registration and voting, and reduced result manipulation at the collation center.

Arulogun (2023) examined the components of Nigeria's election administration system in the context of digitization and emerging technology. It was revealed from the study that the adoption technology had a profound impact on 2023 general elections in Nigeria. Additionally, Suleiman, Gambo and Izah (2021) assessed the role of technology in election management sampling five democracies. The study concluded that technology deployment in election allays voters fear and confidence is instilled that is their vote will count.

Similarly, Afolabi (2020) underscore a study on the level of technology deployment for elections, and the role and effectiveness of biometric technology as an anti-rigging and anti-fraud solution that would ensure credible elections in Nigeria. The study showed that there is increasing deployment of technologies in Nigerian election administration process, and that quite paradoxically, the high deployment level of biometric technologies affects voters' confidence and turn out negatively.

Furthermore as asserted by Ifeanyi, Oke and Atufe-Musa (2020), technological innovation plays a pivotal role in modernizing election results management, particularly in contexts marked by historical challenges such as those faced in Nigeria. Effective deployment of tools like biometric voter registration and electronic voting systems has been shown to enhance the integrity and transparency of electoral processes. For instance, the implementation of card readers and permanent voter cards (PVCs) has proven essential in reducing fraud and improving voter confidence in the electoral system. Owino and Mwikyab (2020) evaluated the relationship between biometric voter registration (BVR) and electronic identification system (EVID) on credibility of electoral system in Kenya by employing descriptive research design. It was revealed in the study that BVR and EVID efficiently reduce multiple registrations and multiple voting.

However, Omilisi (2018) assessed whether e-voting experiment was really a stepping stone or a stumbling block for electoral democracy in Nigeria. It was concluded that the 2015 election was seen as deviant from the past elections with INEC adoption of a biometric

voter’s card that reduced the loopholes in the electoral system to the minimum. The study of Omoleke (2017) set out to investigate the acquisition and application of technology in the conduct of elections in Nigeria and the data gathered were analyzed using the descriptive and inferential statistics. The study concluded that the application of technology in the conduct of Nigerian elections is a major instrument that could assist the election management body to achieve its vision and mission.

Kabiru, Abdulkabir and Baba (2017) examined the role of the card reader in authenticating registered voter, where in, it was found that there has been an increased rate in the use of technologies in Nigerian elections, and that specifically, the introduction of card reader in the process of election in Nigeria has made a huge impact in sanitizing the electoral process as well as reduction in electoral fraud and malpractices.

In a study by Chikodiri (2015) where the deployment of technologies for election administration in Nigeria, but specifically, the role of the card reader in improving the credibility of the 2015 general elections was investigated, the findings revealed that there has been an increasing rate of technological deployment for electoral purpose in Nigeria, and that has the potentials to improve the electoral process in the country.

### 3.0 METHODOLOGY

The model of this study was specified to assess stakeholders’ perception on impact of technology deployment on election results management in Nigeria. The relationship as established is mathematically expressed as:

$$\text{Election Results Management} = f \{ \text{Election Technology Deployment} \} \dots\dots\dots (3.1)$$

$$\text{ERM} = f(\text{BVAS}, \text{IReV}) \dots\dots\dots (3.2)$$

This was expressed econometrically as follows:

$$\text{ERM}_{it} = \beta_0 + \beta_1\text{BVAS} + \beta_2\text{IReV} + \mu_i$$

Where:

ERM = Election Results Management

BVAS = Bimodal Voter Accreditation System

IReV = INEC Election Result Viewing Portal

$\mu_i$  = Random error term

$\beta_0$  = constant

$\beta_1$  to  $\beta_2$  = estimated coefficients

A priori expectation =  $\beta_0 > 0, \beta_1 > 0, \beta_2 > 0$ ;

**Table 1: Variable Description and Measurements**

Dependent Variables	Independent Variables	
	BVAS	IReV
Timeliness of result transmitted	Effectiveness in verifying voter eligibility	Effectiveness in reconciliation and validation of election result from PUs
Accuracy of result transmitted	Accuracy of capturing voter data	Accuracy reconciling and validating election result from Pus
Security of result transmitted	Speed of processing voter data	Security of election result
Transparency of result transmitted	Transparency of the process of election	Transparency of election result
Accessibility of result	Security of voter data	Reliability in reconciling election

transmitted		results access from various multiple Pus
Technically reliability of result transmitted	Technical reliability of providing error-free authentication	Accessibility of result of election

### Researcher compilation (2025)

To obtain first-hand information from the field, a cross-sectional study design was used, and a standardized questionnaire was used to gather primary data. While the second section focused on assessing the relationship between the dependent variable, ERM, and the explanatory variables, technology deployment (BVAS and IReV), which are rated on a five-point Likert scale with 5 being ‘strongly agreed’ (SA), 4 being ‘agreed’ (A), 3 being ‘undecided’, 2 being ‘disagreed’ (D), and 1 being ‘strongly disagreed’ (SD), the first section included demographic data.

For the purpose of uniformity, respondents are categorized into seven groups based on their areas of expertise. Since every group is varied and has distinct requirements and desires, there are also differences in viewpoints regarding the use of technology in ERM. Election officials (INEC permanent and ad-hoc staff), policymakers (Lawmakers and government officials), citizens and voters, academia and researchers, international organizations (International Foundation for Electoral Systems (IFES), International Institute for Democracy and Electoral Assistance (IDEA), civil society organizations (Yiaga Africa)), Journalists and Media.

Every stakeholder active in Nigerian election activities makes up the study's population. Arising from the fact that the study’s population is unknown and its size is unpredictable, the study adopted a practical approach in choosing its sample. The sample size of 70 respondents was chosen using a purposive sampling technique, with 10 respondents chosen from each of the seven groups mentioned above. Because the dependent variables were ranked, the outcome variables were categorical, and the data were on a nominal scale of measurement, the study employed logistic regression to analyze the data.

## 4.0 DATA ANALYSIS AND INTERPRETATION

### The Reliability of the Study Instruments

According to Creswell (2010), the reliability of a research instrument, indicated by Cronbach’s Alpha, refers to the consistency and stability of the developed tool. George and Mallery (2003) asserted that the general guideline for reliability testing is as follows: a figure  $\geq .9$  indicates excellence,  $\geq .8$  signifies good,  $\geq .7$  is acceptable,  $\geq .6$  is questionable,  $\geq .5$  is poor, and  $< .5$  is deemed unacceptable. As shown in Table 1, the Cronbach’s Alpha coefficient was utilized to assess the reliability and internal consistency of the 5-item Likert scale. Therefore, the findings demonstrate that the scale exhibits good reliability and internal consistency with a Cronbach’s alpha coefficient of .878.

**Table 1: Reliability Statistics**

Cronbach’s Alpha	No. of Items
.878	18

Source: Field Work (2025)

### Model Fitting Information

This analysis presents the likelihood ratio test comparing a study model (Final) to one where all parameter coefficients are zero (Null). Given that the significance level of the test is less

than 0.05 (.000) in Table 2, it can be concluded that the final model surpasses the null model, indicating it effectively captures how well it fits the data.

**Table 2: Model Fitting Information**

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept	80.321			
Final	41.009	41.347	6	.000

Source: Field Work (2025)

### The Goodness of Fit Test

To assess whether the observed data contradicts the fitted model, this research utilized Pearson's chi-square statistic along with a chi-square statistic for the deviance. As shown in Table 3, the null hypothesis is rejected since the data align with the assumptions of the model, with significance values of 0.511 for Pearson and 0.503 for deviance, both exceeding 0.05.

**Table 3: Pearson and Deviance Test**

	Chi-square	Sig.
Pearson	29.711	.511
Deviance	22.177	.503

Source: Field work (2025)

### Pseudo R-Square

The study's coefficient of determination is assessed using Pseudo R<sup>2</sup>. This metric indicates the extent of variance in the outcome that can be explained by the independent variables, and what is considered a favorable R<sup>2</sup> value varies depending on the nature of both the outcome and the independent variables. As illustrated in Table 4, the pseudo R<sup>2</sup> values of 62% (Cox & Snell), 69.1% (Nagelkerke), and 58.9% (McFadden) show that the elements of election technology deployed (BVAS and IReV) account for a substantial portion of the variations in the factors affecting election results in Nigeria. Unsurprisingly, many factors can impact election results, with several of them serving as significant predictors.

**Table 4: Model Summary**

Cox & Snell	Nagelkerke	McFadden
.62	.691	0.589

Source: Field Work (2025)

### Test of Parallel Lines

The parallel lines test evaluates the assumptions of proportional odds and compares a model with a single set of coefficients for all categories to one that uses distinct coefficients for each category. It also assesses whether the assumption that parameters are consistent across all categories is reasonable. As indicated in Table 5, the proportional odds assumption for the study model appears to be valid, as the p-value of the Chi-Square statistic is .511, which exceeds 0.05. This suggests that employing logistic regression is appropriate.

**Table 5: Test of Parallel Lines<sup>a</sup>**

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Null Hypothesis	30.151			



General	29.888	1.987	6	.511
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The null hypothesis states that the location parameters (slope coefficients) are the same across response categories

**Source: Field Work (2025)**

### Regression Analysis

The effects of each predictor are summarized in Table 6, with the signs of the covariate coefficients and their relative values for different factor levels offering valuable insights into the influence of the model's predictors.

The impact of BVAS and IReV on election results in Nigeria is illustrated in Table 6 through the use of logistic regression. The established regression equation indicates that, while keeping other elements constant, a one-unit increase in the election technology deployment is associated with a predicted increase of 0.315 in the log odds of achieving a higher level of accepted election results. In broader terms, this suggests a higher likelihood of attaining a greater level of accepted election results as the values associated with a BVAS and IReV increase.

The findings reflect predicted increases in the log odds of achieving a higher level of accepted election results, with values of 0.32, and .047 for BVAS and IReV respectively. It is noteworthy that all variables (BVAS and IReV) align with the a priori expectation, showing positive coefficients.

**Table 6: Parameter Estimates**

GGPS	Estimates (Coefficients)	Std. Error	Wald	Df	Sig.
BVAS	.032	.016	3.443	1	0.000
IReV	.047	.015	12.708	1	0.022

**Source: Field Work (2025)**

### Discussion on Findings

The results from the study indicated a positive and significant correlation between BVA and IReV technology component with election results management, leading to the rejection of null hypotheses ( $H_{01}$  and  $H_{02}$ ). Furthermore, the findings align with previous research. The relationship identified between the elements of BVAS and IReV and election results management corresponds with the results of Wahab (2024) that showed that despite challenges like technological glitches and political interference, technology has positively impacted the electoral process by addressing problems such as manipulation of results, Amusan (2023) revealed that technology improved the accuracy and transparency of polling result, and Ayeni *et al.* (2023) depicted that technologies have reduced result manipulation at the collation center.

### 5.0 CONCLUSION AND RECOMMENDATIONS

In conclusion, the deployment of election technology has had a significant impact on the management of election results. In other words, the use of BVAS and IReV has enhanced the efficiency and accuracy of the election process. By automating tasks such as voter accreditation and authentication, and results reporting, election technology has reduced the likelihood of human error and helped streamline the election process. Additionally, election technology has improved transparency and accountability in the election process by

providing accurate and verifiable results in a timely manner. This has helped increase public trust in the electoral process, ensures that election results are fair and impartial and has contributed to the integrity of the democratic process.

In line with the conclusion, it is hence recommended that, as technology continues to evolve, it is crucial that election officials continue to adapt and utilize the latest advancements to ensure that elections are conducted smoothly and accurately. More so, there should be continuous collaboration between INEC, cyber security experts and other stakeholders to assessing and improving the security measures of election technology deployment to protect against cyber threats. Finally, INEC should be conducting regular audit and checks of election technology system to identify and address any potential vulnerabilities or weakness in the system to promoting trust and confidence in the election results.

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