

THE ROLE OF BVAS IN SAFEGUARDING ELECTORAL INTEGRITY: AN EVALUATION OF THE 2023 GENERAL ELECTIONS IN FCT, ABUJA

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Abstract: The Bimodal Voter Accreditation System (BVAS) was introduced in Nigeria to address election malpractices and enhance electoral integrity. This study evaluates the effectiveness of BVAS in safeguarding the 2023 general elections in Nigeria's Federal Capital Territory (FCT), Abuja, focusing on its role in reducing fraud and improving transparency. A quantitative research design was employed, utilizing online questionnaires to gather data from 385 respondents. Key findings reveal that BVAS significantly reduced voter impersonation and multiple voting, with 85.7% of respondents affirming its efficacy in curbing electoral fraud. However, challenges such as inadequate infrastructure, insufficient technical training for election officials, and low voter awareness hindered optimal performance. Binary logit regression analysis identified voter education, infrastructural development, and funding as critical determinants of BVAS success. While the majority of respondents acknowledged BVAS's contribution to transparency and fraud reduction, persistent technical and systemic barriers underscore the need for further refinements. The study concludes that BVAS holds promise for improving electoral credibility, but its full potential requires comprehensive voter education programs, robust infrastructural investments, and enhanced public awareness campaigns. Recommendations include targeted training for election personnel, technological upgrades, and policy reforms to address existing gaps. These measures are essential to maximize BVAS's impact and ensure sustainable electoral integrity in Nigeria.

Keywords: BVAS, Electoral Integrity, Voter Accreditation, Nigeria Elections, Electoral Transparency

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INTRODUCTION

Nigeria's democratic journey since its return to civilian rule in 1999 has been fraught with electoral challenges that undermine public trust and institutional legitimacy. Despite seven general elections (1999–2023) and numerous off-cycle polls, electoral malpractice—ranging from voter impersonation and ballot stuffing to delayed result

transmission—has persisted (Nnamani, Nduba, & Nwanolue, 2019; Yusufu & Gana, 2023). These irregularities have not only fueled post-election violence and protracted litigations but also diverted governmental focus from governance to crisis management, stifling national development (Ikelebe, 2013; Durotoye in Olufunmilayo & Ibukunoluwa, 2023). The manual voting system inherited at independence, vulnerable to political manipulation (Taye & Adedeji, 2022), set a precedent for systemic flaws that subsequent technological interventions, such as the 2015 Smart Card Reader (SCR) and Permanent Voter's Card (PVC), struggled to resolve (Olufunmilayo & Ibukunoluwa, 2023). Although these innovations reduced overt fraud, technical glitches, inadequate infrastructure, and poor voter education limited their impact (Assibong & Oshanisa, 2018; Kassem & Osasona, 2020).

The 2022 Electoral Act marked a paradigm shift by institutionalizing electronic voting technologies, including the *Bimodal Voter Accreditation System (BVAS)*, to enhance transparency and curb malpractice (Ogieva & Ajisebiyawo, 2023). BVAS, introduced by the Independent National Electoral Commission (INEC), combines biometric fingerprint and facial recognition to authenticate voters, aiming to eliminate multiple voting and impersonation (Egwunwoke, Kingsley & Osaremwinda, 2023). Piloted in smaller elections—such as the 2021 Isoko-South byelection and Anambra gubernatorial polls—BVAS initially showed promise but faced criticism for technical failures and logistical bottlenecks (Shaapera & Yusufu in Yusufu & Gana, 2023). Despite nationwide voter education campaigns (Orhero & Okolie, 2024), its debut in the 2023 general elections exposed critical weaknesses: malfunctioning devices, insufficiently trained personnel, and systemic delays in result uploads (African Union, 2023; Nwabuoku, Esavwede, & Mrabure, 2023). These shortcomings reignited debates about Nigeria's capacity to leverage technology for credible elections.

Existing scholarship on electoral technology in Nigeria—including studies on the Electronic Voters Register (EVR) and SCR (Alebiosu, 2016; Dahiru, Ibrahim, & Mustapha, 2017)—has largely focused on earlier innovations, leaving gaps in understanding BVAS's role in a high-stakes national election. While Ayeni and Esan (2018) and Audu and Akuva (2020) highlighted the SCR's potential, their work predates BVAS's implementation. Similarly, Ogbeide-Ihama (2022) critiqued INEC's preparedness for technological integration but did not empirically assess BVAS's performance. This study addresses these gaps by examining BVAS's efficacy during the 2023 Federal Capital Territory (FCT) elections, a microcosm of Nigeria's broader electoral dynamics.

Despite BVAS's theoretical promise, its practical application in the 2023 elections failed to eliminate malpractice, as evidenced by widespread litigation and public skepticism (African Union, 2023). While BVAS reduced overt fraud, underlying issues—such as inconsistent biometric capture, poor internet connectivity, and voter apathy—persisted (Shaapera & Yusufu in Yusufu & Gana, 2023). This dissonance between technological

potential and operational reality raises critical questions: *To what extent did BVAS safeguard electoral integrity in Nigeria's 2023 elections? What systemic and technical barriers hindered its optimal performance?*

This study evaluates BVAS's impact on electoral integrity in the FCT, Abuja, during the 2023 general elections. It tests the hypothesis:

H01: The use of BVAS machines did not significantly reduce incidents of voter impersonation and electoral fraud during the 2023 general elections in the FCT, Abuja.

LITERATURE REVIEW

Bimodal Voter Accreditation System (BVAS) and Electoral Integrity

The *Bimodal Voter Accreditation System (BVAS)*, introduced by Nigeria's Independent National Electoral Commission (INEC), represents a technological leap in voter authentication. Combining biometric fingerprint and facial recognition, BVAS aims to eliminate voter impersonation and multiple voting by ensuring only eligible voters are accredited (Egwunwoke, Kingsley & Osaremwinda, 2023). Beyond accreditation, BVAS serves as a tool for real-time result transmission through the INEC Result Viewing Portal (IReV), enhancing transparency by allowing public access to uploaded polling unit results (INEC, 2023). This dual functionality addresses longstanding issues of electoral fraud and mistrust, as evidenced by its role in reducing overvoting and post-election litigation (Audu & Akuva, 2020; Kassem & Osasona, 2020). However, technical limitations—such as inconsistent biometric capture and poor internet connectivity—have hindered its full potential (Shaapera & Yusufu in Yusufu & Gana, 2023).

Electoral integrity, defined as adherence to democratic principles of fairness, transparency, and professionalism throughout the electoral cycle (Kofi Annan Foundation, 2012), remains central to Nigeria's democratic aspirations. Abdulrazaq and AbdulRauf (2022) expand this definition to include legal compliance and international standards, emphasizing the need for holistic reforms. Norris (2018) further distinguishes between *negative integrity* (absence of fraud) and *positive integrity* (credibility and competitiveness), underscoring the multidimensional nature of electoral trust. In Nigeria, debates on integrity often focus on technological interventions like BVAS, which promise to mitigate malpractice but face systemic challenges (Orhero & Okolie, 2024).

Empirical Insights on Electoral Technologies

Previous studies highlight mixed outcomes of Nigeria's electoral technologies. The Smart Card Reader (SCR), precursor to BVAS, improved voter confidence in 2015 and 2019 elections but struggled with technical failures and poor voter sensitization (Audu & Akuva, 2020; Ogbeide-Ihama, 2022). Similarly, Kassem and Osasona (2020) noted SCR's role in reducing fraud despite logistical hurdles, while Peters (2015) critiqued its alleged

partisan manipulation. These findings align with global observations: Micheni and Murumba (2018) argue that while integrated technologies enhance efficiency, sustainability requires robust infrastructure and public trust—a challenge in Nigeria's context (Iwuoha, 2018).

Recent evaluations of BVAS reveal similar contradictions. Yusufu and Gana (2023), analyzing its deployment in Kogi State's 2023 elections, found no significant improvement in integrity due to INEC's failure to upload results in real-time and persistent malpractice. Conversely, Ogbeide-Ihama (2022) acknowledged ICT's potential to curb fraud but highlighted disenfranchisement from biometric failures. These studies underscore a critical gap: while BVAS's technical design is sound, its operational success depends on external factors like infrastructure, training, and political will (Nwabuoku, Esavwede, & Mrabure, 2023).

Gaps in Existing Research

Despite advancements in understanding the role of technological innovations like the *Bimodal Voter Accreditation System (BVAS)* in Nigerian elections, critical gaps persist in the literature. First, existing studies, such as Yusufu and Gana's (2023) analysis of BVAS in Kogi State, predominantly focus on regional contexts, overlooking the unique socio-political dynamics of the Federal Capital Territory (FCT). As the administrative and political heart of Nigeria, the FCT presents distinct challenges, including urban-rural disparities, heightened stakeholder scrutiny, and complex logistical demands, which may differently influence BVAS's efficacy compared to other states. Second, while prior research emphasizes technical shortcomings of electoral technologies—such as biometric failures and internet connectivity issues (Audu & Akuva, 2020; Ogbeide-Ihama, 2022)—systemic barriers like voter apathy, institutional inertia, and politicization of electoral bodies remain underexplored. These factors often interact with technological limitations, exacerbating electoral malpractices in ways that isolated technical analyses fail to capture. Finally, much of the current scholarship predates the 2023 general elections, leaving BVAS's performance in its first nationwide deployment inadequately assessed. Earlier studies on the Smart Card Reader (SCR) and other technologies (e.g., Kassem & Osasona, 2020) provide limited insights into how BVAS addresses emergent challenges in high-stakes, large-scale elections. This temporal gap underscores the need for contemporary evaluations that account for evolving voter behaviors, infrastructural advancements, and INEC's adaptive strategies post-2023. Addressing these gaps is essential to developing a holistic understanding of BVAS's impact on electoral integrity and informing context-specific policy reforms.

Theoretical Framework

This study employs the *Innovation Diffusion Theory (IDT)* (Rogers, 2003) to analyze BVAS adoption. IDT posits that technology's success depends on compatibility, complexity, observability, and trialability—factors critical to understanding why BVAS succeeded in pilot elections (e.g., Anambra 2021) but faltered nationally. By framing BVAS within IDT, this research bridges the gap between technological potential and contextual realities.

METHOD

Research Design

This study adopts a *quantitative research design* to evaluate the effectiveness of the Bimodal Voter Accreditation System (BVAS) in enhancing electoral integrity during the 2023 general elections in Nigeria's Federal Capital Territory (FCT), Abuja. Data were collected through a structured online questionnaire, enabling systematic analysis of voters' perceptions and experiences with BVAS. The design ensures objectivity and replicability while addressing the technical and socio-political dynamics of electoral processes in the FCT.

Data Collection

Primary data were gathered using a 25-item online questionnaire distributed via SurveyMonkey. The instrument was divided into three sections:

1. Demographics: Age, gender, education level, and voter registration status.
2. BVAS Effectiveness: Perceptions of BVAS's role in reducing fraud, technical challenges, and voter education adequacy.
3. Electoral Integrity: Metrics on transparency, result credibility, and trust in INEC.

The questionnaire underwent pilot testing with 30 respondents to ensure clarity and validity. Cronbach's Alpha ($\alpha = 0.82$) confirmed internal consistency.

Population and Sampling

The target population comprises registered voters in the FCT, projected at 4,026,000 (NPC, 2024). A representative sample of 385 respondents was determined using the SurveyMonkey sample size calculator, with a 95% confidence level and 5% margin of error. Stratified random sampling ensured proportional representation across the FCT's six area councils (urban and rural).

Analytical Tools

Data analysis proceeded in three stages:

1. Descriptive Statistics: Frequencies and cross-tabulations to summarize demographic trends and BVAS performance.
2. Inferential Statistics:

- *Chi-square tests* to assess relationships between BVAS deployment and reductions in fraud.
- *Binary logistic regression* to identify predictors of electoral integrity, including voter education, infrastructure, and funding.

3. Diagnostic Tests: Variance Inflation Factor (VIF < 5) confirmed no multicollinearity among variables.

Model Specification

The study employs a regression model inspired by electoral technology frameworks (Goar & Madugu, 2023; Onyambayi et al., 2024):

$$EI = \beta_0 + \beta_1(TC) + \beta_2(VE) + \beta_3(DSP) + \beta_4(FND) + \beta_5(IF) + U_i$$

$$EI = \beta_0 + \beta_1(TC) + \beta_2(VE) + \beta_3(DSP) + \beta_4(FND) + \beta_5(IF) + U_i$$

Variables:

1. EI: Electoral Integrity (dependent variable).
2. TC: Technology (internet connectivity, device functionality).
3. VE: Voter Education (awareness campaigns).
4. DSP: Data Security and Privacy (encryption, data protection).
5. FND: Funding (INEC's budgetary allocation).
6. IF: Infrastructural Facilities (power supply, network coverage).
7. U_i : Error term.

Expected Relationships:

1. TCTC, VEVE, DSPDSP, and FNDFND are hypothesized to positively correlate with EIEI.
2. IFIF moderates the effectiveness of BVAS, as poor infrastructure undermines biometric authentication (Shaapera & Yusufu in Yusufu & Gana, 2023).

RESULT AND DISCUSSION

Demographic Characteristics and Voter Engagement

Table 1: Demographic Characteristics of Respondents

Variable	Categories	Frequency	Percentage (%)
Age	18–29	150	39.0
	30–39	120	31.2
	40–49	80	20.8
	50 and above	35	9.0
Total		385	100
Gender	Male	210	54.5
	Female	165	42.9

	Prefer not to say	10	2.6
Total		385	100
Occupation	Student	100	26.0
	Civil Servant	120	31.2
	Private Sector Employee	75	19.5
	Self-Employed	70	18.2
	Unemployed	15	3.9
	Other	5	1.2
Total		385	100
Educational Level	Primary School	30	7.8
	Secondary School	90	23.4
	Tertiary Education	265	68.8
Total		385	100
Location of Voting	Urban	270	70.1
	Rural	115	29.9
Total		385	100

Source: Survey (2025)

Table 1 illustrates the demographic profile of respondents: a majority were young (18–29 years: 39%), male (54.5%), highly educated (tertiary education: 68.8%), and urban residents (70.1%). This aligns with Nigeria's urban youth bulge and suggests that younger, educated populations are more politically engaged, potentially skewing perceptions of BVAS efficacy toward tech-savvy demographics. The underrepresentation of rural voters (29.9%) may reflect accessibility barriers, such as limited internet connectivity or voter education, which are critical to BVAS functionality (Iwuoha, 2018).

Table 2: Voter Participation and Familiarity with BVAS

Question	Response	Frequency	Percentage (%)
Did you participate in the election?	Yes	320	83.1
	No	65	16.9
Total		385	100
Familiar with BVAS before election?	Yes	300	77.9
	No	85	22.1
Total		385	100
Accredited using BVAS?	Yes	310	80.5
	No	75	19.5
Total		385	100
Ease of using BVAS?	Very Easy	160	41.6
	Easy	120	31.2
	Neutral	60	15.6

	Difficult	25	6.5
	Very Difficult	20	5.2
Total		385	100

Source: Survey (2025)

Table 2 reveals that 83.1% of respondents participated in the elections, with 77.9% familiar with BVAS beforehand. However, 19.5% reported accreditation failures, and 11.7% found BVAS difficult to use. These gaps underscore operational inefficiencies, particularly among older or less-educated voters, echoing Ogbeide-Ihama's (2022) findings on biometric exclusion in rural Anambra.

BVAS Efficacy in Reducing Electoral Fraud

Table 3: Perceived Impact of BVAS on Electoral Integrity

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Percentage Agree (%)
BVAS reduced voter impersonation	180	150	30	15	10	385	85.7
BVAS reduced multiple voting	200	130	35	10	10	385	85.7
Timely transmission of results	190	100	65	20	10	385	75.3

Source: Survey (2025)

Table 3 demonstrates strong public confidence in BVAS: 85.7% agreed it reduced voter impersonation and multiple voting, validating its technical design (Egwunwoke et al., 2023).

Table 4: The use of BVAS has Improved Transparency in the Electoral Process

Rating	Frequency	Percentage (%)
Yes	219	56.9
No	166	43.1
Total	385	100

Source: Survey (2025)

However, Table 4 reveals a stark divide: while 56.9% perceived improved transparency, 43.1% disagreed, citing persistent manipulation by officials. This dichotomy reflects

Nigeria's dual challenge: BVAS curbs grassroots fraud but fails to address elite-level corruption, such as result tampering during transmission (African Union, 2023).

Table 7. Cross Tabulation between Election Integrity and BVAS

The use of BVAS has improved transparency and minimized corruption in the electoral process?	Did you participate in the election?		
	Yes	No	Total
Yes	219(56.9%)	0 (0.0 %)	219(56.9%)
No	101 (26.2%)	65(16.9%)	167 (43.1%)
Total	320 (83.1%)	65(16.9%)	385 (100.0%)

Chi Square Value 144.821 P.value 0.001 $\alpha=0.05$ df = 1

Table 7 (Cross-tabulation) confirms a significant association between BVAS use and perceived integrity ($\chi^2 = 144.821, p = 0.001$). Notably, all non-participants (16.9%) doubted BVAS's transparency, suggesting that disengagement correlates with distrust—a critical insight for INEC's voter mobilization strategies.

Systemic Challenges and Operational Barriers

Table 5: Challenges Faced

Challenge	Frequency	Percentage (%)
Poor technical infrastructure	140	36.4
Inadequate training of officials	100	26.0
Insufficient public awareness	90	23.4
Connectivity issues	50	13.0
Other	5	1.2
Total	385	100

Source: Survey (2025)

Table 5 identifies key hurdles: poor infrastructure (36.4%), untrained staff (26.0%), and low awareness (23.4%). These align with Shapera & Yusufu's (2023) critique of INEC's "technological optimism," where tools like BVAS are deployed without addressing contextual barriers. For instance, rural polling units often lack stable power (Collier & Vicente, 2014), rendering BVAS inoperable and disenfranchising voters.

Table 6 Suggestions for Improvement

Suggestion	Frequency	Percentage (%)
Enhance technical infrastructure and connectivity	154	40%
Provide comprehensive training for election officials	116	30%
Increase public sensitization on BVAS usage	96	25%
Ensure stable power supply at polling units	19	5%

Total	385	100
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Source: Survey (2025)

Table 6 highlights solutions proposed by respondents: 40% prioritized infrastructure, 30% staff training, and 25% voter education. These align with the regression analysis in Table 8, where infrastructural facilities (*IF*) and voter education (*VE*) significantly predicted integrity ($p < 0.05$). However, the negative odds ratio for *VE* ($\text{EXP}(B) = 0.328$) suggests that current education campaigns are inadequate or misdirected, exacerbating voter confusion rather than resolving it.

Table 8. Binary Logit Regression Result

	B	SIG	EXP (B)
TC	5.047	0.083	0.619
VE	-1.114	0.010	0.328
DSP	1.040	0.201	2.829
FND	0.924	0.106	2.519
IF	1.187	0.002	0.305
Constant	-2.880	0.203	0.56

Author's Computation using SPSS Version 23

Regression Analysis: Unpacking Contradictions

The binary logit regression (**Table 8**) reveals nuanced insights:

1. Technology (TC): The insignificant odds ratio ($\text{EXP}(B) = 0.619, p = 0.083$) reflects persistent technical failures, such as biometric mismatches and server crashes, which undermined BVAS's reliability despite its advanced design.
2. Funds (FND): While funding showed a positive trend ($\text{EXP}(B) = 2.519$), its insignificance ($p = 0.106$) mirrors Adedayo & Olaniyan's (2018) warning: without accountability, increased budgets fuel corruption rather than efficacy.
3. Infrastructure (IF): The low odds ratio ($\text{EXP}(B) = 0.305, p = 0.002$) underscores Nigeria's infrastructural deficit. For example, during the 2023 elections, only 40% of FCT polling units had backup power (INEC, 2023), disrupting BVAS operations.

Discussion

This study demonstrates that the effectiveness of electoral technologies like the Bimodal Voter Accreditation System (BVAS) is inherently tied to contextual factors such as infrastructure, voter education, and institutional accountability. While BVAS succeeded in reducing overt malpractices like voter impersonation (85.7% agreement, Table 3), its inability to curb elite-level corruption or ensure universal accessibility highlights a

critical gap in innovation diffusion frameworks. For instance, the negative odds ratio for voter education (VE: $\text{EXP}(B) = 0.328$, Table 8) suggests that current awareness campaigns fail to resonate with marginalized groups, particularly in rural areas where 29.9% of respondents faced accreditation challenges (Table 2). These findings align with Iwuoha's (2018) critique of biometric systems in low-resource settings, where technological optimism often overlooks systemic inequities. By emphasizing the interplay between observability (real-time results) and compatibility (contextual fit), this research refines Innovation Diffusion Theory (Rogers, 2003), arguing that electoral technologies must be evaluated not just for technical prowess but for their adaptability to socio-political realities.

To translate BVAS's potential into tangible democratic gains, Nigeria must adopt a multi-pronged approach. First, infrastructural upgrades—prioritized by 40% of respondents (Table 6)—are non-negotiable. Solar-powered BVAS units and satellite internet partnerships with telecom providers like MTN could mitigate rural exclusion, addressing the 36.4% of challenges linked to poor infrastructure (Table 5). Second, voter education requires radical restructuring. Collaborative campaigns with grassroots NGOs, using visual aids and local dialects, could reverse the negative impact of current programs (VE: $p = 0.010$, Table 8), particularly among the 23.4% of respondents citing low awareness. Third, institutional reforms are critical. Blockchain integration for result transmission would address the 43.1% skepticism about transparency (Table 4), while INEC tech academies could resolve the 26% staff training deficit (Table 5). These measures, if implemented, would align Nigeria's electoral process with Kenya's 2017 electronic voting reforms, which combined technology with rigorous oversight.

The study's mixed findings—celebrating BVAS's fraud reduction while exposing systemic flaws—mirror global debates on electoral technologies. For example, the regression result showing insignificant funding impact (FND: $p = 0.106$) echoes Adedayo & Olaniyan's (2018) caution that financial investments alone cannot resolve corruption without accountability. Similarly, rural voters' underrepresentation (Table 1) and accreditation failures (Table 2) validate Collier & Vicente's (2014) argument that logistical barriers perpetuate disenfranchisement. By contextualizing these issues within Nigeria's 2023 electoral crisis—marked by litigation and public distrust—the research underscores a pivotal lesson: electoral integrity hinges not on isolated technologies but on ecosystems that harmonize innovation, equity, and institutional trust.

BVAS represents a technical milestone for Nigerian democracy, but its legacy will depend on systemic reforms. To move beyond "solutions in search of a problem," policymakers must prioritize infrastructure, inclusive education, and anti-corruption safeguards. Only then can BVAS evolve from a contested tool into a cornerstone of electoral credibility.

CONCLUSION

The introduction of the Bimodal Voter Accreditation System (BVAS) in Nigeria represents a transformative effort to enhance electoral integrity, demonstrating measurable success in reducing voter impersonation and multiple voting while fostering public trust in the electoral process. However, its effectiveness remains constrained by systemic challenges, including inadequate technical infrastructure, insufficient voter education, and gaps in institutional preparedness. The persistence of technical failures, such as connectivity issues and biometric mismatches, alongside lingering skepticism about result transparency, underscores the need for a holistic approach to electoral reform. To fully realize BVAS's potential, Nigeria must prioritize investments in infrastructure modernization, particularly in rural areas, and implement targeted voter education campaigns to bridge literacy and awareness gaps. Strengthening legal frameworks to ensure accountability in funding and operational processes, coupled with comprehensive training for election officials, will further solidify BVAS as a tool for credible elections. Ultimately, the success of BVAS hinges not only on its technological capabilities but on Nigeria's commitment to addressing the broader socio-political and institutional barriers that undermine electoral fairness. By adopting these measures, the nation can advance toward a future where technology and accountability converge to uphold the democratic ideals of transparency, inclusivity, and trust.

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