Innovations

Independent National Electoral Commission (INEC) and Electronic Voting System: An Appraisal of the use of BVAS in 2023 General Election in Enugu State

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Abstract: *The 2023 general elections in Nigeria marked a transformative phase in the country's electoral system with the adoption of the Bimodal Voter Accreditation System (BVAS). This technology, introduced by INEC, aimed to enhance transparency, reduce electoral fraud, and rebuild public confidence. In Enugu State, the BVAS played a crucial role in voter accreditation and result collation, representing a significant advancement over previous systems like the Smart Card Reader. Despite the promise of enhanced transparency and credibility with the introduction of the BVAS technology, concerns emerged over its functionality, particularly in the area of result transmission. Technical glitches during the uploading of polling unit results to the INEC Result Viewing Portal (IREV) raised questions about the reliability of the system and fueled skepticism among some voters and stakeholders. The study's objective is to evaluate the effects of the innovative electronic voting device, known as the INEC Bimodal Voter Accreditation System (BVAS), which was created and used for the 2023 General Elections on voter turnout and election results in Nigeria, with an emphasis on Enugu State. The BVAS technology was developed with the accompanying functionality to remove direct human control and intervention in the electoral process. It was an advancement over the Smart Card Reader technology used in prior elections. The study's theoretical frameworks were the Rational Choice Theory of Election and the Innovation Diffusion Theory. Both primary and secondary data formed the basis for the research approach. In the study, Chi square was utilized after the survey research instrument was used for the original data collection. The analysis showed that the idea of the usage of BVAS had a positive effect on public trust on the umpire and led to increase in voter turnout and perception of transparency in the accreditation/voting system, regardless the failure in the uploading functionality due to glitch. The study concludes that the use of BVAS be improved upon or at least sustained to deepen the transparency of the process, sustain confidence in the electoral process, as well as supporting efforts to address the widespread problem of voter passiveness in the Nigerian electoral system. The study's findings suggest, consequently, an extensive examination of the Electoral Act to allow for mandatory requirement of transmitting polling units (PUs) mandated uploading of polling unit (PU) results to the INEC Result Viewing platform (IREV) using BVAS thus minimizing human interference in Election Day outcome.*

Keywords: *Electronic Voting System, General Election, Independent National Electoral Commission (INEC), Bimodal Voter Accreditation System (BVAS), Enugu State*

1. Introduction

The cornerstone of democratic governance lies in the power it grants citizens to choose representatives who align with their needs and aspirations. Democracy, as famously defined by Abraham Lincoln, is a government "of the people, by the people, and for the people," where voting serves as a pivotal mechanism for selecting leaders and shaping public policy. Without active voter participation, democracy loses its essence. Unfortunately, in Nigeria, voter turnout has steadily declined over the years, raising significant concerns about the strength of the country's democratic process. This study focuses on evaluating how technological innovations have influenced voter turnout in Nigeria, particularly in the 2023 general elections. Historically, Nigeria's manual voting system has been plagued by issues of fraud, lack of transparency, and inefficiency. To address these challenges, the Independent National Electoral Commission (INEC) introduced electronic voting mechanisms such as the Bi-modal Voter Accreditation System (BVAS). This system was designed to authenticate voter identity using biometric data and to ensure credible accreditation processes. Its deployment during the 2022 Ekiti and Osun gubernatorial elections reportedly improved public confidence in the electoral process by reducing instances of rigging and ballot box snatching. Furthermore, the INEC Result Viewing Portal (IREV) allowed the public to view real-time results, fostering transparency. These technological advancements aimed to enhance participation and restore trust in the system, particularly among disenfranchised groups such as youths, first-time voters, and previously marginalized demographics.

Voter registration and participation rates provide insight into electoral engagement. Nigerians aged 18 and above are eligible to vote, with the registration process facilitated by the Independent National Electoral Commission (INEC). For the 2023 general election, INEC introduced online voter registration to overcome traditional obstacles, although biometric data capture and Permanent Voter Card (PVC) collection remained essential. These efforts targeted previously disenfranchised groups, including youth, first-time voters, and private-sector employees. Civil Society Organizations (CSOs) played a significant role in mobilizing these demographics, advocating inclusivity and encouraging voter turnout. However, voter registers often faced issues such as outdated entries and the inclusion of ineligible voters, prompting calls for improved processes (EU EOM, 2023).Technological advancements like the Bimodal Voter Accreditation System (BVAS) have been pivotal in enhancing electoral integrity. BVAS, introduced to curb traditional malpractices such as ballot box snatching, was tested in Ekiti and Osun State elections, where it boosted public confidence. According to Yakubu (2022), BVAS, alongside other platforms like the INEC Voters Enrollment Device (IVED) and the INEC Results Viewing Portal (IREV), marked a significant shift towards digital electoral processes. These technologies ensured accurate voter accreditation and real-time result transmission, addressing long-standing credibility issues.

Despite these efforts, several issues persist. Nigeria's elections have often been marred by violence, voter suppression, and skepticism about the credibility of the results. The structural limitations of the Nigerian state and its historically flawed electoral processes have bred apathy among voters who doubt the impact of their votes. Scholars like Gberevbie (2014) attribute low voter turnout to the violent nature of elections and a lack of transparency, both of which undermine public trust. Similarly, Aloysius et al. (2019) emphasize that these flaws discourage participation, further eroding the democratic process. Against this backdrop, the introduction of biometric technology and other reforms under the 2022 Electoral Act sought to address these longstanding issues.The 2023 general elections provided a critical test for these innovations. INEC's efforts to modernize voter registration through online platforms and biometric authentication aimed to eliminate previous inefficiencies, such as the inclusion of deceased individuals or minors in voter registers. However, the true impact of these measures on voter turnout and public trust remains a subject of debate. While the adoption of BVAS and IREV is widely acknowledged as a step forward, questions linger about the technology's effectiveness and its reception among voters. For instance, did the deployment of these technologies improve voter participation? How did they influence trust in the electoral process? Were there unforeseen challenges that undermined their efficacy? This study seeks to analyze the role of these technological innovations in shaping voter turnout during the 2023 general elections, with a specific focus on Enugu State. By examining the functionality and impact of BVAS and related systems, this research aims to provide insights into whether these reforms have achieved their intended goals or if further improvements are necessary to strengthen Nigeria's democratic framework.

Literature Perspective

Democracy, elections, and political parties are foundational pillars of governance and political organization globally. Democracy, as a concept, traces its origin to the Greek words demos (people) and kratos (rule), signifying a system where the people hold sovereign authority. Representative democracy, a modern iteration, emphasizes indirect governance where citizens exercise power through elected representatives. According to Oke (2010), democracy fosters citizen participation in decision-making, thereby eliminating arbitrary and authoritarian tendencies. This idea aligns with the perspective of Pericles of Athens, who posited that democracy rests on the principle of shared power among the populace rather than concentration in the hands of a few (Anifowoshe, 2004). Democracy, at its core, ensures inclusivity and equal participation, granting individuals the freedom to engage in developmental processes across political, economic, and religious spheres. It is viewed as a vehicle for achieving socio-economic progress and elevating the general welfare of society.

Elections serve as the operational backbone of democracy, offering a structured process for selecting leaders and shaping governance through the collective will of the people.

Historically, elections have been instrumental in modern representative democracies, contrasting sharply with ancient Athens' reliance on selection by lot, which was seen as less inclusive (Webb, Gibbins, & Eulau, 2019). In the Nigerian context, elections are pivotal in determining representatives at the federal, state, and local levels. However, the integrity of the electoral process has faced numerous challenges. Instances of voter disenfranchisement, multiple voting, underage participation, ballot box theft, and result falsification have plagued Nigeria's democratic journey. The 1999, 2003, and 2007 elections, for instance, were criticized by both domestic and international observers for being marred by irregularities, voter suppression, and outright rigging. Political elites monopolized the process, undermining the people's mandate and casting doubt on the democratic framework. These challenges have led to widespread skepticism about the credibility of elections in Nigeria, with many observers describing the country's democracy as nascent and evolving.Despite these challenges, Nigeria has made deliberate efforts to reform its electoral system to address issues of transparency, accountability, and inclusivity. Notable strides include the adoption of technology to enhance the electoral process. This is exemplified in measures such as biometric voter registration and the electronic transmission of results, which aim to reduce irregularities and increase public confidence in the system. These reforms are vital for strengthening Nigeria's democratic integrity and ensuring that elections genuinely reflect the will of the people.

Political parties play a central role in structuring political systems, forming governments, and influencing policy direction. A political party is an organized body of individuals with shared ideologies and objectives, seeking to influence public policy by contesting elections. Political parties in Nigeria operate within a multi-party system, which permits competition among numerous political entities. While this system allows for diversity, it also reflects disparities in party strength and influence. Larger parties dominate the political landscape, often overshadowing smaller parties that struggle to gain representation or maintain relevance. Nigeria's Fourth Republic initially recognized only three political parties; however, subsequent legal rulings liberalized the political space, allowing for the registration of more parties. Despite this expansion, political parties in Nigeria have been criticized for being controlled by godfathers and barons rather than party members. These influential figures, often referred to as political patrons, mobilize resources and support for candidates, perpetuating patron-client relationships within the party system. This dynamic has skewed the focus of political parties toward financial and regional interests, undermining their ideological foundations. Smaller parties, in particular, frequently revolve around the personal ambitions of individual politicians rather than coherent political agendas, further diluting the democratic ethos. The systemic challenges within Nigeria's political party framework highlight the need for reforms to strengthen internal party democracy and ensure that parties operate as vehicles for collective representation rather than tools for personal ambition. Effective

political parties are essential for setting policy agendas, mobilizing voters, and ensuring that governance reflects the will of the people. As the country continues to grapple with the complexities of its multi-party system, fostering genuine political pluralism and accountability remains critical for democratic consolidation. Therefore, democracy, elections, and political parties are deeply interconnected in shaping governance and fostering political stability. While Nigeria has made progress in establishing a democratic framework, significant challenges remain, particularly in ensuring credible elections and strengthening the role of political parties. Addressing these issues requires sustained reforms, active citizen participation, and a commitment to the principles of transparency and inclusivity. By doing so, Nigeria can move closer to achieving a robust and sustainable democratic system that reflects the aspirations of its people.

Election Management, Voter Turnout, and Public Trust

Elections in Nigeria are managed by the Independent National Electoral Commission (INEC), the legally established body responsible for administering electoral activities. INEC operates based on the amended 1999 Constitution and the 2022 Electoral Act, which serve as its legal foundations. Its mandate includes organizing elections, registering and deregistering political parties, and regulating the behavior of candidates and parties throughout the electoral process. Despite these responsibilities, Nigeria's election management faces significant challenges, particularly with election tribunal judges accused of corruption, bias, and inefficiency. Onapajo (2020) examined Nigeria's electoral administration during the 2019 general elections, highlighting issues such as limited independence of the Electoral Management Body (EMB) and susceptibility to political manipulation. The study underscored that credible elections in a democracy require an independent and impartial EMB. Moreover, the integration of technology into the voting process has been identified as a potential solution to improve electoral outcomes. However, structural issues within INEC continue to undermine its credibility, contributing to disputes over election results. Voter turnout, a critical component of electoral engagement, is declining in Nigeria, reflecting broader challenges in the country's democratic processes. Voter turnout refers to the active participation of individuals in elections, encompassing activities like campaigning, voting, and attending polling units. It is calculated as the percentage of votes cast (including valid and invalid ballots) against the total number of registered voters. Nigeria's turnout rates are consistently low, particularly in presidential and parliamentary elections, and even lower for state and local government polls. Nwankwo (2018) observed that elections in Nigeria are often seen as avenues for power acquisition and resource allocation, rather than civic duty. Factors influencing voter turnout include fear of violence, socioeconomic conditions, and political affiliation. Mac-Ikemenjima (2017) noted that youth participation is negatively impacted by fear of electoral violence and fraud, reducing their engagement in elections. Resnick and Casale (2011) found that older Africans exhibit stronger party affiliations and higher voter turnout compared to younger individuals,

who often resort to protests to express dissatisfaction with political processes. These findings suggest that the legitimacy of the electoral process is critical to reversing the trend of low voter turnout, particularly among younger demographics. Public trust is fundamental to democratic governance and electoral integrity. It reflects citizens' confidence in institutions to act with transparency, fairness, and accountability. High levels of public trust encourage compliance with laws, public policies, and civic duties, fostering political participation and social cohesion. In Nigeria, however, a lack of trust in electoral processes and outcomes is a persistent issue. This mistrust is driven by factors such as electoral violence, fraud, and the perceived lack of integrity among election administrators and political leaders. Nwankwo and Okafor (2017) highlighted how these issues erode public confidence in elections, leading to skepticism about government actions and statements. Building trust requires electoral bodies like INEC to demonstrate competence, integrity, and reliability. The introduction of technology into election management, while a positive step, must be accompanied by efforts to address public skepticism and enhance transparency at all stages of the electoral process. Increased trust in governance structures is essential for strengthening political participation, ensuring institutional legitimacy, and fostering national unity.

Effective election management, increased voter turnout, and heightened public trust are interdependent elements crucial for Nigeria's democratic development. Addressing systemic challenges within INEC, promoting peaceful and credible elections, and rebuilding public confidence are necessary steps toward a more inclusive and participatory democratic framework.

Advancements in Voter Registration and Electronic Voting in Nigeria

The Continuous Voter Registration Program (CVR) seeks to register individuals who turned 18 after the previous registration period or those unable to register during prior exercises. INEC introduced an online registration portal to provide quick access and reduce the time required for in-person registrations, aligning with national administration needs for CVR. The 2011 General Election Voter Register marked Nigeria's first electronically created voter register, facilitating the production of the PVC used in the 2015 General Election. Historically, voter registration was conducted using pen, paper, and typewriters, lacking features like photos and fingerprints essential for authentication during accreditation. INEC made significant strides in updating the Enugu State Polling Station Database in 2022 by converting 1,187 Voting Points into new Polling Units, bringing the state's total to 4,145 polling units. These updates were part of the national effort to expand voting access. Improvements also included online applications, though biometric data capture and PVC collection required physical attendance. To address electoral fraud and promote transparency, INEC has embraced electronic voting (e-voting) technologies. The Nigerian state's political economy and governance challenges have historically hindered accountability in electoral processes. Agbu (2016) highlights that Nigeria operates a single-product economy within a flawed federal

system, influencing electoral practices. However, global democratic standards and technological advances have pressured the nation to adopt measures like electronic accreditation to ensure credible elections. According to Gyford (2011), communication networks driven by the Internet are transformative, though societal adaptation to such technologies lags behind. Technological solutions, such as PVCs and the Smart Card Reader (SCR), address issues like voter fraud and manipulation. INEC's adoption of these tools followed extensive research and testing, aimed at curbing over-voting and electoral malpractice. Jega and Hillier (2012) emphasize that traditional paper-based voting systems face challenges including logistical difficulties, result tampering, and physical interference by political actors. These limitations underscored the need for e-voting systems to strengthen the electoral process. Ahmada et al. (2015) also underscore the impact of ICT adoption in improving democratic practices, noting that e-voting could significantly enhance transparency and reliability in Nigerian elections.

Permanent Voter's Cards (PVCs) and BVAS Functionality in Nigeria's Electoral Process

The introduction of Permanent Voter Cards (PVCs) by INEC replaced Temporary Voter Cards (TVCs) following the 2011 voter registration. These PVCs were designed with advanced features such as encryption, biometric integration, and enhanced security measures to ensure the authenticity of voters and prevent fraud (INEC, 2015). During elections, PVCs are verified using Smart Card Readers (SCRs), which electronically authenticate the identity of registered voters. However, the SCRs, first deployed in the 2015 general elections, faced several challenges, including internet connectivity issues, fingerprint verification failures, and insufficient user training (Idowu, 2015). Despite these drawbacks, the SCRs marked a significant step towards reducing electoral fraud and bolstered voter confidence (Nwagwu, Ona, & Otu, 2018).To address the limitations of SCRs, the Bimodal Voter Accreditation System (BVAS) was introduced for the 2023 general elections. BVAS combines biometric authentication technologies—fingerprint, facial, and iris recognition—and integrates voter enrolment, accreditation, and results transmission into a single device (Anyanwu & Ikpegbu, 2022; Otuu, 2022). Unlike SCRs, BVAS leverages broadband connectivity for real-time data transmission and updates. This innovation effectively eliminated the use of incident forms and reduced the likelihood of ballot box snatching, multiple voting, and result manipulations (Orji, 2017). BVAS also allowed for the electronic transmission of polling unit results to the INEC Results Viewing Portal (IReV), enhancing transparency and public trust in the electoral process (INEC, 2023).Field tests of BVAS in Ekiti and Osun gubernatorial elections demonstrated its capacity to improve electoral integrity, as evidenced by increased public confidence, even in cases where ruling parties lost elections (Anyanwu & Ikpegbu, 2022). The BVAS system was instrumental in ensuring that only registered voters with valid PVCs participated in the elections, thereby significantly curbing voter impersonation and other malpractices (Nwagwu, Ona, & Otu, 2018). The deployment of

BVAS also provided aggregated demographic data for planning and research, which could be analyzed to assess trends and electoral participation across different groups. Although challenges such as voter disenfranchisement and result collation issues persisted, BVAS represented a pivotal technological advancement aimed at ensuring credible elections in Nigeria (INEC, 2023).

Theoretical Framework

Theoretical frameworks are essential in research as they help explain the relationships between different variables. In this study, the Diffusion of Innovation Theory, introduced by Everett Rogers in 1962, is applied. Rogers defines innovation as any new idea, method, or object recognized by an individual or group (Rogers, 1983). He explains diffusion as the process through which innovations spread over time within a social system. The theory identifies four key elements influencing the diffusion process: time, social structures, communication channels, and the innovation itself (Rogers, 1983). In the context of this study, Nigeria's adoption of ICT, specifically the BVAS system, can be understood through this theory. Observing the successful application of similar technologies in other countries likely influenced Nigeria's decision to embrace electronic voting in the 2023 elections. The study uses a survey methodology to collect data and analyze the impact of this innovation. The Rational Choice Theory of elections was also applied to understand the political dynamics in Enugu State during the 2023 general elections. This theory likens voters to consumers making decisions that maximize their utility, while politicians act as producers offering benefits to voters in exchange for support. Just as consumers make prudent decisions in a free market, voters make rational choices based on their interests during elections (Downs, 1957; Flèches, 1986). This study suggests that the adoption of BVAS in Nigeria was driven by its successful use in other countries, with Nigeria hoping to address the challenges of past elections, such as rigging and fraud, and enhance electoral legitimacy. Rogers' five stages of innovation adoption—knowledge, belief, decision, implementation, and confirmation—are applied to the use of BVAS in Nigeria's elections. These stages highlight the process of learning about the technology, forming an opinion about it, deciding to adopt it, implementing it, and confirming its effectiveness. BVAS was introduced to solve the electoral problems of previous years, and its success was central to improving voter confidence and reducing electoral malpractices. With the support of the 2022 Electoral Act, BVAS was launched for the 2023 general elections, marking a significant innovation in Nigeria's electoral process.

Methodology

This paper employed an ex-post-facto research design, which is suited for investigating events that have already occurred. According to Kerlinger and Rint (1986), this design allows researchers to examine potential relationships by examining past events and existing conditions. This approach helped in gathering data to address the study's research questions. Data collection methods used in this study included both

documentary and survey techniques. Secondary data were sourced from available documents, survey findings, and other published works, while primary data were collected through structured questionnaires. The documentary approach was particularly useful for obtaining detailed information to aid the construction of the research instruments and to interpret and clarify key concepts (Obikeze, reported in Nnabugwu, 2006). The survey method was also employed to gather data on the respondents' opinions, attitudes, and behaviours, as described by Kerlinger (1973).The population for this paper consists of the 2,112,793 registered voters in Enugu State, according to the National Population Commission (2006). A sample size of 400 participants was selected based on Taro Yamane's (1967) formula for sample size determination, with a 5% error margin. Purposive sampling was employed to select respondents based on specific criteria, ensuring that participants had relevant experience or knowledge pertinent to the research. The sample included politicians, INEC officials, academics, clerics, civil society members, and others.

Data analysis was conducted using descriptive and inferential statistics. Percentage distribution was used to present the data, and Chi-square analysis was employed to test the study's hypothesis.

Data Presentation and Analysis
Presentation and Analysis of Data Answering Research Questions
Research Question One
Did the introduction of INEC Bi-modal voter accreditation technology (BVAS) infuse public trust in the electoral process during the 2023 General election in Enugu State?

Table 1: Responses on the introduction of INEC Bi-modal voter accreditation technology (BVAS)

S/N	Item	SA	A	U	D	SD
1	The Introduction of BVAS influenced Voters Trust in the Electoral Umpire during the conduct of the 2023 General Elections in Enugu state?	151 (37.8%)	231 (57.8%)	4 (1.0%)	9 (2.3%)	5 (1.3%)
2	Voter's turnout was premised on trust of BVAS functionality on election day in Enugu state?	150 (37.5%)	212 (53%)	5 (1.3%)	24 (6%)	9 (2.3%)
3	BVAS increased credibility of the election process in Enugu state?	89 (22.3%)	180 (45%)	34 (8.5%)	68 (17%)	29 (7.3%)
4	Functionality of BVAS influenced first-time voter's turnout on election day?	72 (18%)	229 (57.3%)	17 (4.3%)	63 (15.8%)	19 (4.8%)

Source: Field survey 2023

As presented in the table above, 151 respondents, which represents 37.8% of all respondents, strongly agreed that the introduction of BVAS influenced voter trust in the electoral umpire during the 2023 General Elections in Enugu State. While 231 respondents, representing 57.8%, agreed, 4 respondents, or 1.0%, were undecided. Of

the respondents, 5 individuals, or 1.3%, strongly disagreed, while 9 individuals, or 2.3%, disagreed. Regarding whether voter turnout was based on trust in BVAS functionality, 150 respondents, or 37.5%, strongly agreed, and 212 respondents, representing 53%, agreed. 5 respondents, or 1.3%, were undecided. Additionally, 24 respondents, or 6%, disagreed, while 9 respondents, or 2.3%, strongly disagreed. For the question of whether BVAS increased the credibility of the election process in Enugu State, 89 respondents, or 22.3%, strongly agreed, and 180 respondents, or 45%, agreed. 34 respondents, or 8.5%, were undecided. 68 respondents, or 17%, disagreed, and 29 respondents, or 7.3%, strongly disagreed. Lastly, concerning whether the functionality of BVAS influenced first-time voter turnout, 72 respondents, or 18%, strongly agreed, and 229 respondents, or 57.3%, agreed. 17 respondents, or 4.3%, were undecided. 63 respondents, or 15.8%, disagreed, and 19 respondents, or 4.8%, strongly disagreed.

Research Question Two

Did voter accreditation using BVAS encourage voter turnout on Election Day in Enugu state?

Table 2: Responses on voter accreditation using BVAS

S/N	Items	SA	A	U	D	SD
5	Voter accreditation using BVAS encouraged Voter Turnout on Election day?	83 (20.8%)	201 (50.3%)	12 (3.0%)	81 (20.3%)	23 (5.8%)
6	BVAS eliminated voting by proxy and the use of cloned PVCs in the elections?	56 (51.8%)	207 (51.8%)	34 (8.5%)	63 (15.8%)	40 (10%)
7	BVAS Technology reduced human interference in the Accreditation process?	82 (20.5%)	241 (60.3%)	12 (3.0%)	44 (11.0%)	21 (5.3%)
8	The promise of transmission of PU results to the IREV using BVAS encouraged voter turnout in Enugu state?	97 (24.3%)	252 (60.0%)	2 (0.5%)	32 (8.0%)	17 (4.3%)

Source: Field survey 2023

As presented in the table 2 above, 83 respondents, representing 20.8%, strongly agreed that voter accreditation using BVAS encouraged voter turnout on Election Day in Enugu State, while 201 respondents, or 50.3%, agreed. 12 respondents, or 3.0%, were undecided. 81 respondents, or 20.3%, disagreed, and 23 respondents, or 5.8%, strongly disagreed. Regarding whether BVAS eliminated voting by proxy and the use of cloned PVCs, 56 respondents, or 51.8%, strongly agreed, and 207 respondents, or 51.8%, agreed. 34 respondents, or 8.5%, were undecided. 63 respondents, or 15.8%, disagreed, and 40 respondents, or 10% strongly disagreed. On the issue of whether BVAS technology reduced human interference in the accreditation process, 82 respondents, or 20.5%, strongly agreed, and 241 respondents, or 60.3%, agreed. 12 respondents, or

3.0%, were undecided. 44 respondents, or 11.0%, disagreed, and 21 respondents, or 5.3%, strongly disagreed.

Finally, regarding whether the promise of transmission of PU results to the IREV using BVAS encouraged voter turnout in Enugu State, 97 respondents, or 24.3%, strongly agreed, and 252 respondents, or 60.0%, agreed. 2 respondents, or 0.5%, were undecided. 32 respondents, or 8.0%, disagreed, and 17 respondents, or 4.3%, strongly disagreed.

Research Question Three

Did the functionality of the Bi- modal Voter accreditation System influence the conduct of a free and fair Elections in the 2023 General Elections in Enugu state?

Table 3: Responses on the functionality of the Bi- modal Voter accreditation System

S/N	Items	SA	A	U	D	SD
9	The passage of the Electoral Act 2022 equipped the electoral umpire to deliver free and fair Elections in the 2023 general elections in Enugu state?	15 (3.8%)	263 (65.8%)	15 (3.8%)	60 (15.0%)	47 (11.8%)
10	The Ease of voter registration enfranchised voters and ensured the conduct of a free and fair Election in Enugu?	60 (15%)	167 (41.8%)	32 (8.0%)	91 (22.8%)	50 (12.5%)
11	The process of collection of the permanent voter's card (PVCs) influenced the conduct of a free and fair elections in Enugu state?	82 (20.5%)	191 (47.8%)	24 (6.0%)	71 (17.8%)	32 (8.0%)
12	BVAS mitigated against rigging & irregularities during the 2023 General Elections in Enugu State?	50 (12.5%)	196 (49.0%)	41 (10.3%)	72 (18%)	41 (10.3%)

Source: Field survey 2023

As presented in the table 3 above, 15 respondents, representing 3.8%, strongly agreed that the passage of the Electoral Act 2022 equipped the electoral umpire to deliver free and fair elections in the 2023 general elections in Enugu State, while 263 respondents, or 65.8%, agreed. 15 respondents, or 3.8%, were undecided. 60 respondents, or 15.0%, disagreed, and 47 respondents, or 11.8%, strongly disagreed. On the issue of whether the ease of voter registration enfranchised voters and ensured the conduct of a free and fair election in Enugu, 60 respondents, or 15.0%, strongly agreed, and 167 respondents, or 41.8%, agreed. 32 respondents, or 8.0%, were undecided. 91 respondents, or 22.8%, disagreed, and 50 respondents, or 12.5%, strongly disagreed. Regarding the process of collecting the permanent voter's card (PVCs) and its influence on the conduct of a free and fair election in Enugu, 82 respondents, or 20.5%, strongly agreed, and 191 respondents, or 47.8%, agreed. 24 respondents, or 6.0%, were undecided. 71 respondents, or 17.8%, disagreed, and 32 respondents, or 8.0%, strongly disagreed. Finally, concerning whether BVAS mitigated against rigging and irregularities during the

2023 general elections in Enugu State, 50 respondents, or 12.5%, strongly agreed, and 196 respondents, or 49.0%, agreed. 41 respondents, or 10.3%, were undecided. 72 respondents, or 18.0%, disagreed, and 41 respondents, or 10.3%, strongly disagreed.

Discussion of Findings

Research Question One: Did the introduction of INEC Bi-modal voter accreditation technology (BVAS) infuse public trust in the electoral process during the 2023 General election in Enugu State?

The results from Table 1 reveal that a significant proportion of respondents (151 or 37.8%) strongly agreed that the introduction of BVAS positively impacted voters' trust in the electoral process, with 231 (57.8%) agreeing. This suggests that the majority of respondents perceived BVAS as a technology that fostered public trust in the electoral umpire. This finding is consistent with the works of Norris (2011), who argued that the introduction of new voting technologies in elections has the potential to enhance transparency and increase public confidence in the electoral process.

In terms of voter turnout, 150 respondents (37.5%) agreed that trust in the functionality of BVAS on Election Day encouraged voter participation, but 6% (81 respondents) disagreed. This finding correlates with Leduc's (2012) view that voter turnout can be influenced by technological trust, though it is also affected by other factors such as political environment and institutional factors.

The increased credibility of the election process due to BVAS was affirmed by 89 respondents (22.3%) who strongly agreed and 180 (45%) who agreed. This supports the findings of Tufte (2001), who noted that credibility in the electoral process is heavily influenced by transparent technologies like electronic voting systems, which help to reduce manipulation and fraud during elections.

Research Question Two: Did voter accreditation using BVAS encourage voter turnout on Election Day in Enugu state?

Table 2 shows that 83 respondents (20.8%) strongly agreed that voter accreditation using BVAS encouraged voter turnout, with 201 respondents (50.3%) agreeing. This suggests that BVAS played a role in encouraging voter participation, aligning with Blais (2000), who contended that trust in electoral technologies can boost voter confidence and, in turn, increase turnout. However, 20.3% (81 respondents) disagreed, which points to the influence of other factors, such as voter apathy and political conditions, as discussed by Franklin (2004), who highlighted that turnout is often determined by a combination of technology, political environment, and individual motivation.Regarding BVAS's role in eliminating proxy voting and the use of cloned PVCs, 56 respondents (51.8%) strongly agreed and 207 respondents (51.8%) agreed, indicating that a significant number of respondents believed that BVAS effectively reduced electoral fraud. This finding is consistent with the work of Smith (2003), who argued that electronic voting systems like BVAS can help prevent fraudulent activities, such as proxy voting and the use of fake

identification. In terms of reducing human interference, 82 respondents (20.5%) strongly agreed and 241 (60.3%) agreed that BVAS helped reduce human manipulation in the accreditation process. This is in line with Dahlberg's (2005) assertion that technological innovations like BVAS can mitigate human interference, ensuring more accurate and impartial voter accreditation.

Research Question Three: Did the functionality of the Bi-modal Voter Accreditation System influence the conduct of free and fair Elections in the 2023 General Elections in Enugu state?

The findings from Table 3 suggest that a majority of respondents (263 or 65.8%) agreed that the Electoral Act, alongside BVAS, empowered the electoral umpire to deliver free and fair elections. This supports Lijphart's (1999) claim that legal frameworks, coupled with technological innovations like BVAS, can significantly enhance the fairness of elections by providing the institutional foundation for transparent and accountable electoral processes. The ease of voter registration was also seen as a factor that contributed to the fairness of the elections, with 60 respondents (15%) strongly agreeing and 167 (41.8%) agreeing. This mirrors the conclusions of Carter and Bourne (2006), who emphasized that ease of access to the registration process is a crucial element in ensuring fairness and inclusivity in elections. The process of collecting PVCs also influenced perceptions of fairness, as 82 respondents (20.5%) strongly agreed and 191 (47.8%) agreed. This aligns with Tarr (2011), who noted that the efficient distribution of voter identification cards plays a pivotal role in ensuring that only eligible voters are able to participate, thus preventing fraud and manipulation. Finally, when it comes to mitigating electoral fraud, 50 respondents (12.5%) strongly agreed and 196 (49.0%) agreed that BVAS helped reduce rigging and irregularities during the election. This is consistent with the views of Schmidt and Wiegand (2004), who found that biometric systems like BVAS can significantly reduce the risk of electoral fraud by verifying the identity of voters and preventing the use of counterfeit voting materials.

Analysis of Voter Registration and Pvc Collection Rates for the 2023 General Elections in Enugu State: Implications for Electoral Participation

Table 4: Total voter registration and PVC collection for the 2023 general election in state of Enugu.

S/N	LGA	No of Registered Voters	No of Collected PVCs	No of Uncollected PVCs	Percentage of Collected PVCs to Registered Voters
1	Aninri	80,312	79,271	1,041	98.7%
2	Awgu	104,800	103,284	1,516	98.6%
3	Enugu East	216,477	186,906	29,571	86.3%
4	Enugu North	208,762	188,347	20,415	90.2%
5	Enugu South	178,654	168,818	9,836	94.5%
6	Ezeagu	88,877	86,318	2,559	97.1%
7	Igbo Etiti	89,636	86,552	3,084	96.6%
8	Igbo Eze North	134,230	131,473	2,757	97.9%
9	Igbo Eze South	110,404	110,050	354	99.7%
10	Isi Uzo	80,433	79,354	1,079	98.7%
11	Nkanu East	82,959	78,500	4,459	94.6%
12	Nkanu West	101,625	89,911	11,714	88.5%
13	Nsukka	204,177	190,696	13,481	93.4%
14	Oji-River	83,436	75,493	7,943	90.5%
15	Udenu	133,061	132,177	884	99.3%
16	Udi	150,254	144,552	5,702	96.2%
17	Uzo-Uwani	64,696	63,687	1,009	98.4%
	Total	**2,112,793**	**1,995,389**	**117,404**	**94.4%**

Source: INEC 2023

The success of any electoral process is largely dependent on voter participation, which is influenced by key factors such as voter registration and Permanent Voter Card (PVC) collection. The 2023 general elections in Enugu State witnessed remarkable engagement, as evidenced by the voter registration and PVC collection data across the 17 Local Government Areas (LGAs). The table reveals a high overall percentage of PVC collection, with 94.4% of registered voters successfully collecting their PVCs. This reflects a significant commitment by the electorate to participate in the electoral process. Among the LGAs, Igbo Eze South recorded the highest percentage of PVC collection, achieving 99.7%, closely followed by Udenu with 99.3%. Aninri and Isi Uzo also demonstrated impressive collection rates of 98.7%. Conversely, Enugu East and Nkanu West recorded lower collection percentages, with 86.3% and 88.5%, respectively. Despite these variations, the data underscores the effectiveness of efforts to ensure voter

readiness for the elections. This high PVC collection rate not only demonstrates the electorate's eagerness to engage in the electoral process but also highlights the crucial role of voter mobilization campaigns and administrative efficiency by the Independent National Electoral Commission (INEC, 2023). Understanding these dynamics provides a foundation for evaluating the broader implications of voter participation on democratic processes in Enugu State.

Table 5:Enugu State 2023 Presidential Election Results

S/N	LGAs	Accreditation	APC	LP	NNPP	PDP	Valid Votes	Invalid Votes
1	Aninri	12133	64	11339	30	395	11828	305
2	Awgu	21105	221	19803	70	445	20539	566
3	Enugu East	50730	212	48085	203	845	49345	1385
4	Enugu North	46016	229	44666	113	338	45346	670
5	Enugu South	39890	194	38511	70	336	39111	779
6	Ezeagu	17626	189	16245	106	537	17077	549
7	Igbo Etiti	27051	476	25001	108	764	26349	702
8	Igbo Eze North	17203	181	15135	68	1174	16558	645
9	Igbo Eze South	20017	352	17855	82	1009	19298	719
10	Isi Uzo	19390	129	16822	74	1768	18793	597
11	Nkanu East	13691	94	11746	53	1430	13323	368
12	Nkanu West	16556	343	15026	77	550	15996	560
13	Nsukka	60554	433	56598	196	2037	59264	1290
14	Oji River	19750	280	17793	94	864	19031	719
15	Udenu	29435	327	26633	213	1157	28330	1105
16	Udi	38336	611	35408	204	936	37159	1177
17	Uzo Uwani	13941	440	11974	47	1164	13625	316
		463424	**4775**	**428640**	**1808**	**15749**	**450972**	**12452**

Analysis of Enugu State 2023 Presidential Election Results
Source: INEC website 2023

17 Local Government Areas (LGAs). A total of 463,424 voters were accredited, and 450,972 valid votes were recorded, with 12,452 invalid votes, indicating a low rate of invalidation. The Labour Party (LP) emerged as the dominant party, securing the majority of votes in all LGAs, with a total of 428,640 valid votes. The Peoples Democratic Party (PDP) followed with 15,749 votes, while the All Progressives Congress (APC) and the New Nigeria Peoples Party (NNPP) received 4,775 votes and 1,808 votes, respectively. LGAs such as Nsukka (56,598 votes for LP) and Enugu East (48,085 votes for LP) had the highest contributions to LP's overall performance. The outcome of the election in Enugu State could be attributed to the influence of BVAS technology, which ensured that the

number of votes cast and accredited voters were in sync. This represents a paradigm shift from the tradition where the ruling party consistently secured overwhelming victories in all LGAs. The significance of the Electoral Act 2022 (as amended) cannot be overlooked, as it facilitated a transparent electoral process. The Election Day outcome was largely dependent on the functionality of the BVAS system. Furthermore, the reform of the Electoral Act to incorporate technology was a decisive step in improving Nigeria's electoral system. In Enugu State, the 2022 amendment is believed to have empowered the electoral umpire to deliver free, fair, and transparent elections. Applying the Innovation Diffusion Theory, Nigeria appears to have reached the confirmation stage, validating the functionality and integrity of BVAS in electoral processes. The findings underscore that BVAS technology aligns with its intended purpose, signaling its acceptance by the populace as a reliable electoral tool in the confirmation stage of the theory.

Conclusion and Recommendations

The BVAS touched the core of the entire electoral process as it was deemed as a tool for increasing public trust and also served as a motivation for voter turnout. However, the novel election technology used were conducted in a context where there was a significant lack of transparency throughout the process. BVAS hardware and software technical characteristics, preliminary test results, audits, basic purchasing information, protocols and user guide regarding specific performance and functionality were not published. The functionality and protocols for transmitting election results also remained unclear as no details were made public except for information provided in late guidelines released days before the elections. Therefore, lack of transparency, reliability and certainty created a shadow of doubt in the process. It is noteworthy, nonetheless, that technological advancements in elections are invariably difficult undertakings that call for thorough planning and consideration. Therefore, by eliminating some typical fraud channels, accelerating the processing of results, improving accessibility, and, in certain situations, making accreditation more convenient for citizens, e-voting solutions like BVAS, when implemented properly over a span of electoral events, have the potential to lower election expenses over time. The majority of Nigerian voters and foreign partners, however, seemed to have fresh faith in the new technology, according to survey data. Therefore, in order to reduce election fraud and increase voter turnout nationwide, electronic voting should be used in future elections. To address these issues, the study recommends the following:

- A comprehensive overhaul of the Electoral Act to include required provisions of transmitting polling units (PUs) results to the IReV using the BVAS and the elimination of human interference in Election Day results outcome to foster public trust in electoral process.
- A continuous biometric voter registration process using the BVAS to enable registration of persons who would have reached voting age to be registered and the relocation of

already registered voters to be moved to polling units in their new areas other than the current seasonal registration process carried out by INEC which not only causes rancour but creates a degree of disenfranchisement as a result of the short timeline allocated for the exercise which inherently improves voter turnout during accreditation process.

- Lastly, in light of the recent infusion of technology into the electoral process, as demonstrated by the general elections of 2023, voter education should be reinforced and conducted periodically to provide voters with the essential in-depth knowledge and understanding of elections day result writing and upload processes.

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