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AN EXAMINATION OF THE BIOMETRIC VOTER REGISTRATION SYSTEM IN THE GAMBIA: IMPLICATIONS AND PERCEPTIONS

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ABSTRACT

This study's comprehensive aim was to evaluate the effect of BVR on voter enrolment in The Gambia. Specifically, the study sought to examine the effect of the BVR system on enhancing the transparency and credibility of voter registration in The Gambia, identify and analyse challenges encountered by the IEC in implementing and managing the BVR system, and evaluate the validity of concerns raised by political parties concerning the BVR system and its efficacy in addressing election irregularities. The survey technique was adopted in this study, gathering data through questionnaires and leveraging existing records. Out of a population of 199,957, a sample size of 383 was chosen based on Krejcie and Morgan's (1970) formula. Two hypotheses were raised and tested in this study: The first illustrated a significant but inverse relationship between the BVR system's efficacy and voter registration irregularities, indicating that irregularities diminished as the system's efficacy improved. The second hypothesis revealed a significant yet perfect negative relationship between the challenges faced by the Independent Electoral Commission (IEC) with the BVR system and concerns raised by political parties, suggesting that increased transparency from the IEC decreases political apprehensions. Furthermore, the study revealed mixed perceptions on the validity of concerns raised by political parties

concerning the biometric voter registration (BVR) system and its efficacy in addressing election irregularities in The Gambia. Approximately 30% believed in its ability to rectify past electoral malpractices, while 63% felt political parties had genuine concerns about the system's accuracy. Also, 63% of respondents believed the BVR ensured fair voter representation and reduced voter impersonation. In conclusion, while the BVR system in The Gambia shows promise in enhancing electoral integrity, the mixed views highlight the need for public outreach, system refinement, and increased transparency.

Keywords: *Biometric Voter Registration, Election, Election Management, Political Parties and Democracy*.

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1. INTRODUCTION

Since its independence in 1965, the Gambia has relied on manual voter registration (MVR) with significant challenges, including multiple registrations and voting frauds (Freedom Newspaper, 2010). These issues persisted until the establishment of the Independent Electoral Commission (IEC), which heeding the call for a more transparent and efficient electoral process, transitioned to the biometric voter registration (BVR) system in 2011 (Freedom Newspaper, 2010).

Globally, biometric technologies, which trace their origins as far back as 500 BC, have found increasing acceptance among Election Management Bodies (EMBs) for voter verification and identification. While its early applications focused on crime identification, today, biometrics spans multiple uses, including electoral processes. By 2014, around 38 low and middle-

income nations had adopted biometrics for voter registration, with a few African nations, notably Ghana, Kenya, and Nigeria, implementing biometric voter identification (Asante, 2019).

In The Gambia, challenges persist despite adopting the BVR system. The IEC faces accusations from political parties of election mismanagement, including concerns like double registration and inflated voter rolls. While attempts have been made post-2001 to modernise the registration system, inefficiencies continue. The transition to BVR in 2011 aimed to address these challenges. However, the effect of biometric registration on The Gambia's election management needs to be studied more, signifying a clear need for this research.

The primary aim of the study is to evaluate the effect of BVR on voter enrolment in The Gambia. Specifically, it seeks to examine the effect of the BVR system on improving the transparency and credibility of voter registration, identify and analyse challenges encountered by the IEC in implementing and managing the BVR system, and evaluate the validity of concerns raised by political parties regarding the BVR system and its effectiveness in addressing election irregularities.

This research on the effect of biometric technology on voter registration management in The Gambia focuses on the Independent Electoral Commission (IEC), enrolled political entities, eligible voters within KMC, and WANEP (West Africa Network for Peace Building). The study's timeframe covers the period from 2011 to 2022, contingent on the availability of documentation.

2. REVIEW OF LITERATURE

Modern electoral processes often use Biometric Voter Registration (BVR) to develop voter lists. BVR systems use distinct biological and behavioural markers, such as fingerprints and facial scans, to identify individuals (Jain, Ross, & Prabhakar, 2004). This method came into practice to improve upon traditional, often flawed voter registration and counter-election misconduct. A fundamental purpose of BVR is to ensure each voter's distinct identity, eliminating chances of fraud (Alvarez, Hall, & Hyde, 2008).

BVR collects data like photographs and fingerprints, ensuring unambiguous identification (Yang, Wang, Hu, Zheng, & Valli, 2019). Many countries globally have embraced BVR for its potential in upholding electoral credibility. For example, Kenya utilised BVR in 2013 to address previous election irregularities (Cheeseman & Willis, 2016).

However, BVR has issues. Countries encounter high costs, potential technical glitches, security risks, and the need for consistent education about its operation (James, 2011). While BVR can curb registration fraud, it is less effective against other corrupt practices during elections (Nikolova & Marinov, 2017). Also, heavy reliance on such technology might exclude some demographics, especially in areas needing more tech infrastructure.

While BVR promises enhanced electoral integrity, its effectiveness depends on thoughtful deployment, continuous education, and regular assessments.

a. Election

Election is not just a procedural activity but a cornerstone of democratic governance, demanding utmost integrity, transparency, and credibility. Effective election management is pivotal for democratic governance, especially in regions like Africa and The Gambia. The heart of democracy is ensuring honest elections (Lago, 2019; Umar, Olaniyi, Ajao, Maliki, & Okeke, 2019). The adoption of biometrics in elections is growing in developing nations, but concerns about its effectiveness and cost remain (Gelb & Diofasi, 2016). Although democracy indicators improved in Sub-Saharan Africa post-Cold War, challenges like violent, disputed election outcomes persist.

Election Management Bodies (EMBs) face increasing cybersecurity threats, necessitating strong protective measures (Serratosa, 2020). Introducing election technology must adhere to international standards, ensuring transparency, accountability, and result verifiability. The UN's guidelines offer a framework for managing electronic election data (Jacobsen, 2020). The author further stated that access to specific election data by stakeholders, like voters and parties, promotes transparency. The Open Government Declaration underscores the significance of open data in this context.

b. Empirical Evidence

Voter eligibility fraud in the USA suggests a need for a biometric centralised voter database, with Weir (2018) indicating that a lack of a nationwide system might be pricier than expected. Mgovano (2019) advocates for biometrics in enhancing

Tanzanian elections, though acknowledging challenges like limited infrastructure; this sentiment of questioning the cost-effectiveness of such systems is echoed by Gelb and Diofasi (2016). For broader development, Gelb and Clark (2013) stress the importance of biometrics, noting a significant identification gap in developing countries. However, concerns about the financial implications and sustainability of biometric initiatives in developing nations are raised by Gelb and Diofasi (2016). Thiel (2020) further emphasises the potential benefits of a centralised database system, referencing Ghana's centralisation efforts and the associated security concerns.

Meanwhile, biometrics' effectiveness in combating fraud in Ghana's health sector is discussed by Larkotey, Effah, and Boateng (2021). Lastly, Asante (2019) correlates biometric use with increased voter trust and turnout in Ghana. Overall, the successful implementation of biometrics hinges on transparency, stakeholder inclusion, and adequately addressing associated challenges.

c. **Hypotheses**

1.) H_0: The introduction of the biometric voter registration system in The Gambia has not significantly reduced voter registration irregularities.

2.) H_0: The challenges faced by the IEC in implementing the BVR system are not associated with the concerns raised by political parties regarding election mismanagement.

3. RESEARCH METHODOLOGY

In examining the effects of biometric technology on voter registration management in The Gambia, this study adopted survey techniques. Data was sourced directly via questionnaires and indirectly from established records and publications. The questionnaires were curated to capture respondent views on the biometric technology policy's impact to enrich the overall understanding. Based on Krejcie and Morgan's (1970) formula, the study samples 383 participants from a population of 199,957 (IEC, 2016) encompassing diverse stakeholders within The Gambia. Using simple random sampling, 260 eligible voters within KMC, 21 senior and middle management staff of the Independent Electoral Commission (IEC), 90 inter-party committee (IPC) members (5 members from each of the 18 registered political parties in The Gambia), and 12 WANEP management staff were sampled purposefully. The research identifies two pivotal variables: biometric technology (independent) and voter registration management (dependent), aiming to elucidate their interrelationship. Finally, the gathered data were analysed using descriptive and inferential statistics (Simple regression and correlation analysis to test the hypotheses) to draw conclusions in alignment with the study's objectives.

4. ANALYSIS

Of the 383 questionnaires distributed, 318 were returned, accounting for 83%. The remaining 65 questionnaires, representing 17%, still need to be retrieved.

Displaying Information on the validity of concerns raised by Political Parties Concerning the Biometric Voter Registration (BVR) system and its efficacy in addressing election irregularities in The Gambia.

Table 1 below provides a comprehensive view of the respondents' perspectives regarding the validity of concerns raised by political parties concerning the Biometric Voter Registration (BVR) System in The Gambia, particularly its efficacy in addressing past election irregularities.

On the BVR system's effectiveness in addressing past election irregularities, approximately 30% of the respondents (95) strongly agreed with this notion, whereas nearly 28% (87) disagreed, and close to 24% (75) strongly disagreed. Only around 16% (52) agreed, and a tiny segment (about 3%) were undecided. The mean score for this item is 2.6, which suggests a slightly negative lean, as a score of 3 would represent a neutral stance.

Concerning the authenticity of political parties' concerns about BVR's accuracy, 35% (112) strongly agreed that political parties have genuine concerns, followed by around 28% (89) who agreed. However, roughly 19% (60) disagreed, and 16% (52) strongly disagreed. Only about 2% are undecided. The mean score for this statement is 2.9, slightly below neutral, suggesting a mild agreement with the statement.

Regarding fair representation of all eligible voters by BVR, about 31% (98) of the respondents strongly believe that the BVR ensures a fair representation, and an additional 32% (101) agree. On the contrary, approximately 19% (59) disagreed, 17%

(55) strongly disagreed, while only about 2% remain neutral. The mean score here is 3.4, leaning towards agreement.

On political motives behind parties' concerns vs. genuine system efficiency issues, a combined total of about 40% (127) either strongly agree or agree that the concerns are more politically driven. However, over 35% (113) disagreed, and roughly 23% (72) strongly disagreed with this sentiment, indicating skepticism about the political motivations. Only 2% remain neutral. With a mean score of 2.9, the sentiments here also hover slightly below neutral.

Of the BVR system's impact on reducing voter impersonation, close to 48% (152) of the respondents strongly believe that the BVR system has significantly reduced voter impersonation, while about 15% (49) agree. However, 14% (43) disagreed, and 23% (72) strongly disagree. An insignificant percentage (less than 1%) remains undecided. With a mean score of 3.7, this statement has a more robust agreement than others.

The grand mean score for all items is 3.1, slightly above neutral. This result suggests that, on average, the respondents are mildly optimistic about the effectiveness and relevance of the BVR system in The Gambia.

In conclusion, while respondents generally believe in the potential benefits and effectiveness of the BVR system, there is still a noticeable division in views, especially on the motivation behind the political parties' concerns and the actual efficacy of the system in addressing past election challenges.

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Table 1. Respondents' views on the Validity of Concerns Raised by Political Parties Concerning the Biometric Voter Registration (BVR) System and its Efficacy in Addressing Election Irregularities in The Gambia.

ITEMS	SA	A	U	D	SD	Total	Mean
The BVR system effectively addresses past election irregularities in The Gambia.	95 (29.87)	52 (16.35)	9 (2.83)	87 (27.37)	75 (23.58)	318 (100)	2.6
Political parties have genuine concerns regarding the accuracy of the BVR system.	112 (35.22)	89 (27.99)	5 (1.57)	60 (18.87)	52 (16.35)	318 (100)	2.9
The BVR system ensures a fair representation of all eligible voters in The Gambia.	98 (30.82)	101 (31.76)	5 (1.57)	59 (18.55)	55 (17.30)	318 (100)	3.4
Political parties' concerns about BVR are mainly politically motivated rather than system efficiency-driven.	56 (17.61)	71 (22.33)	6 (1.89)	113 (35.53)	72 (22.64)	318 (100)	2.9
The introduction of the BVR system has significantly reduced instances of voter impersonation.	152 (47.80)	49 (15.41)	2 (0.63)	43 (13.52)	72 (22.64)	318 (100)	3.7
Grand Mean							3.1

Source: Fieldwork, (2023).

4.1 Test of Hypothesis One

H_0: The introduction of the biometric voter registration system in The Gambia has not significantly reduced voter registration irregularities.

4.1.1 Simple Regression Empirical Model

To test the hypothesis using a Simple Linear Regression Model, we can set up the model as follows:

Let: Y = voter registration irregularities (VRI) (Dependent Variable) while X = Biometric voter registration system in The Gambia (BVRS) (Independent Variable)

The Simple Linear Regression Model can be as:

$VRI=\beta_0 + \beta_1 BVRS + \epsilon$ .....eq (1)

Where:

- β_0 is the y-intercept (it represents the value of Y when X is 0).
- β_1 is the slope of the regression line (it represents the change in Y for a one-unit change in X).
- ϵ is the error term (captures the variability in Y that X does not explain).

The null hypothesis (H_0) states:

$\beta_1=0$

This means no significant relationship exists between the Biometric Voter Registration System (BVRS) and Voter

Registration Irregularities (VRI) in The Gambia. Suppose the results from the regression analysis indicate that β_1 is significantly different from zero (using a predetermined significance level, usually α=0.05). In that case, we can reject the null hypothesis to accept the alternative hypothesis:

H_a: β_1 is not equal to 0.

This result would imply a significant relationship between the BVRS and VRI in The Gambia.

Table 2. If BVRS affects VRI in The Gambia

Simple Regression Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	318.000	4.0127		59.890	.000
	Biometric Voter Registration System in The Gambia (BVRS)	-89.040	.032	-.874	-48.221	.000

a. Dependent Variable: Voter Registration Irregularities

Source: Fieldwork, (2023).

The regression table showcases the relationship between The Gambia's Biometric Voter Registration System (BVRS) and Voter Registration Irregularities. When breaking it down:

The constant's coefficient is 318.000, meaning that in the absence of the BVRS, we expect to see 318.000 units of Voter Registration Irregularities.

The BVRS coefficient stands at -89.040. This result means that for every unit increase or improvement in BVRS, Voter Registration Irregularities decrease by 89.040 units. The negative sign indicates an inverse relationship: irregularities reduce as BVRS becomes more effective in The Gambia electoral process.

The significance level (p-value) for the constant and BVRS is .000, well below the commonly accepted threshold of 0.05. This result means the findings are statistically significant and not likely due to random chance.

The standardized coefficient (Beta) for BVRS is -.874. This measures how many standard deviations the outcome (irregularities) will change per standard deviation increase in BVRS.

The data underscores the BVRS's importance in The Gambia's electoral system. The BVRS plays a pivotal role in minimizing voter registration issues, and the stronger the system, the fewer the irregularities. This could indicate a clear direction for policymakers: invest in and optimise the BVRS to ensure a more transparent and credible electoral process.

4.2 Test of Hypothesis Two

H_0: The challenges faced by the IEC in implementing the BVR system are not associated with the concerns raised by political parties regarding election mismanagement.

4.2.1 Correlation

Correlation is a statistical measure that describes the extent and direction of the linear relationship between two variables, as discussed below.

Table 3. Correlations

		The challenges faced by the IEC in implementing the Biometric Voter Registration System (BVRS)	The concerns raised by Political Parties Regarding Election Mismanagement
The challenges faced by the IEC in implementing the Biometric Voter Registration System (BVRS)	Pearson Correlation	1	-1.000**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	3792.917	-3792.917
	Covariance	344.811	-344.811
	N	12	12
The concerns raised by Political Parties Regarding Election Mismanagement	Pearson Correlation	-1.000**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	-3792.917	3792.917
	Covariance	-344.811	344.811
	N	12	12

**Correlation is significant at the 0.01 level (2-tailed).
Source: Fieldwork, (2023).

Table 3 provides a correlation assessment between the obstacles the Independent Electoral Commission (IEC) encounters while adopting the Biometric Voter Registration System (BVRS) and the issues political entities highlight about election mismanagement.

The analysis utilises the Pearson correlation coefficient, which discerns the linear connection between two factors. A coefficient value of -1.000 here indicates that when the IEC

faces more challenges in BVRS implementation, concerns from political factions about election mismanagement proportionally decrease. This perfect negative relationship is further reinforced by a p-value of .000, highlighting its statistical significance.

Interestingly, the Sum of Squares and Cross-products and the covariance values, 3792.917/-3792.917 and -344.811, respectively, reinforce this inverse connection between the variables. With data from 12 paired observations, the table suggests that effective problem management and communication by the IEC might reduce political entities' concerns, even when BVRS implementation faces issues.

This seemingly counterintuitive result underscores the complex interplay between technological initiatives in electoral processes and stakeholder perceptions. Effective challenge resolution and transparency by the IEC might bolster political party confidence. This result highlights the necessity for electoral bodies to proactively manage, communicate, and address issues when introducing technologies like BVRS.

Moreover, the outcomes hint at the depth of oversight and attention political groups bestow upon the IEC's activities. The findings also present avenues for more in-depth qualitative investigations into stakeholder perceptions and underscore the significance of context when interpreting these results, as regional sociopolitical dynamics can influence such correlations.

This analysis offers pivotal insights into electoral technological advancements and political party responses in The Gambia,

emphasising the importance of open communication, transparency, and effective problem resolution.

5. DISCUSSION

Table 1 showcases diverse views from respondents regarding the Biometric Voter Registration (BVR) System and its implications on the electoral process in The Gambia. The results revealed a division in the respondents' views. About 30% of the respondents firmly believe in the BVR system's ability to rectify past electoral malpractices, while nearly 52% disagreed and strongly disagreed. Given a mean score of 2.6, slightly below the neutral mark, there is a hint of scepticism towards the system's effectiveness. In their study, "Biometric Recognition in Developing Countries," researchers suggest that while biometric systems, like the BVR, promise improved security and accountability, their effectiveness is often contingent upon the infrastructural, socio-political, and operational contexts of a country (Foudil, 2017).

A considerable 63% of respondents agreed and strongly agreed that political parties have genuine concerns regarding the accuracy of the BVR system. The mean score for this item is 2.9, indicating a mild agreement with the sentiment. Gelb and Clark (2013) elucidate that political parties' concerns are often rooted in the potential for system errors, data breaches, and voter exclusion.

A combined 63% (agreed and strongly agreed) feel the BVR ensures a fair representation of eligible voters. With a mean score leaning towards agreement at 3.4, this sentiment resonates well with studies highlighting the role of biometric

systems in fostering inclusivity and minimising voter exclusion (Mgovano, 2019).

The data offers an intriguing perspective on the debate over whether the concerns raised are more politically motivated than grounded in genuine system efficiency issues. Approximately 62% of respondents believe this to be the case. However, a nearly equivalent combined percentage (58%) disagreed or strongly disagreed, underscoring a significant divide in public opinion. This dichotomy underscores the complexity of differentiating genuine concerns from politically driven narratives.

Respondents recognised the BVR's value in reducing voter impersonation. A combined 63% (agreed and strongly agreed) believe that the BVR system has considerably reduced this issue. This sentiment aligns with scholarly literature, emphasising biometric systems' pivotal role in combating voter fraud and impersonation (Thiel, 2020). The grand mean score for all items suggests a mild positivity surrounding the BVR system in The Gambia, although nuances in opinions are evident.

For Hypothesis One, the simple regression analysis denotes a significant inverse relationship between the BVRS and Voter Registration Irregularities. This result implies that as the BVRS's efficacy improves, irregularities diminish. These findings corroborate studies emphasising biometric systems' role in enhancing electoral integrity (Akpan & Adagba, 2018).

For Hypothesis Two, the Pearson correlation coefficient indicates a perfect negative relationship between the

challenges the IEC faces with BVRS and concerns raised by political parties. This unexpected result suggests that political party concerns decrease when the IEC is transparent about challenges. Transparency in the electoral process has been shown to mitigate concerns and build trust (Asante, 2019).

In conclusion, the introduction of the BVR system in The Gambia has evoked a spectrum of opinions, as reflected in the data. While a general sentiment supports the BVR's potential to improve electoral processes, divisions in views emphasise the importance of public outreach, transparency, and continuous system refinements.

6. CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study advanced the following recommendations:

Given the divided views on the effectiveness of the BVR system, there is a clear need for increased public awareness campaigns. The electoral commission (IEC) should work on elucidating the functionalities, benefits, and limitations of the BVR system to dispel misconceptions.

Considering that the potential effectiveness of the BVR system hinges on the infrastructural context, the government should invest in the BVR system to help strengthen the technological infrastructure supporting the system, ensuring its reliability and integrity.

With many believing that political parties have genuine concerns regarding the BVR's accuracy, engaging in a dialogue

with political stakeholders to address these concerns and collaboratively work towards improvements is essential.

Given the unexpected result suggesting increased transparency from the IEC leads to decreased concerns from political parties, it is recommended that the IEC maintain or even heighten transparency levels, consistently updating stakeholders about challenges, developments, and improvements.

The BVR system should undergo regular audits and evaluations to identify and rectify potential vulnerabilities, ensuring it stays updated with the latest technological advancements.

Set up platforms or avenues where citizens can provide feedback on their experiences with the BVR system. This act will provide first-hand information that can be pivotal in making system adjustments and improvements.

Ensure the BVR system continues to foster inclusivity. Special provisions should be made for marginalised groups to ensure seamless registration and voting, reinforcing the democratic principle of fair representation.

Given the positive sentiment about the BVR system's role in reducing voter impersonation, more resources should be directed to reinforce this aspect of the system, ensuring voter fraud continues to decrease.

Establish collaborations with technological and biometric experts for periodic review and upgrading of the system. This act will ensure that the BVR remains robust and is protected against potential breaches.

Provide extensive training to election officers, political party representatives, and other stakeholders on the operational aspects of the BVR system. This action will ensure smoother election processes and reduce misunderstandings related to the system's functionalities.

These recommendations could help harness the full potential of the BVR system in The Gambia and ensure a more transparent, inclusive, and efficient electoral process.

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