

**AN ANALYSIS OF THE IMPERATIVES OF INTEGRATED DATABASE SYSTEM
IN THE CONDUCT OF ELECTION IN NIGERIA: A FOCUS ON THE 2023
GENERAL ELECTION**

BY

**Martins Yedieke DAUBRY
PG/NLS/2215155**

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DECLARATION

I hereby declare that this dissertation titled “**An Analysis of the Imperative of Integrated Database System in the conduct of Elections in Nigeria: A Focus on the 2023 General Election**” is a product of my research efforts, undertaken under the supervision of Prof. Adewale Aderemi. It is an original work and no part of it has been presented for the award of any degree anywhere. All sources of information have been duly acknowledged and referenced.

.....
Martins Yedieke DAUBRY
PG/NLS/2215155

.....
Date

CERTIFICATION

The dissertation titled “**An Analysis of the Imperative of Integrated Database System in the conduct of Elections in Nigeria: A Focus on the 2023 General Election**” carried out by Martins Yedieke DAUBRY has satisfied the partial fulfillment of the requirements for the award of Masters in Election and Party Politics, National Institute for Legislative and Democratic Studies/University of Benin and is approved for its contribution to knowledge and literary presentation.

.....
Prof. Adewale Aderemi
Supervisor

.....
Date

.....
Dr. Asimiyu Abiola
Director, Department of Studies/Chief Examiner

.....
Date

APPROVAL PAGE

This is to certify that this dissertation “**An Analysis of the Imperative of Integrated Database System in the conduct of Election in Nigeria: A Focus on the 2023 General Election**” has been carefully supervised, read, assessed and approved as having met the necessary conditions for the award of Masters in Election and Party Politics (MEPP) in the National Institute for Legislative and Democratic Studies/University of Benin and is therefore approved for its contribution for knowledge.

.....
Prof. Adewale Aderemi
Supervisor

.....
Date

.....
Dr. Leo Igbanoi
Internal Examiner

.....
Date

.....
Dr. Abiola Asimiyu
Director, Department of Studies/ Chief Examiner

.....
Date

.....
Prof. Hassan Saliu
External Examiner

.....
Date

DEDICATION

This research work is dedicated in memory of my late father Late Chief Martin Y. Daubry, whose legacy has been a source of inspiration for me. Your unwavering commitment and passion for knowledge while on earth, has been my driving force.

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LIST OF ABBREVIATIONS

Abbreviations	Meaning
AFIS	Automated Fingerprint Identification System
ABIS	Automated Biometric Identification System
BiVAS	Bimodal Voter Authentication System
IReV	INEC Result Verification Portal
PVC	Permanent Voter Card
EVR	Electronic Voter Register
CVR	Continuous Voter Register
VIN	Voter Identification Number
SCR	Smart Card Reader
IDMS	Integrated Database Management System
INEC	Independent National Electoral Commission
NIMC	National Identity Management Commission
NPC	National Population Commission
FRSC	Federal Road Safety Corp
NIS	Nigeria Immigration Service
EMB	Election Management Body
EA	Electoral Act
BVN	Bank Verification Number

ABSTRACT

Elections are the cornerstone of democratic governance, serving as a platform for citizens to choose leaders who would represent their interests and formulate policies that foster national development. However, in Nigeria, electoral processes have historically been fraught by electoral infractions such as voter disenfranchisement, logistical inefficiencies and large-scale electoral fraud. This state of affairs had resulted in institutional, procedural and logistics reforms to reposition the process and engender credibility. The study examined the role of integrated database system in the electoral management; analyzed the status of electoral database management system in Nigeria, and investigated the prospects of integrated database management system on Nigeria's electoral management. Several election technology has been introduced into the electoral process such as biometric verification, BiVAS etc, however this study is imperative as it would eliminate electoral database fraud, enhance credibility and foster public trust on the Electoral Management Body (EMB).

The study adopted the mixed research design which is an interplay of quantitative and qualitative methods. Data was sourced from primary source (questionnaire and key informant interview) and blended with data from secondary sources (journals, books, articles and reports, etc.). Statistical frequency tables were used for the analysis of quantitative data while thematic approach was deployed in the analysis of qualitative data. The study arrived at Three Hundred and Ninety (390) as the sample size for quantitative study by deploying the Slovin's formula. And purposive sampling was adopted to arrive at Fifteen (15) KII informants.

For the first objective, the study found that the integrated database system plays a major role in the management of elections in Nigeria as the integration of data will streamline the database system, ensure seamless sharing of data among data users, ensure proper planning of elections and enhance the integrity and efficiency of the electoral process. On the second objective, the study revealed that the current electoral database system has improved compared to its previous

state, but further enhancements are necessary. For the third objective, the study found that integrated database system in the electoral management holds enormous prospect to ensure seamless operation of the electoral process, enhance the integrity of the Election Management System and the effectiveness of the database system and engender credible electoral process and outcomes in Nigeria.

The study recommends for objective one (1) that the Federal Government should unbundle INEC and established an independent body, send on executive bill to the National Assembly or a legislator should sponsor a bill to integrate our electoral database before the 2027 general election. For objective two (2) the study recommends more inter-agency collaboration for data harmonization, improved funding for database administration, implementing a distributed data architecture for voter registration and management ensuring secure, multi-site storage access, etc. For objective three (3), the study recommends among others proper training and retraining of agencies involved in data collection on modern technological infrastructure such as cloud infrastructure, cyber security, etc. The study concludes that the integrated database system holds a great promise for entrenched electoral credibility and improved public trust.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Elections are the cornerstone of democratic governance, serving as a platform for citizens to choose leaders who will represent their interests and formulate policies that foster national development. In Nigeria, electoral processes have historically been marred by challenges such as electoral fraud, voter disenfranchisement, logistical inefficiencies, identity theft, vote contracting, ballot stuffing, inaccurate electoral database and cybersecurity breaches amongst others. This has made government to introduce electoral reforms and amendment of the Electoral Act and relevant electoral guidelines and regulations to improve the electoral process. Despite efforts by several administration and electoral stakeholders to ensure a transparent electoral process particularly through the introduction or adoption of election technologies, it has not been entirely successful, but significant progress has been made compared to where we used to be. The situation has led to calls by Nigerian voters, political parties, civil society actors and election observers on the need for more technology, especially in the area database integration with a view to have a more robust and credible electoral database which would contribute significantly in fostering a free, fair and elections.

Nigeria has several data collecting agencies such as the INEC, Nigeria Immigration Service, Federal Road Safety Corp, National Identity Management Commission, etc, amongst others, however, there has not been a deliberate attempt to streamline these databases to produce a single database that can act as a single source of truth.

Countries that have adopted the integrated system in their electoral process have high success rate and acceptability of electoral outcomes, thus reducing electoral violence and litigation.

India and South Africa have successfully adopted integrated database systems to minimise electoral fraud and ensure credible elections (Mathe, 2022). In contrast, Nigeria's fragmented

data management systems have often undermined the credibility of elections due to poor coordination and weak security infrastructures (Ugwuala et al., 2020). Given the increasing reliance on technology in electoral management, it becomes imperative to investigate how an integrated database system could improve Nigeria's electoral processes.

The lack of integration between INEC's voter database and other critical national data infrastructures creates loopholes that can be exploited for electoral malpractice. For example, during the 2023 general elections, reports indicated widespread incidents of double voting, underage voting, and inflated voter registers, reflecting systemic weaknesses in data management (Nwankwo, 2017).

1.2 Statement of the Problem

An efficient electoral management system is fundamental to the democratic process as it ensures that elections are free from fraud, inclusive, and representative of the people's will (Ugwuala et al., 2020). Despite technological advancements, Nigeria continues to face significant challenges in managing electoral processes effectively. INEC has implemented systems like the Smart Card Reader (SCR), the INEC Result Viewing (IReV) portal, and the Bimodal Voter Accreditation System (BVAS), but issues such as multiple voter registrations, data breaches, and logistical bottlenecks persist (Omodia & Egwemi, 2020). Database management is a critical element in computer science administration. It has many applications for electoral purposes. For databases to be effective and efficient, they have to be carefully designed and documented. Ideally, an EMB's databases should be integrated with the range of applications it uses, allowing for easy sharing of common data across applications to avoid data duplications. Ace Electoral Knowledge Network (2022). The lack of a fully integrated and centralised database system has led to inefficiencies in voter verification, election monitoring, and result collation. Moreover, fragmented data systems hinder the seamless exchange of information between electoral stakeholders, resulting in delayed decision-making and

vulnerability to manipulation (Nwankwo, 2017). The absence of a unified system also limits INEC's ability to verify voter identities against national databases such as the "National Identity Management Commission (NIMC) or the National Population Commission (NPC)". The lack of a unified system to serve as a single source of truth is a challenge to our electoral process. Despite the progress made in the technological advancement of the electoral process, Shittu (2020) identified a deficit in technological infrastructure as a major challenge in the implementation of integrated database systems in Nigeria. Poor internet connectivity, frequent power outages, and inadequate hardware impede the effectiveness of these systems. Furthermore, cybersecurity risk, resistance to technology, capacity gaps, funding constraints, and public mistrust are also major challenges that impede database integration in electoral management in Nigeria (Babajide, 2022; Goje et al., 2021; &Ugwuala et al., 2021). This study seeks to address these challenges to enhance electoral processes in Nigeria.

1.3 Research Questions

This study seeks to answer the following research questions:

- i. What was the role of an integrated database system in the electoral management?
- ii. What is the status of the electoral database management system in Nigeria?
- iii. What is the prospect of an integrated database management system in Nigeria's electoral management?

1.4 Research Objectives

The main objective of this study is to assess the impact of an integrated database system on electoral management in Nigeria. The specific objectives are to:

- i. Examine the role of integrated database system in the electoral management.
- ii. Analyze the status of electoral database management system in Nigeria.
- iii. Investigate the prospect of integrated database management system on Nigeria's electoral management.

1.5 Significance of the Study

These research findings will benefit several individuals, institutions, and organizations. They will be important to the Independent National Electoral Commission (INEC), which has the legislative backing to conduct elections at Nigeria's national and subnational levels. The findings will enable INEC to gain insight on how to enhance the electoral management through integrated database systems, which have been adopted in other climes, and push for the necessary legislative amendments. Political parties would find this research beneficial, as it would enable them to have a robust, accurate, and updated membership database. It would also ensure seamless and smooth updates of their database for planning and organizing, especially during indirect primaries to nominate party candidates. An integrated database system enables parties to ascertain their numerical strength for proper management of party primaries, thus strengthening internal democracy.

Furthermore, the study will help policy advocates and policymakers push and enact electoral laws that would further improve our electoral process, thus enabling INEC to deliver a credible poll. Additionally, citizens will find the paper beneficial, as they will have a sound understanding of the concept and importance of the subject matter; it allows them to engage meaningfully with electoral stakeholders and their representatives to improve the electoral process. This would further improve citizens' trust in the electoral umpire.

The thesis is significant as it contributes to the body of existing knowledge and extant literature on integrated database systems and electoral management by taking advantage of the opportunity it avails. Entrepreneurs and industries that deal with huge amounts of data, from customer records to transaction history, can also find this system useful to optimise their business. Election technologists and innovators can find the study significant as EMBs have continued to embrace technology for the proper management of elections.

Conclusively, government agencies, individuals, academics, researchers, and election technologists will find the work beneficial, as they would be equipped with relevant literature and information that will aid further research in the subject area and identify solutions to the issues raised. It will also aid the process of policy, legal, and administrative reforms that will be needed to improve the integrity and transparency of our elections.

1.6 Scope of the Study

This study focuses on Nigeria's electoral management system, specifically analyzing INEC's electoral database management and the potential integration of database systems. The study will cover the 2023 general elections, reflecting recent technological developments and electoral reforms.

1.7 Limitations of the Study

This study had some limitations in the course of carrying out the research. Data accessibility was a major challenge during the research, as the election management body, which is INEC, refused to release some vital information that would have thrown more insight into the work. They considered some of this information very sensitive and were unwilling to share. Political sensitivity was another issue. Due to the delicate nature of the topic, most critical stakeholders of major political parties refused to grant us interviews. Stakeholders were assured that information released would be handled with utmost confidentiality. Furthermore, some of the respondents scheduled for interview did not show up and didn't give prior notice which delayed the progress of the work. However, online interviews were conducted through phone calls. Finally, some respondents were uncooperative in responding to the questionnaires. Several calls and follow-up measures were introduced to ensure that the questionnaires were answered and returned. Online questionnaires were also introduced to ensure flexibility, reduce human contact and foster efficiency.

1.8 Definition of Key Terms

1.8.1 Election Management Body (EMB)

An election management body is saddled with the responsibility of administering the electoral process. Such bodies usually have different sizes and titles, which include Electoral Commission, Electoral Board, etc. The EMBs are legally authorized for managing all the core essential and core activities that are directly or indirectly associated with conducting elections in a direct democracy activity such as referendum and recall votes. They set criteria for the election and determine those who are eligible to vote; they accept and validate the nomination of candidates from various political parties, prepare and open polling centres, carry out voter sensitisation and declare the result of elections, among other things. Based on the independency of functions, EMBs can be classified as independent, governmental and mixed EMBs. Types of EMBs include the Independent National Electoral Commission (INEC) for Nigeria, the Independent Electoral Commission (IEC) for South Africa and the Independent Electoral and Boundary Commission (IEBC) for Kenya, amongst others.

1.8.2 Biometric Verification

This can be described as an "automatic verification of a person" following some specific physical and behavioural traits or features. It is used to distinguish an authorised person from an imposter. Biometrics may be multimodal (using more than one biometric feature) or unimodal (using a single biometric feature). Some "biometric" features considered unique to an individual include facial features, irises, fingerprints, voice characteristics, etc.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter focuses on review of relevant literature and examines the theoretical framework. Here, various findings by researchers, authors with different background are reviewed and analyzed. This section contains the conceptual review, theoretical review, empirical review, gaps in literature and theoretical framework.

2.1 Conceptual Review

2.1.1 Integrated Database Systems

Integrated database systems refer to technological platforms designed to unify, store, and manage data from multiple sources. These systems enhance operational efficiency, reduce redundancy, and improve data accuracy (Adebusa et al., 2022). In electoral management, such systems are instrumental in consolidating voter registration, election results, and other electoral data, fostering transparency and accountability. Integrated database systems also refer to a technological infrastructure that consolidates multiple datasets into a unified platform, ensuring seamless data management, sharing, and analysis. These systems are designed to eliminate redundancy, reduce errors, and improve the overall integrity and accessibility of data (Goje et al., 2021). They are particularly valuable in complex systems like electoral management, where diverse data sources—including voter registration, polling station records, election results, and logistical information—must be harmonised to ensure accuracy and efficiency.

"Database integration combines and consolidates information acquired through various sources, including databases, cloud storage, data warehouses, on-prem hardware storage, etc. This makes data more accessible across applications, departments, and stakeholders without the risk of data loss or duplication" (Thokala, 2021). Integrating a database allows the unification of different data sources. This particular feature makes it serve as a linchpin in an attempt to serve as a single source of truth. Thus, it does not replicate data from various

locations, allowing for efficient retrieval and management of information. Data integration platforms are efficient approaches to utilising and storing data. Accessing “data in a single location saves end-users time and effort and enhances collaboration across departments. Data easily accessed, analysed, and used saves time, money, and effort”. Every end-user, department, and location can be sure they view the same data to make key decisions in business (Gigaspace, 2025).

Integrated database systems are critical in modern organisations, where data is of paramount importance. The system enables the unification of data and applications, creating an environment where data or information can flow seamlessly across different organisational units, enhancing both decision-making processes and operational efficiency. It consolidates multiple data sources to allow various applications to function in tandem through a unified database repository (Naeem, 2024). This method ensures data consistency and integrity across the entire organisation. Critical aspects of integrated databases include centralised management, redundancy reduction, and data synchronisation. Centralised management involves a single point of control for all data-related processes and enables consistency and reduces conflicts. Redundancy reduction ensures the reduction of redundant storage of data across various systems significantly. Data synchronisation ensures that all changes in data are reflected across the system, provided they are up to date (Tutorchase, 2025).

Database integration is a “process used to aggregate information from different data sources, such as social media, data warehouses, customer transactions, and more, and share a current, clean version across an organisation” (Juraj, 2020). It helps to ensure the deduplication of data, storage based on definite rules, cleansing, and secure sharing with stakeholders (Talend, 2025). Simply put, database integration denotes a “process of taking a set of databases as input and producing as output a single unified description of the input schemas (the integrated schema)” and the associated mapping information supporting integrated access to existing data through

the integrated schema. As such, “database integration is also used in re-engineering an existing legacy system” (Parent & Spaccapietra, 1998).

An integration database serves as a data store for multiple applications and therefore integrates data across a wide spectrum of applications. An integrated database requires a schema that takes the applications of the clients into account. The schema has been favoured in literature due to its numerous advantages. According to Nurnawati & Ermawati (2017), an extra layer of integration services on applications is not needed during the sharing of data among applications.

“Database integration systems (multiple sources integration) are database management systems with the task of integrating data from two or more databases. This system can be separated into two depending on their use and work mode: virtualising and materialising. Virtualising systems store data in connected database systems. They are used for unifying views on several connected databases. In contrast, materialising systems store data in a single data store and are used for unifying data in a single data store, as support for ETL (Extract Transform Load) processes during data warehouse creation” (Juraj, 2020). “Database integration combines data from different sources to create a consolidated version from different sources, which includes databases, cloud data warehouses, virtual databases, files, etc. The integration of databases makes data easily accessible to multiple stakeholders and clients’ applications without reducing data quality” (Naeem, 2024). As noted within recent literature on business development, businesses can achieve operational excellence through the deployment of reliable techniques to record, update and meticulously keep track of their data. Recently, it has become a common storage system or tool among most businesses. These businesses use it to store things such as their customers' information and inventory. This makes database integration important, as analysts can integrate stored data with other systems, files, or applications and use it for several purposes, such as data analytics or reporting.

For clarity and easy comprehension of the concept of an Integrated Database System (IDB), it is expedient to consider the various parts of the idea, i.e., integrated, database and system. First, data can be graphic representations, figures, statistics, etc., with no particular meaning. This means that data can come in an unstructured and meaningless form, such as 1, Job, 12, 2005. When it is properly organised, it can be referred to as a database.

A system refers to a set of elements that are interdependent and interact to form a unified whole or network. To integrate, on the other hand, entails bringing together different parts to constitute a whole.

As evident in the above definitions, a data integration system can, therefore, be defined as a system of sharing data across program and agency boundaries—cross-agency data sharing and coordination—and a set of programs to access that data (Kamal, n.d.). This definition is akin to Nurnawati & Ermawati (2017), who defined an integration database system as "a database that acts as the data store for multiple applications and thus integrates data across these applications".

In practical terms, there are three primary integration approaches. These approaches include need-based data integration, periodic data integration, and continuous data integration (Kumar, n.d.). Kumar explains the three data integration approaches thus:

a) Need-Based Data Integration Approach

This is when the "...data matching effort is undertaken to address a specific business or analytic need, and the data preparation tasks such as data profiling, cleansing, transformation, matching, and linking are performed in the context of the particular business problem or analytic need."

b) Periodic Data Integration Approach

This involves a situation whereby "participating organisations develop data sharing agreements to formalise their data sharing relationships. A data sharing agreement is a formal contract that identifies specific data categories to be shared, the obligations of the participating organisations

regarding the purpose for which data can be used, the frequency with which data will be made available, client confidentiality requirements, data security requirements, etc.”

c) Continuous Data Integration Approach

This is a situation whereby “participating organisations develop a shared information source that is continuously kept current with the administrative systems. This approach must also address certain complexities that result from the real-time processes.”

It is noteworthy, however, that in practice, none of the above approaches work independently; rather, a hybrid or more than one is more often realistic.

Another conception of the integrated database system is that put forward by Chamberlm et al. (1976). They conceive of an integrated database system as consisting of the "Intelligent Database Interface (IDI). "The IDI is “a portable, cache-based interface designed to provide artificial intelligence systems in general and expert systems in particular with efficient access to one or more databases on one or more remote database management systems (DBMS) which support SQL" [Chamberlm, et al., (1976) cited in McKay, Finin and O’Hare, 1990.

For Dončević (2021), integration database systems are database management systems "with the task of integrating data of two or more databases". By this, Dončević conceives of an integration database system to be a system of multiple sources of data integrated into one collective system. Dončević further classified data integration systems into broad groups of virtual and material integration systems. He explained that virtualising systems involves storing data in connected database systems, "which are used for unifying views on multiple connected databases, while materialising systems involve storing data in a single data store, used for unifying data in a single data store." The application of any of the above systems is dependent on the nature of work and mode of use (Dončević, 2021: 1921).

Meanwhile, there are basic features of integrated database systems central to governing the operation within the system. In the works of (Mathe, 2022; Babajide, 2022; Shittu 2020, &Ugwuala et al., 2020) such features are highlighted as follows:

- a) **Data Centralisation:** Integrated database systems consolidate data from multiple, often fragmented sources into a single repository. This centralization minimises data duplication and inconsistencies, providing a "single source of truth" for users (Mathe, 2022). For example, in an electoral system, this could mean synchronising voter records across regions to prevent multiple registrations or fraudulent voting;
- b) **Real-time Data Access:** These systems enable real-time access to updated information, which is critical for decision-making in time-sensitive scenarios like elections. Election administrators, for instance, can monitor voter turnout and logistical needs as the process unfolds, improving responsiveness (Shittu 2020);
- c) **Interoperability:** Integrated systems are designed to work seamlessly with other technologies, such as Geographic Information Systems (GIS) for mapping polling units or biometric verification devices for voter authentication. This interoperability enhances the overall functionality of the electoral management process (Ugwuala et al., 2020);
- d) **Data Security:** Modern integrated systems incorporate robust cybersecurity courses of action to prevent sensitive data breaches and unauthorised access. This is especially important in electoral management, where the integrity of data directly impacts "public trust and the credibility of the election" (Babajide, 2022).

2.1.2 Electoral Management

Electoral management involves organising and supervising electoral processes to “ensure free, fair, and credible elections”. It encompasses voter registration, polling station management, vote counting, and result dissemination. Effective management relies heavily on accurate and

reliable data, highlighting the need for integrated database systems (Omodia & Egwemi, 2020). Electoral management also refers to the processes, structures, and activities involved in organising and conducting elections to ensure their credibility, fairness, and transparency. It encompasses a plethora of tasks, including voter registration, polling station setup, election monitoring, vote counting, and the dissemination of election results.

According to James (2016), electoral management comprises the organisations, resources, networks, and the ethical laws and practices associated with conducting an election. In other words, it is the application and implementation of rules under which the election exercise will operate. These rules are designed by the parliaments and executives at “the top of the political system”. It is the "application and implementation of electoral rules; the rules on how elections will operate are usually designed towards the top of the political system by" parliament and the executives. Nevertheless, the enactment of these rules is crucial for democracy to thrive. The process involves giving frontline officers the right to use their discretion as they make daily decisions about implementing rules, spending resources, and negotiating with critical stakeholders or citizens. Therefore, it is inevitable as “actors negotiate the implementation process, and the consequences of regulations are entirely subject to the implementation phase”. The election management covers areas such as organising, monitoring, and certifying elections. Organising involves pre-election registration exercises, campaigns, actual voting, and vote counting (Birch 2011; Elklit and Reynolds 2001). Monitoring is the electoral conduct all through the electoral process. These include “monitoring of political party/candidates’ campaigns”, media and enforcement of regulations on voting, campaign finance, conduct of the media, counting of votes and tallying procedure, etc. Certifying is the declaration of electoral outcomes.

Arulogun (2023) “Electoral management is the general objectives and principles of organising a state election using the components of a voting system that controls and maintains election

databases, conducts election and setup functions of personnel, designs and formats ballot boxes, acquires and tabulates results, aggregates election results, produces an election report and maintains an audit trail”. It involves the utilisation of specific hardware and software to organise, collate and present election results from a single or multiple polling units. It provides “utilities for other election administration tasks, including maintenance of equipment inventories, estimation of ballot printing needs, maintenance of information on voter service and voting centres, planning of manpower for election administration, as well as funding of activities towards a successful election operation”. Management of elections across different countries comes along with huge complexities that are fragmented in the electoral guidelines of these countries.

Ace Electoral Knowledge Network (2025) Electoral management comprises both the body that presides over the elections and the numerous mechanisms, duties and functions these entities are obligated to carry out. Most “democracies have an election administration of some kind” (usually known as Election Management Bodies or EMBs), and their responsibilities may vary substantially. From being responsible for the polling, conducting and tabulation of votes to including “registration of political parties, oversight of campaign finance, design of the ballot, and setting electoral boundaries”, resolving “electoral disputes, civic and voter education and monitoring of the media”.

Ighadalo (2008) states that electoral management is the process of arriving at a free, fair, and credible selection of candidates to occupy public office. These activities should involve coordinated actions by men and women whose goal is to achieve a “peaceful and orderly” election in the “political system”. The overall goal of the election management body is to ensure a “viable electoral system and hitch-free electoral management” (Nnamani, Nduba & Nwanolue, 2019). Electoral management is the entirety of the electoral cycle, which includes the “functional party system”, candidate nomination, conduct of free, fair, and credible

elections, declaration of election results, and the conduct of post-election activities, which includes election petitions and judiciary independence in election tribunal cases.

2.1.3 Database

Lewis (2016) defined a database as "a shared collection of logically related persistent data (including the description) as part of the information system of an organisation or enterprise."

Databases can be referred to as collections of data organised in a unique way to enable users to efficiently retrieve, manipulate, and store information. Some key characteristics of databases include data structure, data integrity, data independence, and data security, amongst others (Chen, 2023).

A database system comprises two basic elements. The first is a software program, which is sometimes referred to as a database management system. The second is a series of data referred to as a database. The data within the database, according to Tony, Elmagarmid, Ahmed, & Xiangning (1993), are organised by several data models, from a relational model to a hierarchical model. A database system, on the other hand, is a collection of "interrelated data and a set of programs that allow users to access and change or modify this data – that is a database system". Its main purpose is to provide users with an abstract view of the data; that is, the system hides some details of the storage and maintenance of the data. "Database systems are designed to manage huge bodies of information, and this management involves defining a structure for the storage of information and providing mechanisms for the manipulation of information" (Kamal, 2015). A database system must put in place safety measures for stored information in the event of a system crash or unauthorised access. Similarly, a database management system (DBMS) is a collection of interrelated data and a set of programs to access the data. It is a collection of related data with an implicit meaning. The data collected refers to a database that contains information that is important to an enterprise or client. The importance of the "DBMS is to provide a way to store and retrieve database information that is convenient

and efficient. By data, we mean known facts that can be recorded and have implicit meaning” (Kamal, 2015).

A database system is composed of different components and parts that work together to store, maintain, retrieve and manage data. Their different components include:

- I) Hardware: this is the physical component of the computer system such as the CPU, memory, storage, and keyboard needed to store and process the data.
- II) Software: This is the non-physical computer of the computer referred to as the database management system (DBMS) software. The software creates, maintains, manages, and manipulates data in the database systems.
- III) Data: it is the actual data or alphanumeric figures that is stored.
- IV) Procedures: it is the procedures and processes used to maintain and manage the database which include security, backup and recovery, etc.
- V) User: These are the users of the database system, they perform tasks such as querying, analyzing, and updating data (Chen, 2023).

2.2 Theoretical Review

Elections in every part of the world use one form of electronic technology or the other. Different electronic technologies have been deployed by electoral managers to optimise the electoral processes. Under this arrangement, digital equipment is used to execute the electoral process. Experts have lauded the deployment of digital infrastructure in carrying out the electoral process since it requires less human involvement. These electoral processes include voter registration, party and candidate registration, candidate support signature verification, ballot production, electoral logistics, voter identification, voting in polling units, counting of votes, transmission of election results, and preliminary and final presentation of results. Few countries have been able to reach or attain this level of automation in election management (Donatus, Amaefule, Ikenna & Jane frances, 2018).

Ekundayo (2015) summarises election management to include the following:

- I) Participation of electorates in electing their leaders.
- II) Participating in governance activities before, during, and after elections
- III) Legal and constitutional framework of elections
- IV) Registration of political parties, regulation of political parties, and financing of political campaigns
- V) Genuineness and authenticity of the voter register
- VI) The liberalism or otherwise of political parties
- VII) Activities of print and electronic media
- VIII) Activities of the government in power and the security agencies.
- IX) Independence of the electoral body or organ
- X) Independence of adjudication bodies

Electoral management involves implementing elections, including rule-making and electoral governance elements. Designing implementation infrastructures raises rule-making questions: Who should be responsible for implementing elections? What is the role of civil society? Should the involved agencies be independent of political parties and government ministers or under their control? Each of these decisions has direct consequences for the quality of the election (James, 2020). Furthermore, implementation can involve decision-making. There is likely to be discretion accorded to middle-level managers in choosing an accessible polling station, resourcing the polling stations, and motivating their workforce. They may need to deal with long queues that arise at polling stations the way they deal with everyday voter matters. Conclusively, election management bodies (EMBs) are strategic and political actors. Electoral administrators can mobilise themselves to lobby and affect the policy process, but this is not usually the case. It is also common for more than one organisation to be involved in the organisation of elections. This may lead to positive-sum collaborative forms of implementation

and election governance. However, it may also lead to inter-organisational politics, rivalry, and conflicts (James, 2020).

Similarly, the European Centre for Electoral Support (ECES), in their report on Strategic Planning for Electoral Management Body Using Quality Management Principles, identified the lack of strategic planning of the EMBs; more than that, they oftentimes provide a path towards something different than the outcomes originally envisioned. Planning is an integrated process intended to accomplish the EMBs' set objectives and improve the outcomes from one electoral cycle to another. A formal planning process is an essential and consistent component of the ongoing operation and management of electoral activities. "Strategic planning for EMBs and other related institutions can be enhanced via the principles of quality management, which include leadership, process approach thinking, engagement of people, improvement, evidence-based decision-making, and relationship management." However, strategic planning is not a guarantee that an organisation will improve its performance. Successful implementation requires sufficient resources and a clear understanding of its content by all stakeholders. The plan must be considered as a living document, always integrating progress and lessons learnt for it to be effective.

Furthermore, elections are complex and specialised processes that are managed by an institution with several electoral management duties. This body is often referred to as EMB, and its sole purpose is to manage some or all the essential "parts of electoral management, which include determining who is eligible to vote, receiving and validating the nomination" of candidates or political parties, conducting polling activities, and counting votes, amongst others. The country's EMB model may either be a result of a holistic design process or grafted onto an existing system of state administration (IDEA, 2018). Most post-colonial nations are influenced by "colonial administrative patterns". There are three models of electoral management, which include independent, government, and mixed models. Irrespective of

which model is used, all EMBs follow certain guiding principles, which include independence, impartiality, integrity, transparency, efficiency, professionalism, and service-mindedness. The structure, powers, functions, and responsibilities of EMBs are well-defined in the nation's legal framework. This aids the integrity and "independence of the electoral process and promotes consistency and equality in electoral management." An EMB may be established through the constitution, statute, or act of legislature. For example, Nigeria has the Electoral Act 2022. In enhancing the credibility and integrity of elections, the Act mandates INEC to use technology for the conduct of elections. However, there may be a need to amend the Act to mandate INEC and other data sourcing or collecting agencies like NIMC, NPC, and FRSC to integrate their database to ensure maximum efficiency and reliability of data and avoid unnecessary duplication of data (IDEA, 2014). The electoral system choice is an important decision for any democracy. In most cases, this decision profoundly affects the future political life of the country concerned. Their design and effects are subject to other structures within and outside the constitution or electoral act. Some electoral systems identified include plurality or majority, mixed, proportional representation, and others. The plurality consists of "first-past-the-post (FPTP), two-round-system (TRS), and block-vote (BV)", amongst others. The proportional representation includes list proportional representation (List PR) and single transferable vote (STV), while the mixed method includes a parallel system and mixed member proportional system IDEA (2018). However, (Asamoah, 2019), in "Electoral Management in Africa: A Facade or Reality – The Case of Election Dispute Resolution Mechanism", focused on examining how EMBs and the judicial system can prevent electoral violence, as well as providing an assessment of the role of stakeholders and effective electoral cycle management in preventing election-related disputes. The study employed politico-legal debates to corroborate arguments on the root causes of electoral violence and robust measures to prevent or avert them. Part of the study's findings indicate that impartial EMBs and judiciary are

prerequisites for effective election dispute resolution procedures. In this light, they suggest that while multi-stakeholder conflict management is instrumental in promoting peaceful electoral processes in Africa, it unites diverse actors and strongly encourages social diversity.

Additionally, Schaller, Omran, Ahmed & Xiangning (1993), in a report titled 'The Integration of Database Systems', explored the historical trajectory of database integration systems starting from the 1970s, when data was predominantly centralised, to the contemporary decentralised data systems. (Schaller et al., 1993) defined database integration, or "multi-data-base system", as a system of data that "combines participating databases to form a single cohesive interoperable multi-database and provides uniform user access interfaces." They further classified database systems to be composed of two elements, which are a database" (made up of a set of data) and the "database management system" (made up of a software program which ensures the possibility of integration).

One of the challenges of implementing reliable transaction management in data integration systems, as highlighted by (Schaller et al., 1993) in their report, is the problem he referred to as the "atomic commitment of global transactions". The report explained this challenge to entail the "impossibility of ensuring that if any of the effects of a global transaction are executed, then all of the effects will be executed." This means, for instance, if there is a change in the general integrated system, that change can't be reflected in the independent part of a database system. This also amounts to the key characteristics of the integrated database system, which include transparency (network transparency, replication transparency, user transparency, and system transparency); data semantics transparency; autonomy – the ability to unilaterally formulate own concurrency control policy and export schema for interacting with other databases; Heterogeneity – data models, query languages, and processing methods may differ "between multiple databases; Distribution – the databases are physically located at different sites which may include single sites, multiple sites in LANs (Local Area Networks)

or WANs (Wide Area Networks), and multiple networks of LAN/WAN. Alongside the foregoing characteristics, "the cost and performance of the resulting multi-database system" must be put into consideration.

Furthermore, the report by Schaller et al., (1993) also highlights the different dimensions or approaches to the creation of integrated database systems to include (1) tightly coupled federation (with schema integration); (2) loosely coupled system (able to define queries using multi-data-base languages, but "do not maintain hard links into member databases, with only the databases which require integration are attached as needed to fulfil" the transaction request); (3) interdependent data management (interdependencies of multi-data-base must be defined). The report concludes by highlighting the factors necessitating the development of integrated database systems to include the need within organisations to bridge disparate sources of information, the merger of organisations, changes in business requirements leading to a need for new applications, as well as innovations that result in the need for enhanced qualities of information.

Similarly, Parent & Spaccapietra (1998), in their article, align with the previous submission on database integration systems. They submitted that company structures evolve, and new business units are created. Their application will rely on already existing data from various data stores rather than generating new data. The capacity to make data stores interoperable is an essential factor when developing a new information system. Full interoperability is then achieved by distributed database systems, which support integrating "existing data into virtual databases." The latter allows existing databases to remain under the control of their respective owners, thereby aiding a harmonious "coexistence of scalable data integration and site autonomy requirements." Federated systems are growing popular recently. However, many issues remain unresolved. Issues emanating from design focus on either human-centred aspects "(cooperative work, autonomy, and negotiation procedures)" or database-centred aspects "(data

integration and schema/database evolution)" that must be solved to become marketable. Furthermore, there is a need for further studies on the integration of heterogeneous databases and the integration of complex objects.

Bachman (2009), in "The Origin of the Integrated Data Store (IDS): The First Direct-Access DBMS", explored the origin of the production of the IDS – the development challenges it was produced to address and the impact it has had on software development and business management. The author, who adopted a historical analytical approach, defined the Integrated Data Store (IDS) system as that programme that ensures the "capability to associate records into data structure sets and the capability to use these sets as retrieval paths." It reveals that the IDS was first produced in the late 1950s for the purpose of business data processing. Consequently, it was used to review manufacturing processes and to determine the most efficient procedure for achieving effectiveness. At this initial stage, the IDS could only "execute one program at a time". The IDS DBMS was created through the assemblage of various elements that are found in existing frameworks and research papers. Some of these elements are integrated to enable the whole to satisfy the envisaged control system requirements.

Onakoya, Adebayo & Owolabi (2013), in their paper, proposed the establishment of a "central/national database" using the Entity Relational (ER) data model to describe and identify each person uniquely. This ER data model further proposes the establishment of a unique code or National Security code (NS Code) as its primary key to identify each entity and entity relationship within and among public service entities. This model can be used as a digital solution to the insecurity of Nigerians, and that should be seen as an important "national issue that attracts collective responsibility" and must be created by law. From the experience of best practice, the US, UK, Germany, China, Kenya, and South Africa – these "nations have recorded significant improvement due to the establishment of a central national database, which includes

minimised levels of corruption and sanity in governance, security surveillance, data and knowledge-driven society, social security and welfare, immigration control, "national growth and development, personality integrity tracking" and electoral value". The paper concludes by suggesting that all various interests, ministries, departments, and agencies must be upgraded to include the NS code attribute so that entities "can be identified between or within and among their relationship with the public". It further recommends that ECOWAS can explore means to legislate and execute in the sub-region.

Okumoku-Evrero (2018) states that a national database is a structured "data or numerical environment where all citizens of a country and its immigrants are distinctly identified and possess a strong national virtual identity". Nigeria urgently needs scrap a situation where multiple agencies delve into collection of data of citizens and embrace the idea of having single database where the necessary information of every Nigerian will be saved. The National Identity Management Commission (NIMC) is working to have comprehensive data for all citizens through its National Identification Number (NIN) project. Currently, several agencies like the "Federal Road Safety Corp (FRSC), the Independent National Electoral Commission (INEC)", and the National Communication Commission (NCC) capture data from citizens, yet none can refer to each other to get "accurate information." Thus, building a dependable integrated database in Nigeria requires all government agencies responsible for data collection to collaborate instead of competing with one another.

For Kumar (n.d.), in "An Overview of Architectures and Techniques for Integrated Data Systems (IDS) Implementation," he explored the various data architecture and data integration techniques for Health and Human Services (HHS) enterprises. The work on the backdrop of the complexities of data in human service organisations, which has "resulted in blind spots in the decision-making process at multiple levels," focused on exploring the effectiveness of Integrated Data Systems (IDS) in helping to "improve the decision-making process by making

quality information about clients available to decision makers" at all levels – effectiveness of data integration in addressing the challenge of sourcing for accurate information from the right individuals at the right time in the HHS system.

The work argues that the IDS made up of population-level data and client-level data when adopted in the HHS system can lead to more effective service planning at the client or population level and more effective policy response at the macro level. Consequently, the author argues that with population-level data, an integrated data system can enable policy analysts to "develop broader insights into the cross-agency dynamics of target populations while also enabling operations managers" to foster a better insight concerning the expertise needed, resource utilisation, and costs that comes along with serving "multi-agency clients" simultaneously. With the client-level data, on the other hand, caseworkers and service providers can carry out their duties with regards to assessing and adequately organizing in collaboration with other agencies to reduce the gap in service and maximise the "odds of achieving" positive outcomes. The author emphasised the importance and benefits of integrated data systems, highlighting that "the technologies and techniques have matured to the point where the cost and risk of IDS deployment are far outweighed by its benefits." (Kumar, n.d.). Dončević & Fertalj (2020), in their work, identified the increasing need to "create a scientific and technological overview of the field of database integration systems", particularly with the consideration of NoSQL databases as "possible data" sources. Their findings reveal that database integration systems are geometrically expanding owing to the frequent application of NoSQL databases in real-world information systems. In contrast to the application of "relational database systems, database integration systems now must encompass schemaless" data. Their article concludes that the system designer decides "whether to use an ad-hoc data integration system (Apache, Gobblin)" or an integrated database system. At first glance, ad-hoc data integration may seem adequate; nevertheless, it "can be argued that as system

requirements change over time, a database integration system might be more fitting due to the specialised process of automatizations."

Modu (2018), in his work on the design and evaluation of a database in Nigeria, identified some challenges in collecting a database of citizens, which include a lack of computer literacy, neglecting the significance of personal information, and limited access to information. Communication and technology tools, amongst others. The paper also identified various means of data capturing and highlighted the paper-based data collection predominantly used in Nigeria, which has made it difficult for authorities to collect citizen data agencies. In their article, Yao, Navathe & Weldon (2001), acknowledged two levels in database design: logical and physical. Logical design involves defining and combining the views of many applications into centrally controlled and maintained databases with provisions for data security and sharing. Physical design includes all the details of implementing and considering a particular database system.

Smith, Bernstein, Dayal, Goodman, Landers, Lin & Wong (1999), in their article, proposed integrated database system software. Another problem identified was the issue of integrated retrieval. Within these databases, every "independent database has its schema, expressed in its model, and can be accessed only by its retrieval" language. Given that each data base has a different schema, data model and retrieval language, challenges are encountered when formulating and implementing "retrieval requests or queries that require data" from other databases. The paper proposed a multibase software for "integrating access to pre-existing, heterogeneous, distributed databases." The system suppresses differences in Database Management System (DBMS), language, and data models amongst the "databases and provides users with a unified global schema and a single high-level query language." Local databases have the autonomy to update. The architecture is such that "it does not require any changes to local databases" or DBMS. The key objective of the project is to develop appropriate language

constructs for accessing and integrating heterogeneous databases. Their work highlights why non-integrated, heterogeneous, distributive databases arose, which includes, firstly, a huge percentage of these databases were built the benefits that accompanies integrated databases came to light. Secondly, the absence of a central database administrator for most enterprises has made it difficult for independent organisations to "produce an integrated database suitable for them." Lastly, due to the large size of many data processing applications has made distribution a necessity simply to handle the volume of work. The study concludes that "additional research" is needed to fill in the details of optimisation and "incompatible data handling."

Database systems emerged in response to early methods of computerised management of commercial data. A university organisation, for example, keeps information about all instructors, students, departments, and course offerings in a database. A database management system allows "users to define, store, retrieve, and update the information contained in the database on demand" (Database Management System Autonomous, 2016).

Advantages of database management system (DBMS) include;

- I) Controlling of Redundancy: it refers to the duplication of data. In a database system, having an integrated/centralized database and centralized control of data by the Database Administrator, the unnecessary duplication of data is avoided. This also saves the storage space.
- II) Improved Data Sharing: A database management system allows a user to share data with any number of application programs.
- III) Data Integrity: Centralized control of the data allows the administrator to define integrity constraints on the data in the database. This ensures that the data in the database is correct.

- IV) Security: having full authority over the operational data enables the database administrator to ensure that the only means of access to the database is through proper channels. The DBA can define authorization checks to be carried out when access to sensitive data is attempted.
- V) Data Consistency: The elimination of redundant data will greatly reduce the opportunities for inconsistency. Updating data values is greatly simplified when each value is stored in one particular place.
- VI) Efficient Data Access
- VII) Enforcement of Standards
- VIII) Data Independence
- IX) Reduced Application Development and Maintenance Time

Disadvantages of DBMS include;

- I) Complexity: because DBMS supports multiple functionality to enhance user experience, the underlying software are usually complex.
- II) High memory usage: due to the complexity and functionality, it uses large memory to run efficiently.
- III) Centralized systems: DBMS works on a centralized system hence any failure will impact other users (Database Management System Autonomous, 2016).

Strategies for Successful Implementation of Integrated Database Systems. The legal framework is very important for successful implementation; for instance, countries like South Korea, Germany, and Canada have established robust legal frameworks that mandate the use of integrated databases for voter registration and result management. Also, public-private partnerships are important; governments often collaborate with private technology firms to design and implement database systems. For example, India's Aadhaar System integrates biometric data for voter authentication with support from private technology providers (Kumar,

2020). Additionally, the need for capacity building cannot be overemphasised. Training electoral officials and stakeholders is critical to successfully using these systems. The European Union has supported capacity-building programmes in Africa to improve the adoption of integrated electoral technologies (Mathe, 2022).

Furthermore, funding and international support are critical. Developing nations often receive financial and technical support from international organisations such as the United Nations Development Programme (UNDP) and the International Institute for Democracy and Electoral Assistance (IDEA) to establish integrated database systems. Core components of electoral management vital for the delivery of free, fair, and credible elections are highlighted in the works of INEC (2022), (Shittu, 2020; Mathe, 2022; Asante et al. 2020). The electoral framework is important because it is the legal and institutional frameworks that guide electoral management and determine the roles, responsibilities, and powers of election management bodies (EMBs). In Nigeria, the Independent National Electoral Commission (INEC) is the primary EMB, mandated to organise and oversee elections (INEC, 2022). Voter registration is also a critical aspect of electoral management. Voter registration ensures that eligible citizens are identified and included in the electoral process. INEC's use of biometric voter registration (BVR) has been pivotal in reducing fraud, such as multiple registrations and underage voting (Shittu, 2020). Furthermore, election logistics is vital in electoral management because it involves planning and deploying resources such as voting materials, polling stations, and personnel. Effective logistics prevent disruptions, ensure accessibility, and enable smooth operations on election day (Mathe, 2022).

Election monitoring and supervision are vital during elections and are essential to maintain integrity. Election observers, both local and international, often play a key role in this process, ensuring compliance with electoral laws and procedures (Asante et al., 2020).

Key principles electoral management bodies must uphold to conduct free, fair, and credible elections; these are highlighted in the works of (Ugwuala et al., 2020 & Goje et al. 2021). The Independence Electoral management bodies are vital as they must operate independently, free from political interference, to ensure impartiality. Nigeria's constitution enshrines INEC's autonomy to safeguard its integrity (Ugwuala et al., 2020). Fostering inclusivity is important as it ensures that all eligible citizens, including marginalized groups like women, youth, and persons with disabilities, can participate effectively. Additionally, transparency in electoral management involves open communication, access to information, and the use of technologies that allow stakeholders to monitor processes and outcomes. Furthermore, EMBs must be held accountable for their actions and decisions, ensuring adherence to legal and ethical standards.

Global Perspective on Integrated Database Systems in Electoral Management. Around the world, integrating database systems into electoral management has become a hallmark of modern democratic governance. Countries have increasingly adopted these systems to streamline electoral processes, enhance transparency, reduce fraud, and build public trust. The use of integrated databases ensures that election management bodies (EMBs) can efficiently collect, analyse, and utilise data for decision-making across the electoral cycle (Mathe, 2022). This section explores global perspectives on the adoption, implementation, and impact of integrated database systems in electoral management.

2.3 Empirical Review

The empirical review synthesizes existing research findings on the Integrated Database Management system and the management of elections, with a focus on Nigeria and its Election Management Body. It evaluates different studies that highlight the challenges, dynamics, and contributions of integrated databases to electoral management, thereby offering insights into the effectiveness of the electoral process.

There are several studies on electoral management systems in Nigeria, Arulogun (2023), in his work titled *“Digitization of Election Management System in Nigeria: A Contemporary Appraisal of Independent National Electoral Commission (INEC).”* The author highlighted how the use of cutting-edge digital technology like biometric voter registration, optical mark recognition, smart card readers, digitized voting, and electronic transmission of results has enhanced the conduct of free, fair, and credible elections and improved management of election systems, which is in line with best practices around the world. The paper examines Nigeria’s various components of election administration in the context of digitization and emerging technology. The qualitative research method was applied to the study; primary data were used through a questionnaire given to selected voters in a particular section of the country. Part of the paper’s recommendations was that citizens should be more open and receptive to new technologies and that the government should embrace and adapt to emerging technologies in election administration and management. Conclusively, the study revealed the importance of electoral technology to the legitimacy of elections. It also emphasized the need to digitize the entire electoral process to facilitate oversight of INEC. It further revealed approximately 2.7 million double registrants using technology and simplified the registration process with the use of biometrics, making the process more secure.

Similarly, Donatus, Amaefule, Ikenna & JaneFrances (2018), explored the application of Information Communication Technology and electronic technologies in election management, particularly in rural areas of the south-eastern part of Nigeria, the study revealed numerous challenges and bottlenecks encountered in the electoral process in Nigeria and affirms that the adoption of technology in the electoral process has reduced human involvement which was marred with irregularities and electoral violence. The study found that the deployment of electronic technology in rural areas had several challenges, which included poorly trained personnel, poor handling of election gadgets, and malfunctioning of smart card readers. The

findings draw data from interviews with respondents and found that these challenges identified led to the loss of confidence in the entire process by the voters. Their work acknowledges the importance of ICT and election technologies in enhancing the credibility of elections but they however emphasize the need for the electoral umpire which is INEC to properly train their staff on how to operate and handle electoral gadgets and also ensure the optimal performance of these gadgets.

Further insights into the management of elections were given by James & Garnet (2023) in their study “*Are polarized elections the hardest to deliver? Explaining global variations in electoral management body performance,*” which found that there are concerns about the quality of electoral management and the performance of EMBs globally. Furthermore, new threats are emerging that challenge our democratic process, such as the polarization of electorates in many nations. Four core factors were identified that could shape the quality of election management: the culture of corruption, the autonomy of the EMBs, the capacity of EMBs, and the political polarization in the electorate. The article used cross-national datasets to measure patterns across the globe in the performance of the EMBs. It was found that elections appear to be hard to manage when there is significant polarization. It asserts that polarization increases manipulations and unfounded criticism of EMBs. Also, there is a threat of violence and disruption of the electoral process with increased polarization, which may inhibit the electoral management body from performing its duties. It raises a concern that with increased polarization comes increased challenges. The authors conclude that there is a need for EMBs to adopt anti-corruption mechanisms within their system to curb corruption, executive powers over EMBs should be reduced if not eliminated, improved funding and enhanced capacity building for staff of EMBs.

There are several studies on Designs of Integrated Database Systems. Several kinds of literature on the design and application of integrated database systems in electoral management have

been explored. This design and evaluation were explored by Modu et al. (2018) in “*Design and evaluation of an integrated national database in Nigeria*,” making a case for the “idea of an integrated national database, a relational database management system technique to address the absence of a comprehensive set of citizens' data.” The study led to the development of an application prototype that served as a “central data repository that interconnects the citizens and public and private organizations”. The system was designed to allow individuals to “register conveniently, and then a unique reference will be given to every citizen, which will be tied with the database for easier retrieval of individual information in the database”. For security, only authorized “agencies can access the stored information, and organisations can access only information prescribed to them by the system super administrator”. The “developed prototype is tested using the Blackbox technique to determine the effectiveness of the system”, which proves positive. A survey was also conducted to explore the citizen’s compliance and perception of the entire civic registration in Nigeria and another to assess the technical view of the system. Notably, the researcher points to the fact that the evaluation of the designed system is conducted only in some selected areas of Yobe State. Thus, its outcome cannot be generalised due to the diversified nature of different ethnic beliefs and cultures in Nigeria, leaving a gap for further study.

Additionally, Nurnawati & Ermawati (2018), in their study titled “*Design of integrated database on mobile information system: A study of Yogyakarta smart city app*”, ventured to design and “build an integrated database that can be used by various applications in a mobile device-based system platform based on smart city system. The design and development of the database emphasised the flexibility, security, and completeness of attributes that can be used together by various applications to be built”. The method employed is thus the choice of the appropriate database logical structure (patterns of data) and to build the relational database models (design databases). The resulting design was tested with some prototype apps, and the

system performance was analysed with test data. This Android-based app is built on a dynamic client-server where data is extracted from an external database, MySQL. So, if there is a change of data in the database, then the data on Android applications will also change. This Android app assists users in searching for Yogyakarta (a smart city)-related information, especially in culture, government, hotels, and transportation. Consequently, “the integrated database can be utilised by both the admin and the user in an integral and comprehensive platform. This system can help the admin, manager, and operator in managing the application easily and efficiently”. Integrating database systems in electoral management is very important, as they serve as the backbone for effective management of elections. During the voter registration exercise, it consolidates voter data into a single database; these systems ensure that each eligible voter is registered only once, reducing duplication and fraud. In Nigeria, for instance, the adoption of BVAS has significantly improved voter authentication and registration accuracy (INEC 2022). Similarly, integrated systems facilitate the efficient allocation of resources, such as polling materials, personnel, and transportation. By analysing historical and real-time data, administrators can have better logistical planning and make informed decisions before, during, and after the elections (Asante et al., 2020).

Furthermore, centralized systems provide real-time election monitoring, enabling stakeholders to track progress and tackle emerging challenges. They also simplify the aggregation and dissemination of electoral results, fostering transparency and credibility (Goje et al., 2021). An integrated database can help prevent and detect fraud by identifying electoral challenges such as voting attempts or irregular patterns in voter turnout, enabling prompt interventions to preserve the integrity of the election process (Mathe, 2022). The technological requirements are crucial in the discussion of integrated database systems; the following requirements are highlighted:

An advanced software solution is an essential requirement for robust database management. Therefore, software must be capable of handling large volumes of data with high levels of complexity. Examples of software include Oracle, Microsoft SQL Server, and Amazon RDS. High-speed internet connectivity is important for real-time data sharing and synchronization, especially in geographically dispersed regions. Data security infrastructure, such as encryption, firewalls, and access controls, is important to safeguard the integrity and privacy of electoral data (Ugwuala et al., 2020).

There are advantages of Integrated Database Systems in Electoral Management which includes the following;

- i. Improved Data Integrity: By consolidating data and reducing redundancies, integrated systems enhance the reliability and accuracy of electoral databases;
- ii. Operational Efficiency: Automation of processes such as voter authentication and result tabulation reduce manual effort and speeds up electoral activities;
- iii. Enhanced Transparency: A unified system allows stakeholders, including political parties and election observers, to access accurate and real-time information, fostering trust in the electoral process.
- iv. Cost-Effectiveness: Although the initial setup of integrated systems can be costly, their long-term benefits, such as reduced administrative costs and improved efficiency, outweigh the initial investment (Ugwuala et al., 2020).

There are also Limitations and Challenges in the application of integrated database systems in Nigeria's electoral management which include;

- i. Technical Expertise
- ii. High Initial Costs
- iii. Cybersecurity Risks
- iv. Institutional Resistance

High-skilled personnel are required to implement and maintain these systems, especially in developing countries where there is a shortage of technical expertise. Also, there is a huge financial burden or cost in the deployment of integrated data systems, especially for poor countries or nations with low GDP. This may pose a challenge for countries that might want to introduce the system. Furthermore, integrated systems may be vulnerable to cyberattacks, necessitating robust security measures to safeguard electoral integrity. Electoral stakeholders may also be resistant to change due to their familiarity with the traditional system, hence inhibiting the adoption of an integrated system. Therefore, there is a need to address the challenges through investment in technology, infrastructure and capacity building to expand the application of integrated systems in the management of Nigeria's election (Babajide 2022).

2.3.1 Problems in Integrated Database Management in Electoral Systems

The challenges associated with implementing and managing integrated database systems for electoral purposes are multifaceted, particularly in Nigeria. These issues range from infrastructural deficits to political interference, poor funding, and institutional inefficiencies. The persistence of these problems undermines electoral credibility and hinders democratic consolidation.

2.3.1.1 Poor Infrastructure

Infrastructural inadequacies remain a critical obstacle to effective database integration in Nigeria. Many rural areas lack access to stable electricity, internet connectivity, and modern technological infrastructure necessary for the smooth operation of integrated electoral systems (Ibeanu, 2023). This challenge leads to delays in transmitting election data and inefficiencies in managing voter information. For instance, during Nigeria's 2019 general elections, inconsistent network coverage in remote polling units significantly delayed the transmission of results to central collation centres (Bello & Chukwudi, 2023). In comparison, countries like South Africa have invested heavily in modern infrastructure to support their Independent

Electoral Commission (IEC). Maphephe (2019), observed that real-time data transmission was possible during elections in South Africa due to the availability of stable communication networks and power supply.

2.3.1.2 Political Interference and Corruption

Political interference in the electoral process remains a significant issue in Nigeria's database management. Eze (2018) reported that powerful political actors often manipulate data systems to favour their interests, leading to inflated voter registers and falsified results. This manipulation erodes public trust and undermines the credibility of elections. Ibeanu (2023), further noted that the lack of independence for the Independent National Electoral Commission (INEC) makes the institution susceptible to external influences, especially during the collation of election results. In contrast, Ghana's Electoral Commission enjoys a higher degree of autonomy, which has helped to insulate its data systems from political manipulation (Debrah, Effah & Owusu-Mensah, 2019).

2.3.1.3 Fragmentation and Poor Coordination of Data Systems

Nigeria's electoral data management suffers from fragmentation and poor coordination among different departments within INEC. Amao (2022), emphasized that the absence of a unified database system leads to inconsistencies in voter records, polling unit information, and results collation. This problem was evident in the 2015 and 2019 general elections, where multiple instances of conflicting voter data caused delays and disputes. Comparatively, Kenya's Integrated Electoral Management System (IEMS) links all aspects of electoral data, including voter registration, polling unit data, and result collation, into a centralized platform (Otieno et al., 2018). This integration has minimized discrepancies and improved the efficiency of the electoral process in Kenya.

2.3.1.4 Insufficient Technical Capacity

The effective implementation of integrated database systems requires skilled personnel who can manage complex electoral data. Nyeenenwa& Mohammed (2022), noted that INEC's staff often lack adequate training in data management and technology, leading to errors in data entry, collation, and analysis. This skill gap is compounded by frequent changes in electoral technology, which leave personnel unprepared to handle new systems. In Ghana, the Electoral Commission mitigates this issue through regular training programmes for its staff, ensuring they are proficient in managing biometric voter registration and other data-driven processes (Debrah, Effah& Owusu-Mensah, 2019).

2.3.1.5 Financial Constraints

Electoral database systems are expensive to implement and maintain. Adebayo (2018) highlighted that Nigeria's electoral reforms are often underfunded, resulting in poorly managed database systems and outdated technology. Financial constraints also limit the scope of voter education campaigns, which are critical for ensuring public understanding and trust in data integration efforts. Ibeanu(2023)pointed out that inadequate funding was one of the primary reasons why INEC could not fully implement electronic transmission of results in previous elections. In contrast, South Africa's IEC receives substantial funding from the government, enabling it to invest in advanced technologies and maintain high standards of data management (Maphephe, 2019).

2.3.1.6 Lack of Public Trust and Awareness

The success of integrated database systems depends largely on public trust. (Ajayi, 2024) found that many Nigerians are skeptical about the integrity of electoral databases, fearing data manipulation and breaches of privacy. This mistrust is exacerbated by a lack of transparency in how electoral data is collected, stored, and utilized. Public mistrust is less of an issue in Ghana, where extensive voter education campaigns have increased awareness and confidence

in the electoral process (Debrah, Effah & Owusu-Mensah, 2019). These campaigns emphasize the importance of data integration in reducing electoral fraud and ensuring credible elections.

2.3.1.7. Legal and Policy Gaps

Nigeria's legal framework does not adequately address the complexities of managing integrated electoral data. Bello & Chukwudi (2023) highlighted that existing electoral laws lack provisions for regulating data integration processes, leaving room for inconsistencies and malpractices. For instance, there are no clear guidelines on data storage, protection, and usage, which create vulnerabilities in the system. Carter (2021) noted that in Kenya, comprehensive legal frameworks were pivotal in ensuring the smooth operation of the country's Integrated Electoral Management System. These laws provide a clear mandate for data integration and include strict penalties for data manipulation. The challenges of poor infrastructure, political interference, fragmented systems, insufficient technical capacity, financial constraints, public mistrust, and weak legal frameworks significantly undermine the effectiveness of Nigeria's integrated database systems. Comparative studies from Ghana, Kenya, and South Africa highlight that addressing these issues requires substantial investments in infrastructure, institutional reforms, and public education. Without these measures, Nigeria will continue to struggle with inefficient electoral management and a lack of public confidence in the system.

2.4 Gaps in Literature

Based on the reviewed literature and having explored different authors such as Donatus, Amaefule, Ikenna & JaneFrances, 2018; Arulogun, 2023 & Modu et al., (2016), and many others on electoral management and the design and application of integrated database systems in the electoral process, it is worthy to note that these authors have not satisfactorily and systematically addressed in the extant literature the integrated database system and the electoral management within the period of study, necessitating further research. A range of methodologies were employed in the work, including descriptive surveys and qualitative

analysis. For instance, the survey captured citizens' perceptions and experiences regarding the integrated database in the registration of voters, while the qualitative analysis delved into cutting-edge technology used to improve electoral management in Nigeria. Despite valuable insights derived from these methodologies, there are significant gaps in the literature in terms of comprehensive analysis that examines the effectiveness of integrated database systems in the management of elections. Several studies tend to focus on the design and applications of integrated databases and software used in database management systems without integrating them into electoral management, thus leaving room for further research. Addressing this gap is, therefore, crucial to understanding how an integrated database system can help enhance the electoral process is not only important but necessary.

To address this gap, the paper aims to develop a robust methodological approach. It will use a qualitative method to gain insight into the relationship between integrated database systems and electoral management.

2.5 Theoretical Framework

2.5.1 System Theory

The systems theory is adopted as a theoretical guide for the study. According to Rudolf Stichweh, the object of study or main focus of the systems theory is the comparative study of systems. For Heba (2016), therefore, "Systems theory or systems science is the interdisciplinary study of systems in general, intending to realize patterns and clarify principles that can be determined from and applied to all types of systems at all nesting levels in all fields of research.

The biological "general systems" theory, as first espoused by Ludwig Von Bertalanffy in the 1920s (Ntete-Nna, 2004), has been adopted by scholars in different fields, including the mathematical, communication, and social sciences. Consequently, several variants of the theory have emerged, including Structural Functionalism by Radcliffe-Brown (1952), Political

System Analysis by David Easton (1953), the 1950s sociological version by Talcott Parsons, Bronislaw Malinowski's bicultural or psychological functionalism, Claude Shannon (1949) communication theory, and Norbert Wiener (1948) information and cybernetics system theory, etc.

Despite the various variants of systems theory above, the emphases of the systems theory according to Chih-Hui & Sapphire (2017) are placed on dual "spectrums of organizations' relationships – the interdependence among the components of which the system is constituted and the organization–environment relationships" – the feedback from the environment. Thus, "the structure and patterns and relationships of a system emerge from interactions among components; consequently, each system is unique"

In summary, systems science proposes a way of organizing our thoughts about phenomena that are complex. We can consider phenomena as complex sets of interacting networks, each understood as elements and relationships, and each transforming input to produce outputs by operating a set of feedback and/or feedforward control procedures, hierarchy, emergence, adaptation, and metalanguage (Heba, 2016).

According to Connolly and Harms (2015), "systems theories help us to think about these interactions between people and their social and physical environments" . They are applied to components of a greater system that work to create equilibrium in human existence (Edubirdie, 2022).

2.5.2 Major Proponent and Propositions of the Systems Theory

As earlier stated, the relevance and application of the systems theory have been evident in different fields of study, including the biological sciences and social sciences, as well as in the area of information and cybernetics. Consequently, several scholars have emerged as proponents of the theory in the foregoing fields.

Notably, the origin of the system theory has been traced by S. P. Verma to the writings of biologist Ludwig von Bertalanffy in the 1920s (Cited in Ntete-Nna, 2004; Laszlo and Krippner, 2018). Bertalanffy wrote on the concept of “general systems theory”. Bertalanffy’s focus was on an organic analogy or perspective. He explained that a "biological organism can live, reproduce, and function through the organized system of its several parts and organs" – how the different parts interact. According to S. P. Verma, it was from this biology background that the system theory crept into social anthropology through the works of the likes of Emile Durkheim, A. R. Radcliffe-Brown, and Bronislaw Malinowski. Afterward, the theory was adopted by sociologists like K. Meton, Talcott Parsons, etc. (Cited in Ntete-Nna, 2004).

Emile Durkheim borrowed from the biological foundation of the general system theory as postulated by Bertalanffy to explain the social system. He argued that a "society can maintain its essential processes through the way that the different parts interact. Institutions such as religion, kinship, and the economy constitute the organs, and individuals constitute the cells in the social organism, according to Durkheim’s postulation.

This is also in line with structural-functionalism as postulated by Radcliffe-Brown. Radcliffe-Brown’s structural functionalism seeks to describe the different parts of society and their related functions in ensuring the overall stability of the society. Thus, rather than on the biological aspect, Radcliffe-Brown focused basically on social structure, suggesting that society maintains itself through a system of interdependent relationships (Porth, Neutzling, & Edwards, n.d.). Radcliffe-Brown argued that explanations of social phenomena had to be constructed within the social level. Thus, individuals were replaceable, transient occupants of social roles. Unlike Malinowski’s emphasis on individuals, Radcliffe-Brown considered individuals irrelevant (Goldschmidt 1996).

For Bronislaw Malinowski’s bicultural or psychological functionalism, he suggests that individuals have psychological needs such as reproduction, food, and shelter, with the social

institution existing to meet these needs. He further espoused the needs of the individual to include "culturally derived needs and four basic instrumental needs (economics, social control, education, and political organization), which require institutional devices." Notably, he held that each institution has personnel, a charter, a set of norms or rules, activities, material apparatus (technology), and a function that it must carry out towards contributing to the stability of the entire system. Consequently, according to Goldschmidt (1996), Malinowski pointed out how the "satisfaction of these needs transformed the cultural instrumental activity into an acquired drive through psychological reinforcement".

Also, the systems theory has been applied in the area of information and cybernetics by the likes of Claude Shannon and Norbert Wiener (Rudolf, n.d.). According to Heba (2016), "Cybernetics is a theory of the control and communication of regulatory feedback in biological, sociotechnical or social systems. Changes to the external environment are looped back to the system, which makes adjustments to maintain a steady state (p. 7). Wiener defines cybernetics as "the science of control and communication in the animal and the machine" (Wiener, 1948). In the field of political science, David Easton is usually credited with pioneering the application of the theory in the analysis of political processes (Anifowose & Enemuo, 1999). David Easton was the first political scientist to adopt the systems approach in constructing a framework for the study of political systems, focusing on the intersystem behaviour of different systems (Hanumanthappa, 2023). Easton argued that the political system exists within the environment of other systems that impact it and which it in turn impacts through continuous exchanges and interrelationships. Such other systems include but are not limited to the psychological, physical, biological, and social systems (Anifowose & Enemuo, 1999). The function of the political system, according to Easton, is derived from the inputs it gets from its environment by way of demands, and the response of the political system to such demands amounts to the outputs, which are the authoritative decisions of government (Ntete-Nna, 2004).

Notably, despite the variations in the different perspectives or applications of the systems theory by various scholars, the central underpinning of the systems theory is based on the conviction that all facets of human problems should be regarded as a whole (Edubirdie, 2022).

2.5.3 Strength of the Theory

Drawing from its interdisciplinary foundation, system theory enables a broad consideration of not just the multiple dimensions but also the uniformity of functions and roles of data management bodies, technology, and the electoral process in Nigeria. Therefore, the systems theory is adaptive and dynamic and is sufficiently applicable to such fields as management, statistics/mathematics, social sciences, etc. Also, the systems theory enables an understanding of organizational structures and how utilizing their synergy can help in the actualization of collective objectives. Indeed, the importance of synergy in the success of an organization cannot be overemphasized. Thus, the systems theory provides for the study of the interrelations between structures in an organization.

As it concerns this study specifically, the strength of the systems theory lies in its ability to ensure proper examination of the data management and the electoral process in Nigeria as well as how they are influenced by certain structures within the environment. Consequently, it enables an examination of not just the individual but the collective goal of data management in Nigeria, vis-à-vis democratic consolidation in the country.

2.5.4 Application of the Theory

The application of the systems theory specifically to this study is hinged on the fact that the principles of the theory are important in providing a theoretical foundation for evaluating the roles and functions of the various data-gathering institutions and how they can collectively function alongside the chief Election Management Body (EMB) in Nigeria, the Independent National Electoral Commission (INEC), towards efficiently and effectively attaining a credible and reliable database system which would in turn foster credibility in the electoral process in

Nigeria, as well as encourage acceptance of election outcomes by citizens and political actors alike. Thus, the system theory provides an integrated approach for exploring the various data-gathering and management structures (National Identity Management Commission, National Birth Register, National Death Register, etc.), which exist as part of the environment of the INEC as an independent but interdependent structure. Indeed, the system theory enables a holistic consideration of the emotional, biological, and social functions of INEC, as well as analyzing the role of other processes within its environment, especially those that would contribute towards the effectiveness of the institution.

The foregoing position is also corroborated by Langdon Winner (1986), who argues that some technological privileges or access are linked to institutionalized patterns of power or authority.

2.5.5 Weakness and Limitations of the Theory

One of the system theory's observed weaknesses is that it is hinged on the assumption that any degree of influence at any level controls the entire system. Thus, any limitation in the system at any stage can dramatically impact its failure or continued success (Edubirdie, 2022).

Also, the system theory is criticized for not being able to ensure an accurate prediction of several parameters at the same time. This begs the question of whether or not systems theory can be able to accurately encompass the complexities of interactions and interrelationships that emerge for the different systems at different levels, formally or informally. For instance, a sudden and unforeseen change in one system can pose a significant threat to the system and thus create an imbalance in the overall system, leading to unfavorable outcomes.

In the foregoing sense, several theories have emerged in opposition to systems theory. For instance, according to Porth et al. (n.d.), interactionist theorists criticize system functionalism for failing to adequately conceptualize the complex nature of actors and the process of interaction. In the Marxian view, the system theory is criticized as being conservative and static

in that it emphasizes the contribution of social phenomena to the maintenance of the status quo rather than leading to a change in prevailing circumstances.

Also, scholars of theory construction have questioned the system theory as being excessively focused on the functions of phenomena over and above everything else (Turner & Maryanski 1991). For instance, the system theory is viewed as flawed for its disregard for historical processes as well as its assumption that societies are in a state of equilibrium (Goldschmidt, 1996).

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter focuses on the research method adopted for the study. It attempts to explore in detail the methodology used during the research. The chapter includes the research design, population of study, sampling techniques and sample size, instrument of data collection, validity and reliability of instruments, and data analysis methods.

3.1 Research Design

The research design uses a mix of quantitative and qualitative methods, including questionnaire administration and Key Informant Interviews (KII), to understand the subject matter. The design was considered suitable because it helps describe, analyze, and enhance our understanding of integrated database management systems in the electoral management. The descriptive approach was adopted to analyze the nuances of the electoral management.

3.2 Population of the Study

The study population comprises key stakeholders in Nigeria's electoral process, including officials of the Independent National Electoral Commission (INEC), electoral-related civil society organizations such as YIAGA Africa, Inter-Party Advisory Council (IPAC), PLAC, election observers, and academics to provide insightful perspectives on the subject matter. Furthermore, the officials of the three major political parties in Nigeria, some selected electorates, and election technology experts were also engaged in the study.

Table3.1: Population Study Summary Table

POPULATION STUDY SUMMARY TABLE		
S/N	DESCRIPTION	POPULATION
1	INEC	16,000
2	YIAGA AFRICA	60
3	CISLAC	40
4	IPAC	100
5	APC	200
6	LABOUR	150
7	PDP	150
8	Computer Science Network (CSN)	140
9	ACADEMIA	60
	TOTAL	16900

Source:Field work, February 2025.

3.3 Sampling Technique and Sample Size

3.3.1 Sampling Technique

A purposive sampling technique was adopted for this study. The method allows the researcher to select participants based on their insight or knowledge about the subject matter that is being investigated (Sharma, 2017). This ensures that only participants with profound knowledge of the study are engaged, thereby offering broader insight around the research question.

3.3.2 Sample Size

A sample is a representative or a fraction of the population of study. It is seen as a section of the population that have similar characteristics. Slovin's formula was adopted to determine the appropriate sample for the study. To calculate the sample size (n), given the population size (N) and margin of error (e),

The formula is given as:

$$\eta = \frac{N}{1+Ne^2}$$

$$\eta = \frac{16900}{1 + 16900 (0.05^2)}$$

$$\eta = 390$$

Thus, a total number of 390 respondents is drawn as the sample size.

3.4 Data Collection Methods

The study adopted primary data collection methods for its analysis. Primary data are data generated by the researcher using questionnaires, interview techniques, or survey methods. The primary data was sourced from semi-structured interviews, considered the most suitable, while questionnaires and interviews with Key Informant interviewees (KII) were carried out. Key Informants Interviewees were purposively selected based on their expertise on the subject matter. The KII includes officials from INEC, election observers like YIAGA Africa, PLAC, and the Inter-Party Advisory Council (IPAC) and election technology experts. The study also administered questionnaires, which allowed respondents to indicate whether they agreed, strongly agreed, disagreed, strongly disagreed, or were undecided.

3.5 Research Instruments

The study adopted a close-ended questionnaire for quantitative analysis and an interview guide for qualitative analysis. The mixed method was adopted to have a balanced opinion on the subject matter. The questionnaire was administered to elicit information from the respondents. The research instruments were tailored to address the research objectives. Adopting the close-ended questionnaire and interviews enhances the validity and reliability of the result.

3.6 Validity and Reliability of Instruments

In ensuring the reliability and validity of the instruments, the researcher, with the assistance of his supervisor, ensured that the questions passed through thorough scrutiny and review. They were clear, straightforward, and consistent. The questions were structured in such a way that their content was able to elicit the needed data to achieve the objectives of the study. The supervisor also modified the questions to give the research a clear direction. Furthermore, the questions were designed to avoid ambiguity while ensuring no important detail was ignored. A triangulation exercise was also carried out to partly fulfil its validity requirements.

3.7 Data Analysis Techniques

Data was collected and analyzed using analytical tools, such as descriptive and percentage pie charts, bar charts, and tables analyzed using quantitative content analysis. SPSS software was used to process the questionnaire. A thematic analytical approach was adopted, involving the transcription of recorded interviews and categorization into thematic groups.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter contains the presentation, analysis and interpretation of data collected in the course of the research obtained through questionnaire administration from respondents and structured interviews from Key Informant Interviewees (KIIs). Deductions were drawn in line with the stated objectives of the study. Data was systematically presented and analyzed to obtain valid information for drawing conclusions.

4.1 Bio data and Socio-Demographics of Respondents

Table 4.1: Distribution of Respondents by Sex

Sex	Frequency	Percentage (%)
Male	89	64.5
Female	49	35.5
Total	138	100

Source: Field work, February 2025.

Table 4.1 shows the sex distribution of respondents. The sex data distribution indicates that out of the 138 respondents, eighty-nine (89) respondents representing 64.5% of the respondents were male, while 49 respondents representing 35.5% were female. This means that male respondents to the survey was higher than the female.

Table 4. 2: Age Distribution of Respondent

Age	Frequency	Percentage (%)
18 - 25	13	9.4
26 - 35	23	16.6
36 - 45	64	46.3
46 - 55	29	21
56 - above	9	6.5
Total	138	100

Source: Fieldwork, February 2025.

Table 4.2 shows the age distribution of respondents. From the above, 13 persons, representing 9.4%, were between 18 and 25 years old; 23 persons, representing 16.6%, were between 26 and 35 years old; 64 persons, representing 46.3%, were between 36 and 45 years old; 29 persons, representing 21%, were 46 and 55 years old; and 9 persons, representing 6.5%, were

56 and above. This implies that the respondents aged 35 and 45 years old constituted the highest respondents to the study, while those aged 56 and above were the least sampled.

Table 4. 3: Marital Status Distribution of Respondents

Marital Status	Frequency	Percentage (%)
Married	86	62.3
Single	45	32.6
Separated	4	2.9
Divorced	0	0
Prefer not to say	3	2.2
Total	138	100

Source: Fieldwork, February 2025

Table 4.3 shows the distribution of respondents by marital status. The table above indicates that 86 of the respondents, representing 62.3%, were married; 45 of the respondents, representing 32.6%, were single; 4 of the respondents, representing 2.9%, were separated; while 3 of the respondents, representing 2.2%, preferred not to say. From the data, married persons constituted the highest respondents, followed by single respondents.

Table 4. 4: Occupation Groupings of Respondents

Occupation	Frequency	Percentage (%)
Electoral Official	33	24
Civil Society	40	29
Political Party Reps	15	10.8
CSN	23	16.6
Academia	27	19.5
Total	138	100

Source: Fieldwork, February 2025.

Table 4.4 shows the distribution of occupational groupings of respondents. The table reveals that 33 respondents representing 24% were electoral officials, 40 respondents representing 29% were from civil society, 15 respondents representing 10.8% were representatives of political parties, 23 respondents representing 16.6% were from the Computer Society of Nigeria, and 27 respondents representing 19.5% were from academia. From the available data, civil society

represents the highest number of respondents, followed by election officials, while political party representatives were the least sampled respondents.

Table 4. 5: Educational Qualification Distribution of Respondents

Educational Status	Frequency	Percentage (%)
Senior Secondary Certificate	2	1.44
Diploma (OND)/ NCE	8	5.8
Bachelor’s Degree/HND	65	47.1
Master’s Degree and above	58	42
Others	5	3.6
Total	138	100

Source: Fieldwork, February 2025.

Table 4.5 shows the distribution of educational qualifications of respondents. The table reveals that 2 respondents representing 1.44% were holders of senior secondary certificates, 8 respondents representing 5.8% had OND/NCE certificates, 65 respondents representing 47.1% had bachelor’s degrees or HNDs, 58 respondents representing 42% had master’s degrees and above, and 5 respondents representing 3.6% had other qualifications. This shows that respondents with bachelor’s degrees or HNDs were the highest in the survey, followed by master’s degree holders and above. The least respondents had other qualifications.

4.2 Data Analysis, Interpretation and Evaluation of Findings.

This chapter contains the analysis of the result and discussion of findings. Presentation, analysis and discussion of findings were done in accordance with the objectives of study highlighted in chapter one.

Table 4. 6: Summary of sampled questionnaire

Response	Frequency	Percentage (%)
Total number of retrieved questionnaires	138	35.4
Total number of unreturned questionnaires	252	64.6
Total number of administered questionnaires	390	100

Source: Fieldwork, February 2025.

Table 4.6 shows the summary of sampled questionnaire. As highlighted in the table above, a total of 399 questionnaire were distributed, 138 questionnaires representing 35.4% were retrieved, while 252 questionnaires, representing 64.6% were not retrieved from respondents.

4.2.1 Presentation of Quantitative Data Based on Objectives.

Respondents' knowledge of the subject matter: Respondents knowledge was tested to ascertain their level of understanding and knowledge of the subject matter.

Table 4. 7: Are you aware of the concept of Integrated Database System?

Response	Frequency	Percentage (%)
Yes	134	97.1
No	4	2.9
Total	138	100

Source: Fieldwork, February 2025.

Table 4.7 shows the distribution of respondent's knowledge on the concept of integrated database system. From the table, 134 respondents which represents 97.1% are aware of the concept of integrated database system, while 4 respondents representing 2.9% are not aware of the concept of integrated database system.

The following are the data from the finding based on Objective 1.

Table 4. 8: Role of Integrated Database System in the electoral management.

Response	Frequency	Percentage (%)
It reduces vote buying, eliminates falsification of results, promotes transparency and professionalism among electoral officials, and reduces election-related violence.	30	21.7
It unifies, stores, and manages data from multiple sources; ensures seamless data management, sharing, and analysis; eliminates data redundancy, reduces errors, and improves the overall integrity and accessibility of data.	100	72.4
I don't know	8	5.8
None of the above	Nil	0
Total	138	100

Source: Fieldwork, February 2025.

Table 4.8 shows the distribution of respondents on the role of integrated database systems in electoral management. 30 respondents representing 21.7% agree that it reduces vote buying, eliminates falsification of results, promotes transparency and professionalism among electoral officials, and reduces election-related violence, while 100 respondents representing 72.4%

acknowledge that it unifies, stores, and manages data from multiple sources; ensures seamless data management, sharing, and analysis; and eliminates data redundancy, reduces errors, and improves the overall integrity and accessibility of data. 8 respondents, representing 5.8%, indicate that they do not know.

Table 4. 9: Do you agree that an integrated database system is critical in enhancing electoral management?

Response	Frequency	Percentage (%)
Strongly Agree	90	65.2
Agree	40	28.9
Undecided	5	3.6
Disagree	3	2.2
Strongly Disagree	0	0
Total	138	100

Source: Field work, February, 2025.

Table 4.9 shows 90 respondents, representing 65.2%, strongly agree that the integrated database system would enhance the electoral process, while 40 respondents, representing 28.9%, agree; furthermore, 5 respondents, representing 3.6%, were undecided, and 3 respondents, representing 2.2%, disagreed with the notion.

Table 4. 10: Main objectives of integrated database system in the electoral management

Response	Frequency	Percentage (%)
To streamline data management, data sharing, and data integrity and reduce multiple collection of data by different agencies, providing a “single source of truth” for data users.	129	93.4
To increase the complexity of data handling, data sharing among data users, and increase data redundancy.	6	4.3
I don’t know	3	2.2
None of the above	nil	nil
Total	138	100

Source: Fieldwork, February 2025.

Table 4.10 shows the distribution of respondents on the main objectives of integrated database systems in electoral management. 129 respondents representing 93.4% agree that it streamlines

data management, data sharing, and data integrity; reduces multiple collections of data by different agencies; and provides a “single source of truth” for data users. 6 respondents representing 4.3% believe that it increases the complexity of data handling, data sharing among data users and data redundancy, while 3 respondents representing 2.2% admit they do not know.

Table 4. 11: Do you agree that an Integrated Database Management System would ensure Effective Electoral Management?

Response	Frequency	Percentage (%)
Strongly Agree	85	61.5
Agree	40	28.7
Undecided	0	0
Disagree	10	7.1
Strongly Disagree	3	2.2
Total	138	100

Source: Fieldwork, February 2025.

Table 4.11 shows the distribution of respondents if they agree or disagree that an integrated database system would ensure effective electoral management. 85 respondents representing 61.5% strongly agree that an integrated database system would ensure effective electoral management, while 40 respondents representing 28.7% agreed also. Furthermore, no respondent was undecided; 10 respondents, representing 7.1%, disagreed, while 3 respondents, representing 2.2%, strongly disagreed.

The following are the data from the finding based on Objective 2.

Table 4. 12: Does the current Electoral Database Management System has the capacity to detect fraud?

Response	Frequency	Percentage (%)
Yes	60	43.2
No	43	31.4
Not sure	34	24.7
I Don't Know	1	0.74
Total	138	100

Source: fieldwork, February, 2025.

Table 4.12 shows the distribution of respondents to know whether the current electoral database management system has the capacity to detect fraud or not. 60 respondents, representing 43.2%, are of the opinion that the current electoral database management system has the capacity to detect fraud; 43 respondents, representing 31.4%, opposed it, while 34 respondents, representing 24.7%, are not sure and 1 respondent, representing 0.74%, does not know.

Table 4. 13: How best would you describe the challenges of the current electoral database system?

Response	Frequency	Percentage (%)
Data duplication, omission and redundancy; data error and lack of single source of truth.	120	86.9
Improved data management, data sharing, data consistency and integrity.	16	11.6
I don't know	2	1.44
None of the above	nil	nil
Total	138	100

Source: fieldwork, February, 2025.

Table 4.13 shows the distribution of respondents on the description of the challenges of the current electoral database system. 120 respondents representing 86.9% agree that data duplication, omission and redundancy; data error; and lack of a single source of truth are some of the challenges with the electoral database system, while 16 respondents representing 11.6% indicate that improved data management, data sharing, data consistency and integrity pose some challenges, and 2 respondents representing 1.44% indicate they do not know.

Table 4. 14: Rating of the effectiveness of current electoral database system.

Response	Frequency	Percentage (%)
Excellent	7	5.1
Good	25	18.1
Average	65	47.1
Poor	30	21.7
Very poor	11	7.9
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.14 shows the distribution of respondents on the effectiveness of the current electoral database system. 7 respondents representing 5.1% rate the effectiveness of the current electoral database system as excellent, while 25 respondents representing 18.1% agree that the system is good. Furthermore, 65 respondents representing 47.1% indicate that the effectiveness of the database system is average, 30 respondents representing 21.7% indicate it is poor and 11 respondents representing 7.9% believe it is very poor.

Table 4. 15: Do you agree if there is a need for improvement on the current electoral database management system?

Response	Frequency	Percentage (%)
Strongly agree	102	74
Agree	30	21.7
Undecided	3	2.17
Disagree	3	2.17
Strongly disagree	nil	Nil
Total	138	100

Source: Fieldwork February, 2025.

Table 4.15 shows the distribution of respondents on whether they agree there is a need for improvement in the current electoral database management system. 102 respondents representing 74% strongly agree with the notion, 30 respondents representing 21.4% agree also, while 3 respondents representing 2.17% are undecided and 3 respondents representing 2.17% disagree.

The following are the data from the finding based on Objective 3

Table 4. 16: Is there need for more technology in Nigeria’s electoral management system?

Response	Frequency	Percentage (%)
Yes	128	92.7
No	6	4.3
I don’t know	4	2.9
None of the above	nil	Nil
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.16 shows the distribution of respondents to know if there is a need for more technology in the electoral management system. 128 respondents representing 92.7% say yes to more

technology, while 6 respondents representing 4.3% say no, and 4 respondents representing 2.9% say they don't know. All the interviewees agreed that there is a need for more technology in the management of our elections.

Table 4. 17: Does the legal framework or existing policies support the implementation of integrated database system?

Response	Frequency	Percentage (%)
Yes	69	50
No	40	28.9
I don't know	29	21.1
None of the above	nil	Nil
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.17 shows the distribution of respondents' knowledge of whether the legal framework or existing policies support the implementation of an integrated database system. 69 respondents representing 50% say yes, meaning the legal framework or existing policies support it, while 40 respondents representing 28.9% say no, and 29 respondents representing 21.1% say they don't know. From the data above, the majority of the respondents agree that the current legal framework or existing policies supports the implementation of an integrated database system.

Table 4. 18: In your opinion, do you support the implementation of integrated database system in the electoral management?

Response	Frequency	Percentage (%)
Yes	135	97.8
No	0	0
I don't know	3	2.17
None of the above	0	0
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.18 shows the distribution of respondent if they support the implementation of integrated database system in the electoral management or not. 135 respondents representing 97.8% indicate that yes, they support its implementation, while no respondent indicate no, and 3 respondents representing 2.17% indicate they do not know.

Table 4. 19: Potential challenges in implementing integrated database management system.

Response	Frequency	Percentage (%)
High initial setup and maintenance cost and technical expertise, resistance to change by stakeholders, and data privacy concerns.	128	92.7
Efficient data management and data integrity	8	5.8
I don't know	3	2.1
None of the above	0	0
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.19 shows the distribution of respondents on potential challenges in implementing an integrated database management system. 128 respondents representing 92.7% identified high initial setup and maintenance costs, technical expertise, resistance to change by stakeholders and data privacy concerns as some of the major challenges of its implementation. 8 respondents representing 5.8% indicate that efficient data management and data integrity are some of the challenges, while 3 respondents representing 2.1% say they do not know, and no respondents say none of the above.

Table 4. 20: How likely are voters to trust an integrated database system in the electoral management?

Response	Frequency	Percentage (%)
Very likely	48	34.7
likely	56	40.5
Neutral	19	13.7
Unlikely	13	9.4
Very unlikely	2	1.4
Total	138	100

Source: Fieldwork, February, 2025.

Table 4.20 shows the distribution of respondents if voters are likely to trust an integrated database system in the electoral management. 48 respondents representing 34.7% indicate that voters are very likely to trust it, 56 respondents representing 40.5% indicate they like it, while 19 respondents representing 13.7% were neutral. Furthermore, 13 respondents representing

9.4% indicate it is unlikely for voters to trust an integrated database system, and 2 respondents representing 1.4% indicate very unlikely.

4.2.2 Presentation and Analysis of Qualitative Data Based on Objectives.

4.2.2.1 Demography of the Informants

This section presents the profiles of the fifteen informants selected from INEC officials, political parties, and civil society organizations and the academy for the study on integrated database systems and electoral management in Nigeria. For confidentiality, each informant is identified by a unique code rather than by name in the analysis.

Table 4. 21: Demographic Characteristic of the Informants

S/N	Informants	Category	Designation	Gender	Age	Education
1.	Informant	INEC	Admin Sec	Male	45yrs	BSc
2.	Informant	INEC	Ass. Dir.	Male	48yrs	BSc
3.	Informant	INEC	Admin Sec	Female	44yrs	HND
4.	Informant	INEC	Deputy Dir.	Male	50yrs	MSc
5.	Informant	PP	Prg. Officer	Male	29yrs	BSc
6.	Informant	PP	Sen. Prg. Officer	Male	47yrs	MSc
7.	Informant	PP	Elec. Prog. Officer	Male	45yrs	MSc
8.	Informant	PP	Member	Female	40yrs	ND
9.	Informant	PP	Deputy Chir.	Mal	35yrs	BSc
10.	Informant	PP	Party Sec.	Male	33yrs	BSc
11.	Informant	CSO	Data Analyst	Male	40yrs	HND
12.	Informant	CSO	Data Analyst	Male	39yrs	BSc
13.	Informant	CSO	ICT Officer	Female	37yrs	BSc
14.	Informant	CSO	Prg. Officer	Male	35yrs	BSc
15.	Informant	Academic	Lecturer	Male	47yrs	Ph.D

Source: Field Survey, February, 2025

Table 4.1 presents the demographic profile of the fifteen participants interviewed for the study on integrated database systems and electoral management in Nigeria. The table indicates that the group comprised twelve males and three females, with ages ranging from 30 years (1 participant), 30 to 40 years (6 participants), and 50 years (8 participants). In terms of educational qualifications, the participants held the following degrees: one Doctor of

Philosophy (Ph.D.), three Master's (M.Sc.), eight Bachelor's (B.Sc.), two Higher National Diplomas (HND), and two National Diplomas (ND). Regarding their professional roles, the interviewees included INEC officials – Administrative Secretary (2), Assistant Director (1), Deputy Director (1) – and political party representatives such as Programme Officer (1), Senior Programme Officer (1), Election Programme Officer (1), Member (1), Deputy Chairman (1), and Party Secretary (1). Additionally, representatives from civil society organisations and the academic community participated, including two data analysts, one ICT officer, one programme officer and a senior lecturer.

Objective One: Examine the role of integrated database system in the electoral management.

Theme One: Integrated database system played an important role in the electoral management of 2023 elections in Nigeria.

The integrated database system designed to contain all voters' information, through which votes cast are automatically counted and results can be generated centrally with less time, has been deployed by several countries to ease the problem of time wasted in collating and counting votes during elections. It played an important role in the 2023 general elections in Nigeria with a special focus on the FCT. The study found that INEC deployed the integrated database system to ease election management by standardizing the system for easy access.

To corroborate this finding, all interviewees agreed that integrated database systems play a vital role in the management of elections. Buttressing this point, informants I, IV, X and XI narrated thus:

Integrated database system helps to standardize the system and makes the management of election easy, it makes data access seamless and accessible.

Its advantage in terms of electoral management can never be downplayed because it plays a very pivotal role in ensuring we have a credible election.

Similarly, informants II, VIII and XIV noted that:

Integrated database system is the master stroke that drastically reduces the encumbrances associated with effective electoral management for easy access through standardization of the system.

Also, interviewee XII and XV expressed his views on the role of an integrated database system

Well the role it should ideally have is to ensure that it reduces election malpractices, data manipulation, figure misplacement and manipulation. That is if the number of registered voters in a particular polling unit is 100, then the number of accredited voter should be well recorded without any tempering of it, and at the backend when BIVAS is bringing out the report from the IReV, everything in the system should come out the way it should be, that is the number of registered minus the number of accredited voters and actual voter, there should be accurate figure and accurate time stamps, which integrated role can play, however the personals behind the system are the evil behind the process, it is a good idea, a good invention, witty invention that should be able to transform the electoral process to make it an enviable institution for other African institution to learn from.

Supporting this point, interviewee III, VI, and VII, posited that thus:

Of course, it's very critical and it is what they use in developed nations. You could be in your office and walk to the nearest polling booth and cast your vote and go back to your office, and it is well captured, it would be very difficult to manipulate, although it may be manipulated based on human factor, nevertheless, it is one of the best process to ensure a free and fair and credible election. It is the most efficient way to gather data of voters and have a credible election.

Similarly, interviewee V shed more light on it:

Data is everything, it is important for planning, mobilization. You know that when politician do campaign, it is also predicated on the voter's strength, although they are harvesting from INEC data, you see a particular area has so numbers, and then they begin to intensify their campaign, it makes planning better and planning is everything when it comes to election management. The data will allow INEC to know the number of security agents to be mobilized to a particular area because of the share size of

the voting population. The data beyond that can also help you to correct some of the social imbalance, for instance if there is no much of gender balance in terms of registrant in a particular area, you have an integrated database system that shows you there is enough number of women who are actually not on the INEC database, so it allows for INEC to begin to mobilize more women onboard, so you now using database to promote inclusion. This can also be applied to youths and persons with disabilities to control social imbalances.

It can be deduced from the analysis that there is a consensus among respondents that an integrated database system would contribute to the effective management of elections.

Objective Two: Analyze the status of electoral database management system in Nigeria.

Theme Two: The current electoral database management system in Nigeria has the capacity to detect fraud.

The study further found that the current electoral database management system in Nigeria has the capacity to detect, mitigate for the EMB to effectively address such frauds. This has help INEC to detect multiple registration, over-voting, etc. and addressed them effectively.

In tune with this finding, most of the informants II, VIII and XIV agreed that there are measures put in place to detect fraud even if they may not be sufficient enough, interviewee 1 stated thus:

There are measures put in place by the Electoral management body such as Automated Fingerprint Identification System (AFIS), Automated Biometric Identification System (ABIS) amongst other measures, however, ABIS has not been ran nationwide to effectively clean up the database, this because there is no time to do so, due to off-cycle elections and by-elections. Each state has not been run down entirely, which may require shutting down of the database. Underage voter on the list is a political problem, and rural areas do not have data where the age of electorates can be verified. Community and parents are involved in underage registration, sometimes INEC staffs can be mobbed or harmed if they refuse registration of suspected underage voter especially in rural areas.

Also, informants XII and XV also stated thus:

Yes, there are measures put in place, one of it was the unique identifier introduced (VIN), collation of biometrics, the biometric is to help you check if the person have registered before, after registration to help clean up. After each registration, INEC identifies underage voters after clean up, they streamline their search to polling unit, ward and LGA. You cannot be registered in Gwagwalada, then election day you register in Gwarimpa, AMAC. On election day, because of no movement, you cannot go to Gwarimpa and vote after voting in Gwagwalada. So, the clean-up is limited to the state, so if one registers in FCT and Abia state, it cannot fly. There people who also register in different polling units within a ward still flies sometimes due to technological failures, the system was unable to catch them after the facial, thumbprints and names check. The measures are not sufficient enough and you know the cost of technology to run an effective biometric check is very expensive especially facials and fingerprints.

Objective Three: Investigate the prospect of integrated database management system on Nigeria's electoral management.

Theme Three: Integrated database management system on Nigeria's electoral management holds great potentials for electoral credibility/ integrity in the country.

The study also found that the integrated database management system holds enormous prospects to engender credible electoral process and outcomes in Nigeria. This was corroborated almost all the informants; especially informants II, V, VIII X, XIV and XV who stated that:

Integrated database management system holds great promises to rid the system of corrupt inflation of votes, manipulation of the process and outcomes. Ambitious and corrupt politicians and conspirators within INEC will certainly find it difficult to alter the records to the advantage of such

politicians. Therefore, it will build public trust in the INEC as an EMB, and the electoral process as well as engender credible results that will be acceptable to the greater majority. It will also reduce the judicialization of the electoral process as there will be less disputes owing to the growing trust in the EMB and the entire gamut of the electoral process.

Similarly, informants III, IV, VI and XI noted that:

The current integrated database (IDMS) will in the nearest future bring about a seamless database management in Nigeria's electoral process which will in turn translate to electoral credibility improved trust in INEC's ability to effectively manage or administer elections in the country.

Theme Four: There is still room for improvement on the current electoral database management system

The study revealed that despite the identified strengths and advantages of the integrated database management system, there is still need for improvement for greater and better results. This is partly because of the dynamics of Nigeria's political terrain and the political ingenuity (notoriety rather) of the political class. To corroborate this finding, informant I, VIII, XI and XII asserts this:

Of course, yes, there is need for improvement, we need to all the time. The National Assembly has been calling for the amendment of the Electoral Act 2022, that electoral act is still ongoing and I'm very sure before the next election cycle 2027, the current Electoral Act might have undergone another, that is where the question of Integrated database system, question on IReV issue, those are the things we need to see how we can verify and how we can improve our election integrity and how independent could it be, to serve the interest of democracy and Nigerians not serving the interest of individuals, powerful individuals in the country.

Also, interviewee II, IX and XIV also buttressed this point further when he averred that:

There is a saying that goes that “the largest room in the world is the room for development,” nothing is delivered perfect, you will want to change every day, there are electoral pattern all over the world, like Turkey, US that you can seat at the comfort of your home and vote, you can go the supermarket and vote, like in Nigeria when we are voting, it’s not a working day, when we vote, work stops, it is not the best practice. If we involve a mechanism that is seamless, you can go to your office and still vote on election day, that is when the integrated database management is coming into our electoral management system, so your work place I.D card can serve the purpose of your voters’ ID card, National ID card and office ID card, so you have a single ID card that have multiple purpose, that is what integrated system is all about.

Theme Five: There is the need for the introduction of more technology in Nigeria’s electoral management system

All the interviewees agreed that there is need for more technology in the management of our elections. For instance, informants I, III, V, VII, IX, XII and XV noted that:

INEC needs to continually innovate by taking electoral technology very seriously. Thus, election results should be transmitted, collated and automatically generated in order to avoid wasting of man-hour collating, calculating and calling of results manually. It will also inject trust and boost credibility.

Theme Six: Existing legal framework or policies support the implementation of integrated database system.

Section 9(2) supports the implementation of the integrated database system by expressly stating that the Commission shall keep the register of voters in its national headquarters and other locations as the Commission may determine provided that the Commission keeps the register of voters in:

- (a) electronic format in its central database; and
- (b) manual, printed, paper-based record or hard copy format.

In support of the above, informants IV, VIII, XI and XIV opined that:

Electoral Act 2022 and INEC regulations support the implementation of integrated database management system however; it does not support outright electronic integrated database management system.

Theme Seven: The implementation of integrated database system in the electoral management should be sustained.

Additionally, all of the interviewees alluded to the fact that there is a need to implement the integrated database system. Corroborating this fact, interviewee IV, XII and XIII assert that:

Of course, yes, its implementation is supported by all well-meaning Nigerians because election issues in Nigeria is work in progress, each aspect of it is essentially important, once it is being done and managed. It is something the Nigeria government should look into to improve the integrity of the information and the electoral body.

Also, aligning with the foregoing, interviewee V and IX posit that:

The implementation of the integrated database system is going to drastically improve the management of our election and it is truly support. In fact, every well-meaning Nigerian and democrat should support it, because, when implemented, it's going to be a major game changer in our electoral system. Other countries have adopted it, we should waste no time in adopting and implementing it also. At some point in time, government was working towards something similar, so its implementation is long overdue.

Theme Eight: Implementing integrated database management system is faced by a plethora of challenges.

Supporting this finding, informant VII posits thus:

One of the biggest challenges is inter-agency collaboration. You know that if you send a budget that you want to gather data, at your own agency, it comes with budget and there are people that benefits from it, and if another agency too sends a budget that they want to gather data, there is a benefit to it also, but if we say all of these agencies stop gathering data, we only have one central agency that would be collecting data, people starts frowning because you have stopped some benefits for them. Number two is political interference, politicians are all about their own interest, that's why you see

everyone is trying to see how they would manipulate the system to his or her own advantage, and number 3 we can talk about audit of the register, without proper auditing of the register, we would just be running estimated numbers in our head, and it affects planning, also finance is another challenges, running a data is expensive maintaining a data is also expensive, you need to put in the cloud and also off-cloud, so you can have a backup.

Informants VI and XII also buttressed this point further when she averred that:

One challenge that everybody has in this country is ownership, now everybody believes that my data is my data, if NIMC starts doing this, then what happens, in fact when this whole ID for D started, that was the first, everybody was protecting their data, so government would not give us money to capture data, so everyone has their own interest, everyone believes this is their job, neglecting national interest. NIMC can't capture everything we need, or capture people into polling units, the initial problem of integrated data was ownership, with time everybody understood that ultimately security is key, so everybody said ok, they will still capture data, but they won't capture all the data, so everyone left that to NIMC. So, the major problem was ownership, everyone feels like they have a constitutional right to do so. Nobody wants anybody to take their job, there is progress now. Finance is also an issue.

Theme Nine: Voters are likely to trust an integrated database system in the electoral management.

Supporting this finding, informants II and X posit that:

The issue of trust is what we have been having over and over again, because now the elections that we are having right now is putting a lot of doubt in voters mind and then building their confidence and trust in the system, so now if you want to bring in any other thing again, they will say that now, they have started to manipulate the system again, so transparency and accountability, that is what is lacking today in our system in Nigeria and most especially when it has to do with elections which is highly sensitive commission, so anything that has to do with election in Nigeria and the world is always raising tension, because everybody wants to see how their interest

would be protected, so the issue of trust is a great deficit in our election. So yes, voters will trust it, and no they will not trust it, so I am in between.

Also, informant VIII stated that:

Once all the concerns are met, people will trust the integrated database system, and they will be able to use it for planning purpose, as a matter of fact, for me in my locality and I intend to even contest, I will have access to the people that we have, the demography, how many people are age 1, 2 , and 3, I would be able to plan, if I want to do my campaign, I would be able to know what and what would be available for them at that level, so it's something the entire country population would embrace and the stakeholders, the CSO's, NGO's international partners, development partners, international community, it's something that is been used over the world, United States, South Africa, UK have such platforms, just name it, they have been using such integrated database system for so many things over the years.

4.2.3 Discussion of Major Findings

4.2.3.1 Discussion of Quantitative Findings by Objectives

The study found that the majority of the respondents (97.1%) are aware of the concept of an integrated database system as a potent instrument for an effective election management system for electoral credibility. On the effect of the integrated database management system on electoral administration, the study found that it mainly unifies, stores, and manages data from multiple sources; ensures seamless data management, sharing, and analysis; eliminates data redundancy; reduces errors; and improves the overall integrity and accessibility of data. This is true considering the fact that 72.4 per cent of the respondents agreed to these functions of the integrated database management system. The finding also shows that it reduces vote buying, eliminates falsification of results, promotes transparency and professionalism among electoral officials, and reduces election-related violence. However, some of these advantages seem untrue considering the fact that only 21.7 per cent of the respondents agreed to that. While

it is expected to promote transparency and professionalism among electoral officials, it may not lead to reducing election-related violence, vote buying and eliminating falsification of results. This is because these infractions or malpractices are unconnected with integrated database management systems.

On the main objectives of an integrated database system in electoral management, the study reveals that it mainly seeks to streamline data management, data sharing, and data integrity; reduce multiple collections of data by different agencies; and provide a “single source of truth” for data users. With 93.4 per cent of the respondents agreeing to the above, it is unlikely that the objective of an integrated database system is to increase the complexity of data handling, data sharing among data users and data redundancy. The primary aim of an integrated database system is to ease up data management by making it easily accessible in an atmosphere devoid of complexities. The study further revealed that an integrated database system would guarantee effective electoral management. 90.2 per cent of the respondents agreed that an integrated database system would ensure effective electoral management. This is because the effective voter register/database is pivotal to effective management of elections. Thus, it can be inferred from the analysis that there is a consensus among respondents that an integrated database system would contribute to the effective management of elections in Nigeria.

On whether the current electoral database management system has the capacity to detect fraud or not, 43.2% of the respondents were of the opinion that the current electoral database management system has the capacity to detect fraud, while 31.4% opposed it, leaving 24.7% undecided and 0.74% who do not know. This means that although an integrated database system holds great prospects for effective election management in Nigeria, its prospects to detect fraud may be circumvented by ambitious and desperate politicians to their own advantage.

This study further revealed that data duplication, omission and redundancy; data error; and lack of a single source of truth are some of the challenges with the electoral database system in Nigeria. Other identified challenges to the implementation of an integrated database system include high initial setup and maintenance costs; technical expertise; resistance to change by stakeholders and data privacy concerns as some of the major challenges of its implementation. Given the issue of a data crisis emanating from data duplication by several public agencies is a huge factor in ensuring an integrated database system. With agencies such as the National Identity Management Commission (NIMC) – National Identity Number (NIN), INEC, Central Bank of Nigeria (BVN) and Immigration Service (international passport). On the effectiveness of the current electoral database system, the study rated the current integrated database system as average in terms of effectiveness in driving the electoral system. It further indicated the need for improvement on the current electoral database management system to align it with the prevailing realities and the dynamics of the political system. The study also revealed there is a need for the introduction of more technology in the electoral management system to meet political dynamisms.

According to quantitative data, existing legal policies support the implementation of an integrated database system. With 50% of the respondents answering in the affirmative. Relevant sections of the Electoral Act 2022 and INEC regulations empower INEC to maintain a comprehensive voters' register in electronic form and otherwise at its national headquarters and across its offices in the states.

Findings further show that Nigerians are likely to trust an integrated database system in electoral management. Public trust in the electoral system comes with the credibility of the process and outcomes. Thus, if the integrated database system fails to engender credible elections, the electorate are most likely to lose trust in the entire system.

4.2.3.2 Discussion of Qualitative Findings by Objectives

Objective One

The integrated database system designed to contain all voters' information, through which votes cast are automatically counted and results can be generated centrally with less time, has been deployed by several countries to ease the problem of time wasted in collating and counting votes during elections. It played an important role in the 2019 and 2023 general elections in Nigeria with a special focus on the FCT. The study found that INEC deployed the integrated database system to ease election management by standardizing the system for easy access. This is supported by (Shittu, 2020 & Arulogun, 2023), who noted the role played by technology in electoral administration. While underscoring the important role played by integrated database systems in the 2023 General Elections, Arulogun(2023) noted that:

The adoption of digital technology had a profound impact on 2023 general elections in Nigeria. First, the Independent National Electoral Commission's Continuous Voters Registration initiative was able to identify approximately 2.7 million double registrations using technology in voters' registration and also simplifying the voters' registration procedure with the use of biometrics and digital data, easing the process for eligible prospective voters to register and to vote (p.42).

The introduction of BiVAS for easy voter data authentication and accreditation, snapping and transmission of election results to IReV featured prominently in the elections. The system standardized voters' database and made the management of election easy by making data access seamless and accessible. It also reduced electoral malpractices as it does not allow for

Objective Two: Analyze the Status of Electoral Database Management System in Nigeria.

Section 9(2) supports the implementation of the integrated database system by expressly stating that the Commission shall keep the register of voters in its national headquarters and other locations as the Commission may determine provided that the Commission keeps the register of voters in:

(a) electronic format in its central database; and

(b) manual, printed, paper-based record or hard copy format.

In support of the above, informants IV, VIII, XI and XIV opined that:

Electoral Act 2022 and INEC regulations support the implementation of integrated database management system however; it does not support outright electronic integrated database management system.

This means that the current integrated database system allows for both electronic and manual databases of voters. However, the electronic database system comes into play during elections for the authentication/accreditation of voters during elections, while the manual register is pasted on the wall for voters to confirm their names and numbers prior to accreditation and voting.

The study further found that the current electoral database management system in Nigeria has the capacity to detect and mitigate fraud and helps the EMB to effectively address such frauds. This has helped INEC to detect multiple registrations, over-voting, etc., and addressed them effectively. Qualitative data shows that INEC put in place measures to mitigate fraud. These include the unique identifier introduced (VIN) and the collation of biometrics. The biometric helps to check double or multiple registrations in order to help clean up.

Objective Three: Investigate the Prospect of Integrated Database Management System on Nigeria's Electoral Management.

The study also found that the integrated database management system holds enormous prospects to engender credible electoral processes and outcomes in Nigeria. Ogbadebo (2025) noted that integrated database systems and BVAS have contributed enormously to transparency and fraud reduction in Nigeria's elections. Similarly, Angaye, Clark and Ikenga (2024) observed that BVAS, which is an integral part of the integrated database system, has significantly improved the transparency and integrity of the election by curbing electoral malpractice, such as multiple voting and ballot stuffing. An integrated database management system holds great promise to rid the system of corrupt inflation of votes and manipulation of

the process and outcomes. Ambitious and corrupt politicians and conspirators within INEC will certainly find it difficult to alter the records to the advantage of such politicians. Therefore, it will build public trust in the INEC as an EMB and the electoral process as well as engender credible results that will be acceptable to the greater majority. It will also reduce the judicialization of the electoral process, as there will be fewer disputes owing to the growing trust in the EMB and the entire gamut of the electoral process.

The study indicates that despite the identified strengths and advantages of the integrated database management system, there is still a need for improvement for greater and better results. This is partly because of the dynamics of Nigeria's political terrain and the political ingenuity (notoriety rather) of the political class. According to Ikenga (2024), there is still room for improvement to adequately address challenges such as inadequate infrastructure, insufficient training of electoral officials, and limited public awareness about BVAS and integrated database systems generally. Thus, INEC needs to continually innovate by taking electoral technology very seriously. Election results should be transmitted, collated and automatically generated in order to avoid wasting man-hours collating, calculating and calling results manually. It will also inject trust and boost credibility.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

This chapter includes the summary, recommendations based on the findings of the research and conclusion.

5.1 Summary of Findings

The study examines the role of an integrated database system in electoral management. It acknowledges the role technology plays in the management of elections. Respondents and interviewees agreed that an integrated database system would be beneficial in our electoral system, as it would help streamline data management and sharing, enhance data integrity, reduce multiple collections of data by different agencies, determine the actual number of voters on the register, and provide a single source of truth for data users where data can be verified.

The study reveals that there has been significant progress made in improving the database system of the electoral management body, the system has undergone a series of changes from operating a manual voter register, which was seen as dirty and lacking in credibility to a more advanced Electronic Voter Register, where biometrics such as facials and fingerprints of electorates are captured to serve as a means of identification and accreditation of voters before voting. Also, the introduction of AFIS ABIS has reduced the incidence of double and multiple registrations and underage voters has yielded significant progress. However, most of the respondents and interviewees suggest that there is room for improvement in the current system, acknowledging that the current database system has some issues such as poor network, data error, and omission, data duplication, dead persons still visible on the voter list, the inability of the BiVAS to capture biometrics of voters during accreditation and lack of consolidation of data. The study further revealed that an Integrated Database system would not only address most of the challenges identified but would also enhance the effectiveness and credibility of our electoral management system.

Furthermore, the study reveals that some of the prospects of an integrated system are that it will ensure the seamless operation of our elections, ensure the integrity of the election management system, enhance the effectiveness of the database system, ensure better planning for the election management body, mobilize under-represented group into the database system, using data as a tool to promote inclusion. The Electoral Act 2022 needs to be reviewed or amended, as the case may be, to provide the necessary legislative framework for the integration of the database system. There is also a need for inter-agency collaboration among data-collecting organizations rather than a rivalry for the integration of databases to come to fruition. Agencies such as NIMC, INEC, National Population Commission (NPC), Nigeria Immigration Service (NIS), Federal Road Safety Corp (FRSC), and others must together to ensure that we have a database that is clean, reliable, credible, and accessible by data-using agency especially INEC which will help to improve the integrity and credibility of our elections.

5.2 Recommendations

Given the findings of this study, the following recommendations are made in line with the objectives of the research:

For objective 1: the following recommendation is made:

The federal government should unbundle INEC to establish an independent body to develop, manage and operate the integrated database of citizens with the necessary legal backing. This should be done through an executive bill from the President or executive member, or through the legislators. This bill should be passed and enacted as law before the 2027 general elections. This agency or body must be granted full protection and immunity and shielded from the influence of the executive and other interested parties to ensure its total neutrality and objectivity in carrying out its mandate. There should also be a means of appointing individuals to head the organization, where the appointees are not answerable to the president.

For objective 2: the following recommendation is made:

There is need for more inter-agency collaboration and synergy among data collecting agencies to ensure the smooth implementation of an integrated system. Relevant legislature establishing these agencies should be amended to mandate them to share data with the established agency. Also, due to the importance of the task of integrating data, the government should ensure adequate funding for the agency. Such an agency should be given the ‘first line charge’ in order to enhance efficiency and productivity.

For objective 3: the following recommendation is made:

There is a need for proper training and re-training of agencies involved in data collection on modern technological infrastructure such as cloud infrastructure, cyber-security, and firewall protection to avoid any possible breach in data. INEC in collaboration with the legislative arm of government and other critical stakeholders must work together to design and develop a clear-cut legal framework for the implementation of the Integration of the database system in Nigeria.

5.3 Conclusion

The study analyzed the role of an integrated database system in the electoral management. It also analyzed the status of the electoral database system and the prospects of an integrated database system in electoral management. Indeed, there have been appreciable improvements in our electoral database system and the management of our electoral process. However, there is still room for improvement. The study found that the introduction of technologies such as BiVAS, IReV, ABIS, AFIS, PVC, and EVR has contributed significantly to improving the integrity and credibility of our electoral process, there are still visible challenges such as missing names on the register, poor network, lack of adequate training of electoral officials, poor infrastructure, among others, which has raised questions about the credibility of our electoral process.

Since elections are a critical component of our democracy, the importance of free, fair, and credible elections cannot be overstated. Elections cannot be deemed free and fair if the electoral database of the election management body presents challenges that cast doubt on the integrity of the electoral process. Despite these challenges, there is a strong prospect that an integrated database system would enhance the effectiveness of the database, improve the credibility of our electoral process, prevent fraud, reduce election costs, minimize election litigation, and enrich the management of our elections.

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